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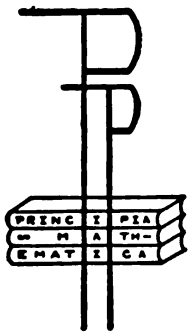
PRINCIPLES OF PSYCHOLOGY

BY J. R. KANTOR
PROFESSOR OF PSYCHOLOGY, INDIANA UNIVERSITY

VOLUME I



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PREFACE

Periodically it becomes necessary for the scientist to pause in his investigations and resurvey his intellectual domain. By way of orientation he must take account of the ends achieved and mark out the newer trends of development. All the more is such a reorientation necessary when we consider that the results of such a survey are the indispensable foundations for all further and future scientific effort. Decidedly, it is such results that provide a basis for criticism of materials and methods, without which no science can be sure of its present ground or future development.

Especially necessary is such a cyclic resurvey in the science of psychology. And why? Because the workers in this youthful and growing science have not yet become thoroughly satisfied as to what constitutes even the data of psychology, or the methods by which they shall be investigated. Certainly psychologists have not been able to agree upon these points. Still more necessary are investigations into the fundamentals of psychology because it is the belief of many that we have not yet completely stilled the doubt as to whether psychology is a science at all. Such doubt unmistakably prevails in spite of the fact that psychologists have for nearly three quarters of a century (since Weber and Fechner) seriously and earnestly striven to make their discipline into a natural science. But not even the introduction into psychology of mathematical and laboratory methods could provide that discipline with a definite scientific status as long as psychologists still conceived of their data in animatistic terms.

But is psychology a science? Without hesitation we reply that it is. At any rate we believe we can see the possibility of psychology for the first time entering upon such a career. Here we may record a distinct advance even from the standpoint of our immediate psychological predecessors. For we may now confidently hope to depart from the animatistic conceptions which for centuries have been the chief stumbling blocks in the path of psychology's entrance to the realm of natural science.

Now what are these animatistic conceptions? To mention only three of the many forms, animatism stands first for the view that psychology deals with contents (mental states) which do not have properties shared by other natural phenomena and which in consequence have to be observed by specialized methods. Secondly, it means that psychology deals with processes that are not susceptible of observation at all but which are known through manifesta-

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tions. And finally it makes psychology deal with organisms having within them inner driving forces to make them do what they do. Not because these animatistic conceptions have entirely disappeared, do we say that psychology is a natural science, but rather because signs are multiplying that psychologists are beginning to realize that they must eschew such entities and must deliberately occupy themselves only with the interactions of actually existing things.

Howsoever obsolete and harmful we realize animatistic conceptions to be, yet curiously enough, we observe that psychologists still attempt by various heroic methods to transform such principles into the materials of a natural science. This transformation they endeavor to achieve by connecting psychical states and forces (awareness, consciousness, the mind, etc.,) with the anatomical and physiological whole or a part of the body, and especially with the nervous system and its activities.

Supreme among these celebrated methods is the endowment of the nervous system with powers and activities that it does not and cannot have. Thereupon through the manipulation of these imaginary, neural functions psychologists perhaps unwittingly assumed that the existence of mentalities (native capacities, mental images, instincts, etc.,) is guaranteed, or at least that such mentalities exist in their manifestations. It is through such invented neural functions that psychic essences and animatistic potencies achieve their diuturnity as malefic influences in psychology. Another phase of the same method of maintaining animatistic states of consciousness in psychology is indulging in such a verbal preoccupation with non-existent neural facts that the illusion is created that one is rigorously concerned with natural phenomena, whereas in reality one is merely reading into the actual neural functions capacities not discoverable in a scientific study of them.

With clearest vision must we discern, however, that psychology cannot hope to be a member of the family of natural sciences as long as it makes its data consist of such artificialities as a mind in some form which parallels neural functions or a body, or what is perhaps much worse, when it makes its data consist of a mind that is a body. No matter how we conceive such minds or bodies, they can never be assumed to be the actually observable facts that science demands as an earnest of solid achievement.

But if we are to avoid the Scylla of animatistic mentalities must we then brave the dangers of a physiological Charybdis? Must we take as our data muscular movements and glandular secretions, or any or all of the large number of combinations of such factors? Most emphatically not. We must heartily reject all so-called behaviorisms along with mentalisms of every variety. In no sense can we accept any of the views which consider the data of psychology to be neuro-muscular or neuro-musculo-glandular re-

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sponses. Two vital objections may be recorded against such views.

In the first place, if the writers who hold such doctrines really abide by them they inevitably face the consequences of neglecting the description of most of the actual content not only of human but of animal psychology. And in the second place, such views, just as inevitably as the animatistic doctrines, lead to the acceptance of psychic powers and moreover an acceptance in a more subtle and more detrimental form than in the out and out mentalistic view. As a record of fact, many peculiar and most potent powers have been ascribed to the neural and glandular processes and functions. It will suffice to mention only the ultimate desires and cravings which are made the moving forces of all psychological phenomena. Animatisms in the sense of unobservable powers and forces we therefore see can be connected with body functions or biological phenomena as well as with so-called mental processes. Physiological psychologies of this type may count as the least of their demerits that they overlook the fact that genuine psychological data consist of nothing less than the actual and complete conduct of human and infrahuman organisms, as we actually know and study them, in their responses to other animals and things constituting their stimuli. Neither in connecting animatistic mentalities with a body or nervous system, nor in making psychology consist of the exclusive study of the body or nervous system, can this discipline be brought into the domain of the natural sciences.

Our objective reveals itself. In this treatise our aim is to study psychological phenomena as actual, observable events consisting of the responses of psychological organisms (human and infrahuman animals) on the one hand, and the stimulus objects or conditions which interact with them on the other. On the whole, of course, our primary interest must be in the conduct of such organisms. No less, however, must we emphasize the stimuli objects or situations, since they are the primary causal conditions of such actions and consequently equally essential phases of the data of psychological science.

Not only does the presence of stimuli objects condition the operation of a response at any particular moment, but it is through previous contacts of the person with such stimuli that he has acquired the reactions which now operate. How significant is the study of stimuli conditions would appear even if it incurred but the one result of preventing us from attempting to make a phase of the reaction, such as the neural mechanism, for example, the cause of the whole action. To be valid all of our analyses must necessarily attempt a description of any psychological fact in terms of the complete action details of such responses and of the qualities of the stimuli. By including stimuli conditions in our description we accomplish even more than this. Namely, the

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study of stimuli factors provides us with materials for understanding psychological phenomena in terms of correlated conditioning factors. At the same time the necessity is precluded of finding in an acting thing the causes of its own behavior. Is it an illegitimate assumption to make, that by thus rejecting self-determining principles of action in favor of interacting organisms and stimuli, psychology repeats the process which Gallileo initiated for mechanics when it retreated from the hypothetical Aristotelian causes to go toward the principle of relative positions and motions of bodies?

It is in this sense, then, that psychology must become a natural science. Only by avoiding meticulously all powers or functions, whether considered as psychic or biological, which do not represent actual observable phenomena or interpretations derived from such observations, can we erect our science upon a firm foundation. Are there any other actually observable facts than the mutual interactions of psychological organisms and the stimuli which elicit their reactions?

Furthermore, to adhere to observable facts means to get rid of all illicit abstractions whether presumed to represent facts or principles. Accordingly, such a science cannot but declare its independence from such ultimate principles as the infamous vitalistic or mechanistic theories. For the terms just used represent abstractions which have no actual basis in observations. Not only must we submit that the facts of every science must be handled without recourse to interpretations that transcend any actual descriptive procedure, but also that psychology is rapidly reaching the stage at which it can study and describe its phenomena without such factless interpretations.

Turning to another type of abstractions but on a factual plane, we may point out that contrary to the psychological tradition of many centuries' standing, we cannot reduce psychological phenomena to the three conventional types, namely, knowing, feeling, and willing. Howsoever useful such a classification may have been when psychology was professedly concerned with "psychic phenomena" the extended use of such a classification today means inevitably to prejudice the study of specific psychological responses. Certainly there are distinct forms of behavior which may be called knowing, feeling, and willing activity, but to carry the differentiation so far as to declare that there are only three types of psychological facts is not only to neglect some of our most important activities (e. g., desiring and creating) but also to do such violence to our phenomena as completely to misrepresent them.

Thus assuming that as a natural science the data of psychology can only be the concrete interactions of organisms and the things to which they respond, we accept the fundamental methodological

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principle of describing only the intimate details of responses with the corresponding minutiæ of stimulation. For example, being interested primarily in human conduct we are therefore required to investigate the actions of human individuals as distinct humanistic occurrences of very particular types. In effect this means that we must take account of the numerous human conditions and institutions which give rise to psychological phenomena and which condition their occurrence. Only by taking into consideration the intimate nuances and refinements of human interactions with things and persons can we hope to describe adequately human behavior and avoid worthless artifacts. We deem it to be the essence of valid scientific method thus to study any given fact as it actually transpires and not to reduce it to something else, not even to a simplified part of itself.

Naturally, when we study our facts in this way we discover that human behavior is very different from the activities of the infrahuman animals. We do not mean to imply, of course, that human conduct in some of its types (reflexes for example) is not very like, though not identical with, infrahuman animal behavior. But surely this is not to deny that human behavior has distinct characteristics not shared by the activities of the infrahuman animals. As students of human psychology we must be capable of studying complex conduct in addition to the simplest behavior (sensory discrimination, motor reflexes, etc.) which can be described in biological terms. Is it not the attempt to biologize human phenomena which has resulted in handing over to novelists and psychopathologists the sole guardianship of the problems of human behavior and human personality? By studying human reactions as they occur we may not only hope to take psychology away from the contaminating influence of animatistic philosophy, but to save it likewise from the distorting aura of an artificially simplifying biology.

As the title page of this work is intended to imply we cannot hope to describe human conduct in any adequate manner, in a general treatise. We cannot do more than offer general principles of such phenomena, generalized descriptions that are suggestive of the essential specific details of the responses studied. A more adequate study of psychological phenomena can be achieved only in extended monograph form and a completely, exhaustive description perhaps not at all.[1] That we are forced to confine ourselves to such generalized descriptions is itself a significant point. For we are thereby led to see that it is this necessity to study essential details of performance in psychological investigation which marks the differences between the coördinate psychological and non-psychological branches of the natural sciences,

[1] Some slight compensatory relief we believe we have obtained by cross-descriptive repetitions in various chapters.

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and not some ultimate differences in type of fact. The non-psychological sciences (physics for example) dealing as they do with comparatively simple phenomena, find it expedient to abstract as much as possible from qualitative, descriptive features in order to arrive at abstract, quantitative statements. Not so in the domain of psychology, however. Here the intimate qualitative happenings are too important to neglect.

Because as principles of human psychology we can only have generalized descriptions of behavior, it is desirable to provide as copious a series of illustrations of the principles offered as possible. Thus our work includes studies of volitional as well as voluntary action, and knowing behavior as well as thinking. Also we offer fairly complete expositions of language responses, intellectual, cultural, and desire reactions, which are ordinarily only briefly mentioned in psychological books, along with the more conventional topics usually constituting the main content of psychological treatises.

As can only be expected, such an enterprise as we have essayed could not avoid many terminological problems. To a certain extent it has been possible to employ the same terminology for reactions as in the older literature although there the names used meant entirely different things. To some degree, however, these names may be referred to actual facts without prejudice of interpretation. In such cases the old terms have been used with different signification. But in many cases, entirely new terms have been necessary, and here the resistance of the conventions of linguistic pedantry not to coin new words, had to be overcome in order both to give enlarged reference to previous descriptions and to develop terms to achieve new descriptions of psychological facts. Among the terms more recently developed and employed to describe psychological facts the writer desires to call attention to the actual significance carried by the words stimulus, response, and reaction or response pattern. The careful observance of how these terms are used in the present work will aid materially in keeping the viewpoint of this book clearly differentiated from some others bearing a superficial resemblance to it.

Departing as the writer has in most instances from traditional descriptions of psychological phenomena, he has considered it advisable to add as part of the material of this work chapter appendices under the rubric of "Perspectival and Bibliographical Notes." These notes are intended to serve the purpose of connecting up the exposition with the more outstanding traditional treatments of the phenomena described. They are not intended to be historical résumés of the various topics discussed.

Although the original plan of this work was conceived some six years ago the development of its content proceeded so slowly that the writer has yielded to the expedient of publishing in some cases

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parts, and in others, whole chapters in the various psychological journals (and especially the *Psychological Review*, the *American Journal of Psychology*, *Journal of Comparative Psychology*, and the *Journal of Philosophy*). The writer takes this opportunity of offering his formal thanks to the editors of these and other journals for their kind permission to incorporate this material in the present work.

March 1924. J. R. K.

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CHAPTER I

THE DOMAIN, METHOD, AND DEVELOPMENT OF PSYCHOLOGY

The domain of psychology comprises the phenomena which we may call conscious or psychological reactions. By psychological reactions we mean the responses which psychological organisms, such as human individuals and higher types of animals, perform when they adjust themselves to the various stimulating objects surrounding them. Naturally the scientist who investigates the data belonging to the psychological field arrives at a distinct set of laws and principles which vary in detail from the laws and principles of the other sciences.

Psychology is a natural science. The psychologist not only studies by direct observation the phenomena (reactions) in which he is interested, but he also verifies the correctness of his observations by suitable methods. Furthermore, upon achieving such verifications he interprets the reactions he has studied. The results achieved by such investigation are: (1) an understanding of an exceedingly important kind of natural phenomena, and (2) a measure of control over such phenomena; so that whenever possible they can be modified and adapted to various needs.

The importance of emphasizing the fact that psychology is a natural science lies in the prevalence of the opinion that phenomena are the subject matter of natural science only when they can be reduced to symbolic terms such as mathematical equations. It is further believed that in order to be scientific, phenomena must be analyzable and reducible to absolute, simple elements of some sort.[1] Clear it is, however, that biological and human phenomena such as compose the facts of psychology do not lend themselves to mathematical treatment in any thoroughgoing way, nor to the process of reduction to ultimate units different from the observable facts. On the contrary, the facts in the domain of psychology must be described as they actually occur with all possible fullness of living detail. In the case of a forgetting situation, for example, we must point out just what it is that the person has formerly learned and which now he has forgotten, as well as the

[1] This is one version of the methodological view that the subject matter of science is conceptual in character.

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detailed attendant circumstances at the learning and forgetting periods. For it is such attendant features of the action which are the causes and occasions of the forgetting and in terms of which the action must be described and explained. After such description has been accomplished, however, the psychologist in common with other scientists, is able to profit greatly from a statistical organization of his data, provided of course, that exactly corresponding facts are of frequent occurrence.[1]

But whence comes this notion that scientific facts must be reducible to absolute, simple units of some sort capable of rigid mathematical treatment? Was it not from physics and chemistry which admittedly are the most firmly established of the whole scientific family? Precisely so, and because this is true we must carefully scrutinize the situation here. It is just because the facts of physics and chemistry are considered so unimportant in detail that their data can be reduced to absolute units. Thus the attempt is made in "physical" science to deal with nothing but quantitative materials.

But even in the physical sciences this absolute quantification cannot be tolerated. In the first place, organic and physiological chemistry resist such treatment. On the other hand, what the physical scientist does when he reduces his data to quantitative terms is to throw his qualitative content over to the psychologist, demanding that he take care of it. Thus, colors, sounds, tastes, smells, etc., are put into psychological hands, while the physicists want to retain only molecular and radiational motions or energies. A critical insight into the situation in physics indicates that even the simple descriptive differences in mechanical motions are obtained by averaging or other statistical methods in order to get absolute mathematical results. This is done to get a unit of study or interpretation, and of course such a procedure is an essential feature of all scientific or exact work. But we must not overlook here the fact that absolute, single observations are not available, either because of actual variability in the unit events or data, or because of observational conditions. Psychology also must have its unit of observation and description. Simply because psychology cannot take as its unit anything less full of content than the actual response of a person to a stimulus object, it does not

[1] The role of mathematics in science is frequently most hopelessly misunderstood. Mathematics does not constitute machinery for making facts; you can get no more out of an equation than you put into it. In general, mathematics constitutes a valuable instrument in science, whenever it is applicable for the purposes of handling data, for showing relations and implications. Even where mathematics is applicable it must be employed with caution, for it is not unknown in psychological circles that numbers in the form of test scores and correlations have been confused with the things or processes for which the mathematical elements are really only the symbols.

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follow that any aspersion can be cast upon its scientific character.[1]

Psychological Behavior Compared with Physical and Biological Behavior

Further to elucidate the domain and character of psychology let us contrast it with other scientific fields. All sciences deal in one way or another with things or beings and the manner in which they act. Thus physics studies physical things (levers, dynamos, etc.), their movements and changes, while biology devotes itself to the investigation of the nature of living organisms (plants, and animals) and their activities. Moreover, the physical and biological sciences divide themselves into branches which emphasize either the thing itself, its structure, organization and growth, or the behavior of the thing. In the case of the physical sciences it happens, however, that objects (molecules, atoms, electrons) are conceptually reduced in the last analysis to motion or energy, that is, activity. In the biological domain the object or organism is kept fairly distinct from the activity, and so biology has a morphological or structural branch, and a physiological division.

Psychology proper is entirely a science of activity. But because psychological activity is always the action of an organism or a person this science must have its closely associated sciences which deal with structures. So far as the interest of the psychologist extends toward the structural organization of the organism or, person, an interest that is almost constant and frequently imperative, it may be asserted that psychology is a branch of biology.

Another type of structure just as imperious a claimant of the interest of the psychologist is of course the organization of the activities themselves. For example, all the person's complex reactions are not only the acts of biological organisms but also of specific anthropological individuals. The Chinese speaker is entirely different from an English speaker. In this sense, psychology is also a branch of anthropology. But this fact of structure is significant only for complex human activities and even here the structures are reducible to actions.

Psychology, then, is concerned primarily with reactions or behavior and the independence of psychology as a science depends in part upon keeping the reactions distinct from the biologlcal organism that performs them. Briefly, psychological organisms, as differentiated from biological organisms, may be considered as a sum of reactions plus their various integrations.

As we have indicated, the type of action which psychology studies differs markedly from the actions investigated in other domains of science. In order to throw the psychological reactions into clear relief and to understand them better, it is well to compare them in detail with the activities which the other sciences

[1] It is only accidentally and through various subterfuges, therefore, that the physical sciences are more rigid than biology or psychology. However it is to be observed that in particular details the two latter sciences can both be absolutely rigid and mathematical.

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study. We may divide all sciences into three distinct fields based upon outstanding differences in the activity of the objects studied. These three fields are (1) physical behavior, (2) biological behavior, and (3) psychological behavior. It will be helpful to study these different forms of activity in the sequence given, since they are arranged in the order of their complexity.[1]

Physical Behavior

Physical objects (mechanical) are characterized by the property of *inertia*. This means in effect that they do not act unless some other object operates directly and immediately upon them. In order to make a physical object change its position of rest, direction or rate of motion, some other object must impinge upon it. Moreover, the action which occurs is absolutely equal to the energy expended by the other object. Thus, in any action of one body upon another the momentum gained by one body is absolutely equal to that lost by the other. From these facts it follows that the actions of physical bodies are definitely predictable and constant. All the actions of physical bodies may therefore be expressed in mathematical equations. From the standpoint of the acting object we may say that the physical body does not store up actions which can be made to operate by some stimulus, but that each motion must be directly influenced and controlled by some other object.

Biological Behavior

Sharply contrasted with the action of physical bodies is the behavior of living or biological things. Living things are essentially complex organizations of substances (cells, organs) which constantly renew themselves (metabolism). To their own organismal units they add materials which they transform into component parts and thus replace the unstable substances which are constantly breaking down. Thus, the living being is indefinitely more active than a physical object,[2] and so prolonged is its activity that we may say it is storing up and releasing energy more independently than is ever the case in a physical object. This latter characteristic of an organic being is called *irritability*. When we observe the larger actions of the biological organism in its adaptations to its surroundings, such as the securing of food and disposing of it, we may say that it definitely responds to its stimuli. In other words, the mode of behavior of a living organism at any given time is entirely out of proportion to the stimulation of it by some other object. As a result of this sensitivity the organic individual develops certain definite organized and complex actions to particular conditions surrounding it and also to the processes going on within itself. These acts are

[1] Order and complexity, that is, on a hypothetical, one-dimensional scale. The writer is assuming that typical and equivalent cases are compared and that the present stage of knowledge is taken into consideration.

[2] We might say that it has forces working upon it from both the inside and outside of the unit thing under observation.

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called *tropisms* or *taxes*, and since they are constant modes of adaptation to particular stimulating conditions they are subject to comparatively accurate prediction. Because tropismic and taxic activities are not entirely proportional to the forces which call them into action they cannot, however, be expressed in definite mathematical equations.

Psychological Behavior

From the standpoint of action the biological scale progresses upwards to the psychological level. When we reach the higher organisms and man, the behavior of these individuals are markedly independent of the object and conditions to which they adapt themselves.[1] The behavior of the psychological organism consists of complex acts which are responses developed in contact with surrounding things. At this level of action the organism is highly spontaneous. Its reactions are peculiarly adapted to meet the needs of the surroundings, and thus are not only adaptive but developmental as well. An especially important factor in the independence of psychological reactions is the fact that in some cases, after the organism has once acquired a reaction system to a stimulus object it can be aroused to function with respect to the correlated stimulus by means of one of several conditions. Thus when I agree to do something to an object (mail a letter) I may be reminded of it by a number of things (mail box, mail wagon, mail carrier, etc.).

Special Characteristics of Psychological Activities

Psychological activities differ from the other two types of phenomena which have been discussed in the possession of special characteristics, each of which involves a different relation or interaction of the stimulus and response factors of an act. At least six of such characteristics we can enumerate in the following table.

1. Variability of Reaction.
2. Differentiation of Reaction.
3. Modifiability of Reaction.
4. Integration of Reactions.
5. Delay of Reaction.
6. Inhibition of Reaction.

These characteristics we will now discuss in order.

Variability of Reaction

Psychological behavior is highly fitting. Depending as it does upon the stimulating conditions it is characterized by a decided immediacy and directness with respect to the stimuli. When the psychological organism comes into range of stimulation of an object the relation or interaction between the

[1] This is another way of referring to the transcendence of equivalent forces. Further this statement expresses the development away from the equivalent action and reaction of two similar objects to the situation in which one object is a highly organized affair and the other may be from the same standpoint a very inferior affair, namely, a passive condition or circumstance. When we observe that every reaction must have a stimulus, the statement of independence is of course a strictly technical expression.

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two continues to a definite conclusion, frequently with a great variety of movements upon the part of the organism until one of several things happens. Either the organism (a) changes its relation with respect to the stimulus, (b) produces some effect upon it, or (c) the stimulus object disappears, or becomes invisible, or (d) the animal is fatigued or exhausted. The number and intensity of these variations are determined of course by the specific details of the situation.

This variability naturally makes for an increased efficiency on the part of the organism in adjusting itself to its surroundings. In the simpler cases such variability of action displays a picture of directed activity, lengthily persisted in, as in the example of a hungry animal placed in a cage in sight of food which is outside the cage. The animal attempts to squeeze through the bars, meanwhile moving rapidly about in the enclosure, biting, pulling, clawing, and shaking this and that part of the cage, throwing itself against other parts, in a mad effort to accomplish what sometimes can, but no less frequently cannot be done. In the more complex cases the organism develops the capacity of actually responding to a goal or end through a deliberate variation of means. The fundamental mechanism here is the fact that a psychological stimulus always involves a large complex behavior situation, even if it is what we ordinarily call a single object. Consequently the organism can vary its responses by directing its activity to alternate or serial phases of the total object or situation. In other cases stimuli objects are such that something in particular must be done to them and so a large amount of varied conduct may be necessary to carry out this action.

Differentiation of Reaction

At the basis of variability of behavior (as well as some other characteristics of psychological action) is the process of differential reaction. The organism is able to discriminate between the different objects constituting its stimulating surroundings, or between different auspices or settings under which the stimuli objects are presented. By thus discriminating it offers different responses to different objects and to the same objects in different settings. In a general sense, we may say that different specific things, persons, or objects produce different effects upon the organism, which in turn exhibits a differential sensitivity toward those objects. In this way objects take on particular stimulative functions. This differential sensitivity is well illustrated by the common fact that an organism responds differently to similar objects which display one or more different features. Red balls are reacted to differently than are green ones. Sweet things call out different responses than do sour or bitter. Not only are differential reactions correlated with different objects but also with the different qualities of those objects, such as their colors, tastes, odors, textures, hardnesses, etc.

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Modifiability of Reaction

When once an object produces some effect upon an organism, this effect persists and frequently results in a change in the later response to the same object. In a sense, then, we may think of the characteristic of modifiability as a discrimination of stimuli with direct reference to previous contacts which the organism has had with those stimuli and to present variations in the environmental settings. So far as the stimuli objects are concerned we may say that they take on a different stimulational function. Since it is not untrue that all the reactions of an individual at any time are modified responses, because all behavior must have a history, we might say that the modifiability of behavior is a genuinely acquisitive process. Thus, for example, the child who modifies his original hand-extension reaction to the candle flame acquires a withdrawal response or learns to withdraw or not to extend his hand. In general, the characteristic of modifiability of responses permits the organism to profit by its past experiences, and thus allows the individual to develop a growing power over his surroundings.

So far we have been discussing modifiability with respect to change in the response factor. There is another form, in which the modifiability involves primarily a change in the stimulus. This is the type of phenomena called conditioning. What happens here is that instead of an object taking on a new stimulational function which correlates with a modification of response, there is (in the case of simple reactions) a new object taking on the same stimulational function as an old object.[1]

Integration of Reactions

Not only does an organism perform differential reactions to objects and later modify them, but it also summates or integrates these responses. The psychological organism develops complex response systems which can be definitely observed to be combinations of simple reactions. As an example of this integration we might cite the case of a person reacting to a ball game. In this particular instance it is evident that the person has previously developed specific responses to many of the various objects and events which comprise such an elaborate situation. In the past a ball reaction was acquired and a crowd reaction, and in the experience of almost everyone we can trace out the precise period of development of the informational responses to the game as a whole.

To use a simple illustration, notice how a child holds his cup of milk when he stops drinking in order to answer or ask a question. Not having much of his behavior integrated he is very liable to, and frequently does, hold the cup in an unbalanced manner, because of not having yet achieved the coördination of speaking and controlling his arm movements at the same time. Especially does the development of speech indicate the complex integration of sim-

[1] See reference to conditioned reflex, p. 17.

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pler reactions into larger wholes. At first, the infant learns to make single verbal responses to objects. Later the single word responses become integrated into sentences or comprehensive language reactions. Perhaps the integrative process is still better exemplified by the development of writing reactions. In this case we can trace the growth of simple strokes into complex word and sentence movements. It is this integrative characteristic of psychological reactions which makes for the agility and rapidity with which the person can react to complex situations and it is of course an important factor in general intelligence.

On the stimulation side we have also a syncopation or unification of the stimulational functions comprising the objects to which individuals adjust themselves. That is to say, all the letters in a word or all the phrases in a sentence constitute a single stimulus for a reading or understanding response. On the whole, the integrational feature of psychological reactions makes for ease and simplicity of behavior.

Delay of Reaction

A fundamental characteristic of psychological behavior is the fact that stimuli objects can produce effects upon organisms long after they have ceased to be in direct contact with those objects. This characteristic indicates the organism's independence of the stimulating conditions, an independence which gives it a valuable measure of spontaneity. Delay of reaction is brought about in two ways. First, the stimulus excites a reaction system which functions incipiently until a given time when a definitive overt response is performed. Let us observe at once that the incipient act may be a gross movement of some type or an overt response, in the sense that some direct action may be performed upon the stimulus object. The definite overt act, however, is the significant one. Thus in the case of a delayed reaction of an elementary sort, some overt act in the form of a posture or bodily set or orientation will serve to fill in the gap between the stimulation and the final response.

Inhibition of Reaction

Not only can the psychological organism delay its reactions to stimuli, but it can also inhibit completely its responses. This inhibition is a process of the differential operation of the various reaction systems which the organism has acquired. That is, one can inhibit some reactions and perform others instead. In effect, we find operating here varying degrees of excitation of response systems by stimuli. For various reasons some stimuli may become prepotent over others, as in the case of a more favorable setting which they may have, or because they have just operated upon the organism which is now especially sensitive to them. We must note here that the process of inhibition is always a case of preferential reaction and never one of non-action. The non-action situation is a definite and unique sort of activity, involving a replacement action by elementary reflexes.

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Such a non-action situation is, therefore, a relatively simple sort of behavior. In fact as long as the organism is complete and not disintegrated it is never inactive, no matter what the stimulating conditions may be.

These several characteristics of psychological behavior are obviously not mutually exclusive properties of the organism. In various degrees they all contribute in fitting the organism to develop more and better adjustments to its surroundings. Furthermore, the organism endowed with such behavior characteristics or properties is fitted to develop responses commensurate with its surroundings. A definite advance in acquiring such responses is the development of the capacity to realize what type of reaction it can make to its stimulating objects. Such cognizance eventually leads to the organism's appreciation of its relation to its surroundings and its powers of adaptation to them, with the consequent acquaintance of the organism with itself. At this stage verbal responses are great aids in the development and integration of reactions, in the delay of responses and in the organism's control of its objects. At the peak of such controlled behavior is the voluntary action which comprises elaborate discrimination of stimuli conditions and effectiveness of response.

The Divisions of Psychology

Obvious it must be to the student of psychological reactions that the great variety of specific types of psychological phenomena necessitates their division into specialized branches for convenience of investigation. The following table represents one of the many possible methods of dividing the field.

(1) *Animal.*			
(2) *Human.*	Normal	Child Genetic Development	Individual
			Cultural
		Adult	
	Abnormal	Child	Noticeable variants
			Defective
		Adult	Developing
			Disintegrating

Animal Psychology

The first distinction made between psychological reactions is that between the comparatively simple (typical) reactions of animals, and the more complex reactions (typical) of the

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human person. Naturally we expect to find that human and animal responses overlap in many instances, but the human organism also performs an immense number of actions which are distinctly human in character and have no counterparts in the animal world. For example, animal reactions lack complex meaning behavior, language activity, actual thought responses, voluntary actions and cultural behavior in general. Manifestly the differences between the human and the infrahuman organisms are entirely a matter of degree of development. We are not therefore surprised to find in many cases among the infrahuman animals rudimentary forms of distinctly human action. All these similarities and differences are of course a matter of observational record, and the exact likenesses and differences between the different types can only be determined by actual comparison. This principle holds equally, however, for the differences between two human animals or between two infrahuman animals.

Because there is much in common between human and animal reactions the experimental study of animal behavior offers a series of facts useful for the interpretation of human conduct.[1] Especially valuable are such animal studies because of the limited possibilities of experimenting upon human subjects.

Child Psychology

The differences in the general stages of biological growth of an organism parallel naturally the types and developmental stages of the psychological responses of the person. This affords a basis for distinguishing between adult and child psychology.

In a genuine sense all psychological reactions are genetic because they are forms of adaptation built up by the contact of the person with the objects around him. The period of childhood, particularly, is a distinct stage of rapid and more or less complete acquisition of response systems. In this period the organism faces the very intricate problem of general orientation which means the necessity of acquiring all the fundamental response systems. Among the most important of the reactions studied in the domain of child psychology is the development of language responses. Not only do language reactions afford us a means for the thorough understanding of human responses as built up and put into operation after being acquired, but the study of them enlightens us concerning the integration of our most complex responses.

For the most part what the individual is, in a fundamental psychological way, depends upon his development of behavior equipment in his childhood. Accordingly, it is exceedingly important to study the development of the individual from the standpoint of his family, playmate, and other distinctly child surroundings. How significant the early years of childhood are from a psycholog-

[1] Unfortunately sometimes such interpretations are overworked as in the attempt to make the conditioned reflexes of animals explain complicated human behavior.

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ical standpoint may be observed from the fact that the foundation for intelligence capacities and capabilities are laid down and established in the early foundation years of the child's life.

Social Psychology

A remarkably fruitful specialization in psychology is the investigation of cultural or social reactions. This specialization results in the division of psychological data into individual and social behavior. Individual psychology covers the field of human reactions to the individual conditions in which they develop and function, while social psychology is interested in the reactions of persons to specifically group conditions. This distinction might be otherwise stated, namely, that with individual reactions we adjust ourselves to natural objects and specifically personal conditions, while with social responses we adapt ourselves to characteristically human conditions and group phenomena. Again, we might say that individual psychology is interested in the principle of all human behavior in general, while social psychology studies only specific reactions common to numbers of individuals or collectivities. The distinction here, it will be noticed, is made upon the basis of the different type of objects or conditions to which persons adapt themselves. Consequently, social psychology will be concerned with the development of human institutions of all sorts, social, legal, religious, ethical, æsthetic, and intellectual, and with the way in which individuals adapt themselves to such institutions. Also, among the problems of social psychology we include investigations of the influences which specific group settings produce upon an individual's reactions, whether such settings are imposed upon the person by human circumstances or are chosen by the individual himself, as in voluntary associations.

For the sources of cultural reaction data we must depend upon descriptions obtained from the study of extant peoples who are living either under our own type of civilization or under more simple circumstances. Here also we obtain valuable insight concerning the actual data of psychology, in the sense that we can compare behavior features of our own and widely different peoples. Thus, we learn to what extent our cultural surroundings of intellectual, technical, religious, legal, and other types affect our cultural conduct. We may learn in what direction our behavior is constantly changing, and at what rate, etc. Most useful are such observations also for the development of critical attitudes in interpreting cultural response data.

From different sources we derive different forms of psychological data. So far, we have been speaking of the ordinary facts of general human individual reactions and of cultural responses within one's own and closely related national groups. When direct observations are impossible, however, we may derive such information from authentic biographies and letters, although ex-

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ceedingly great caution must be exercised in such instances in the interpretation of the raw materials. Such investigations should be verified by referring to the records of social, political, artistic, and other conditions existing at the time.

Also important as sources of the data of social psychology are historical records of all sorts showing the existence and transformation of human reactions from one period of time to another. For instance, the study of the arts, sciences, techniques, morals, and social organizations establish what are the thoughts and other actions of various peoples, and how such reactions have varied with the changing conditions of the times in which they occur.

Where the direct study of the records of reactions are impossible, much can be learned from investigating the products of peoples, such as roads, bridges, tools, works of art, buildings, social and economic institutions, etc. It is by such studies as these that we can frequently learn what the surrounding conditions were to which persons and groups have made adaptations in the past. From all these various sources, then, do we gain data concerning our social reactions to phenomena and events of all sorts, as well as to the artificial and distinctly human or cultural stimuli to which we adapt ourselves.

Abnormal Psychology

Within the domain of human reactions the responses may fall above or below the standard set for human adaptability of various sorts. Such a standard is generally based upon the capacity of the person to adjust himself efficiently to his immediate surroundings in order to maintain his existence and to improve his condition. In actual practice of course, this criterion involves a number of intermingled bases, such as social, economic, and moral factors, but upon one or more such bases individuals may be classified as normal, subnormal or supernormal. Such a classification has been of primary importance in recent years for the distribution of pupils of differing capacities in the school grades. In this classification the criterion is the ability to measure up to a scale of performance, indicating the actual acquisition of reaction systems of specified types.[1]

Naturally the variants of psychological activity are of different sorts. In children we may distinguish between (1) noticeable variants, which indicate super- and subnormal individuals representing developments of school and social behavior, and (2) actual defective individuals. Under (2) we may distinguish between (a) individuals who are biologically defective in the sense of imperfect and injured individuals and consequently unable to attain

[1] Here we must utter a warning against confusing the actual facts of human behavior with the various theories and assumptions designed to account for such behavior. Especially must we guard against the assumption that actual behavior is teleologically determined by some mysterious factor or tendency called native or innate intelligence.

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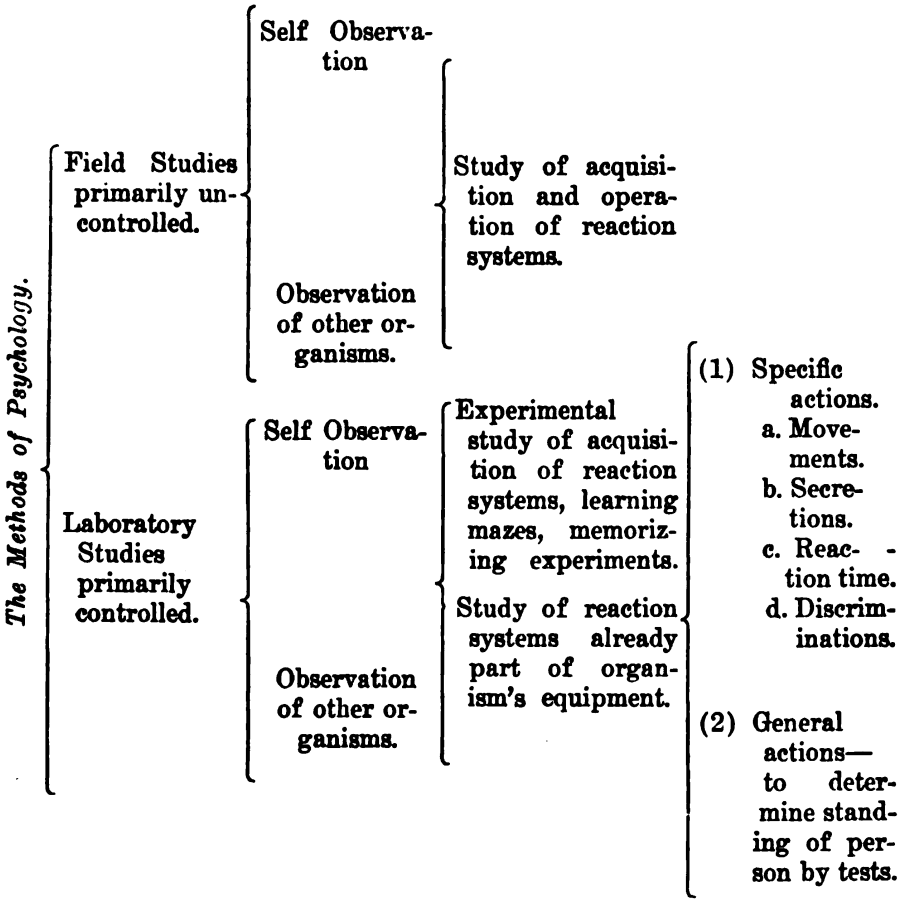
to a normal equipment of behavior traits, and (b) individuals, who, because of unfavorable behavior conditions, have not as a matter of actual fact developed behavior, or who have developed unadaptable or unadapting behavior.

Among distinctly adult behavior abnormalities we may distinguish (a) those that are due to wrong development of actions, and (b) behavior defects resulting from the disintegration of the individual as in the case of luetic or other infections or injuries of various sorts. Aside from the cases enumerated, it is obvious that the adult individual will also have the defects which are derived from his childhood development or lack of development.

The following table presents graphically the methods of psychology.



The Methods and Sources of Psychology

Scientific observations are characterized by a critical technique which is utilized in the examination of phenomena and in their verification preparatory to the formulation of laws and principles. Because of the variation in kinds of facts observed, each science must develop its own particular means of dealing with its phenomena. Psychology in common with many other sciences makes both

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field and laboratory investigations. Accordingly, it not only must have a way to obtain data by observing reactions as they ordinarily occur, but also as they may be elicited by the use of instruments [1] and other controls. In a general sense laboratory or experimental observations will be much more rigidly controlled than those made in the field. In the former case not only will the data (reactions) be recorded but they will be measured also.[2]

(1) Field Observations

The method of field observation in psychology is and doubtless always must be by far the widest employed and the most important.[3] For the existence of this situation a number of circumstances are definitely responsible. In the first place, as we have already observed, psychological phenomena, especially of the more significant and important type, are complex facts uniquely and unrepeatedly occurring in complicated situations. Is it not obvious that these situations cannot be reproduced in the laboratory or under experimental conditions? Accordingly our laboratory experiments can only be applicable to the simplest of psychological activities. In this fact we possibly find the explanation for the large place that animal work takes in experimental psychology. Even when we are able to study the less complicated reactions in the laboratory it is impossible for us to isolate the separate features in order to control them rigidly. For example, in the comparatively simple cross out experiment (in which a subject crosses out all the "a"s on a printed page) we cannot isolate the attention, perception, and other component responses from each other.

Another condition militating against rigid experimentation in psychology is the fact that the stimulus, or what corresponds in

[1] Possibly it is not unsafe to say that the original urge to employ apparatus in human experimentation has not maintained its vigor. Always of course such use of instruments was more practicable in the study of those reactions which more nearly approached the physiological activities. Also it may be observed that probably the most satisfactory use of instruments in human psychological experimentation has to do with control of stimuli.

[2] This matter of measurement is relative. Since things are properly measured only in units of their own occurrence or structure it is questionable whether we measure any more effectively when we make our data conform to the type of measuring tools available (tools not rigidly derived from the things measured), than when we compare things as they actually are, by developing our own critical capacities of judging them. Why should we neglect the most useful of all scientific instruments, the observer's judgment and other relevant activities? When the data lend themselves naturally to fairly absolute measurements such should by all means be used, but is this the case with complex psychological phenomena?

[3] Such a situation in any science is obviously always contingent upon the development of new viewpoints and new methods, but it is certainly an unscientific attitude that would attempt to gloss over the existing circumstances in order to bolster up one's confidence and sense of power over the phenomena studied.

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the physical sciences (mechanics) to the cause or force (in a practical sense), is in psychology a genuine reciprocal factor in the datum. This means in effect that the psychological stimulus is entirely a functional and not a structural affair. Moreover, the stimulus is always a direct function of its reciprocal response,[1] so that control by way of interchange of stimulus is excluded from experiments. In other words, because of the equivalence between the two things operating upon each other in a physical datum the qualitative character of the cause factor may be neglected. Not so in psychology, however, for each reaction is differential with respect to its own particular stimulus object. Possibly as we have already indicated above, the comparison between the psychological and physical data means merely that in the one case differences are negligible and in the other they are not. But in actual practice this means that the more exact our psychological studies are in the sense of the physical sciences the less closely will they be related to nature.

That psychology is still primarily a field science means merely that it is concerned with the most complicated data with which any science has to deal. But this means in no sense that the psychologist relaxes in any degree the rigidity of his critical attitude in the observation and interpretation of his data. And after all, is it not this critical attitude in observing and interpreting phenomena, in whatever way it may be employed, which constitutes science? For what, we may ask, are experimental techniques and instruments (when they are not merely observational aids, that is, extensions of our eyes and ears, etc.) but the tools whereby this critical study is furthered and guarded? The development of controlled field studies of various sorts indicates how tenuous in reality is the line which separates field from experimental studies.

Illustrative of the important problems of behavior amenable to field observation are the development and use by children of their entire equipment of reaction systems to particular stimuli objects. In such observations as these we discover the facts and principles which constitute the backbone of psychological science. For such behavior development as we observe here not only continues throughout the life of the person but at the same time comprises most of the essential facts of the science.

Practically all that we know concerning the emotional, thinking, willing, feeling, and speaking reactions, as well as all others related to these in complexity, we have learned from field observations of the self inspection sort. The same thing is true of the complex responses that go to make up what we call intelligence, character, moral conduct, etc., of the person.

[1] For a description of stimuli see chap. II.

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(2) Laboratory and Experimental Studies

As is true in all psychological observation, laboratory methods yield results of two sorts, namely (a) information concerning the process of developing or acquiring reaction systems and their modifications by various means, and (b) the use and operation of them when acquired by the organism. In the first type of observation, for the most part, the act itself is stressed and the psychologist describes the development of reactions in terms of improvement of performance. In the latter case the problem is to determine what responses the individual is able to make when presented with definite controlled stimuli. Such responses when measured as definite kinds of performances, constitute accurate indices to the reaction systems which the individual possesses, whether they have been recently acquired by him or represent part of his early action development. Naturally there is much overlapping in the two sorts of experiments, since obviously we cannot draw very sharp lines between what are after all different phases of the same exceedingly complex phenomena. In studying the simpler types of performance, or products of acts (in reaction time, for example), acts themselves are as much under observation as products.

(a) Among the experiments designed to study the *development of reactions* we may consider the various problems of learning. Among the most interesting studies is the acquisition of responses to a maze problem. An animal or human subject is made to learn a complicated path by avoiding blind alleys. The rate of progress is measured by the time required to get through the maze and the number and type of errors made or eliminated.

Another typical experiment is the acquisition of verbal or informational responses of various sorts. This experiment involves the learning of certain materials, series of words, nonsense syllables, series of letters and their order, as measures of the comparative retentive capacities of individuals. In order to control the stimuli given, a constant exposure apparatus is used which presents the material to the subject at constant intervals.

The acquisition of typewriting, telegraphy, language, and other reactions has been studied under controlled conditions, yielding results concerning the best distribution of trials, individual and sex differences, length of practice period, the rate of loss with interrupted practice, and many other specific points.

(b) *Performance* experiments are of two general types. The first method is designed to elicit specific responses to specific stimuli, while the second is employed to stimulate series or groups of responses for the purpose of classifying individuals as to their general standing in a group. In the first method the psychologist makes use of the ordinary apparatus and technique of the psychological laboratory, while in the second method the responses are

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elicited by the use of stimuli organized in the form of psychological tests.

Typical of the laboratory observations of responses to particular stimuli are the studies of reaction time. The subject is requested to press a telegraph key as soon as possible after the presentation of the stimulus. The key is connected with an electrical time measuring device (chronoscope) and the time of reaction is noted.

Among the earliest psychological experiments are the studies of discrimination. Subjects are required to distinguish between the different weights of objects, between closely similar colors, sounds, tastes, etc. To a certain extent such experiments reveal the relative acuity of differentiation of individuals to the particular stimuli employed.

Another form of experiment is designed to study the secretory reflexes. A classic example of this type of method is that known as Pawlow's salivary reflex experiment. By inserting a tube through a dog's cheek the kind and quantity of saliva secreted can be accurately determined.[1] Other reflexes of an organic sort can be studied by means of the pneumograph, or plethysmograph.[2]

The method of measuring the relative ability of a person to do various sorts of tasks as compared with others is by eliciting a group or series of performances on the basis of a prepared scale. The best known of such scales is that which was first devised by Binet for the purpose of classifying the school children of Paris. At the present time there are many such scales in existence, some being used to establish school standing and others for employment purposes. Not only are the scores intended to test individuals separately but they have also been developed for group testing.

Naturally the organization and interpretation of data in psychology as in the other sciences, will involve the employment of statistical methods. When the reactions of persons are accurately reported then it is frequently necessary to manipulate such facts by mathematical methods in order to provide a basis for serviceable interpretation. Especially is this true when reactions of individuals are to be compared for various purposes.

As we have already intimated a survey of the experimental method in human psychology reveals the fact that so far only simple reactions (reaction time, discrimination reactions) have been found to be amenable to the rigorous handling of the experimenter. For example, the experimental study of memory has not as yet proceeded beyond the controlled memorizing of numerous

[1] Cf. Yerkes and Morgulis, The Method of Pawlow in Animal Psychology, Psychol. Bull., 1909, VI, 257.

[2] For descriptions of such apparatus and their use, cf., Titchener, Experimental Psychology, 1901-05.

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syllables and numbers; nor has the study of thinking reactions progressed beyond the observation of how a person works puzzles of various sorts. However, the field of psychology reveals to us a gradually accumulating mass of facts and principles which, to judge from the history of science in general, are not unlikely to prove to be of vast importance in the further development of psychology. For only out of such a matrix of verified facts can we hope to discover new principles. This truth is strikingly confirmed by the discovery of the universally famous principle of the conditioned reflex. This principle, which is of exceedingly great importance, was as a psychological problem developed as a by-product of investigation upon the physiology of the digestive glands. But even if we are not especially sanguine concerning the discovery of new principles through experimentation, there is immediate compensation for such experimental work in the fact that whether our studies yield principles or not, we learn to know the essential facts about psychological phenomena from the experiments themselves. That is to say, from the immediate observations of how individuals react we gather information concerning the details of human behavior which have a value in themselves. And it is such accumulation of knowledge that serves as the anchors by which we can keep our interpretations rooted in the soil of fact. Furthermore, in evaluating the experimental method of study we must take account of such experiments in verifying, substantiating, and making definite the information and principles of human behavior which are discovered by various field observations.

It remains to be added here that with respect to both kinds of data which the different psychological methods are employed to obtain, we may trace out two fairly distinct sources. Unique among the sciences stands psychology because of the fact that not only does the observer get his data from the study of other organisms but also from observing his own behavior. Further, not only is one's own reaction a source of psychological data but it is frequently a necessary source, for there are many facts that can only be obtained in this way. There are large classes of actions which must be studied essentially by this method.

To illustrate, suppose that we observe a person come out of his home, walk several blocks, return thereto, then appear again carrying under his arm a book which he did not have on his first appearance. Now let us assume that this was a case of forgetting with subsequent recall. What we have observed then is a reaction to a book which was called out by some other stimulus substituted for the book. The precise stimulus which brought out the memory reaction or the detailed features of the response cannot, excepting in rare cases, be known to anyone but the person who performs the behavior. To understand the reaction, however, it is neces-

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sary to know what called it out. Such information can only be had by the observation and report of the reacting individual himself.

In a somewhat similar way we must learn from the individual who performs the action what are the details of his memorial, thought, imagination, and other complex responses. But of course, this fact does not signify in any sense that whatever the reaction happens to be, it is anything but a definite objective fact in nature.[1]

The Relation of Psychology to the other Sciences

By way of clarifying somewhat further the nature of psychology as a science we might indicate some points concerning its relationship to other members of the scientific family. We have already seen that psychology is closely interrelated with the biological sciences, since the psychological organism is a living being. As a science of reactions, psychology is more closely allied with the science of biological processes, namely, physiology, than with the science of biological structures, that is morphology; although psychology, no less than physiology, must take cognizance of the nature and organization of the cells and tissues constituting the anatomy of the reacting organism,—especially so when injuries and defects of the organism are correlated with deficiencies of behavior.

While the science of psychology and physiology both study the activities of the same complex organisms, the differences in the two sciences are too great to be overlooked. In the first place, the psychologist not only looks upon the organism he studies as a tremendously complex machine which can maintain itself by various metabolic processes, but in addition he must take account of the organism's properties of interacting with stimuli. The latter point we have previously discussed. Primarily, the psychologist is interested in the discriminating, selecting, and attending reactions which the specific stimuli objects surrounding the person call out in him, as well as in the emotions, volitions, and feeling reactions which he makes to such objects. At most it might be said that the physiologist is interested in the partial operation of such activities or in the separate organs functioning in such activities. And not at all is he interested in the person's development of the specific reactions which he makes to his particular stimuli objects. As a matter of fact, then, the close contact of psychology and physiology comes at the point where psychology studies the organism's simplest organic behavior (reflexes) and where physiology studies its most complex organic phenomena, namely, sensory functions and secretory processes of the total organism. In these

[1] For a somewhat fuller discussion of this point see an article by the writer entitled, Can the Psychophysical Experiment Reconcile Introspectionists and Objectivists? American Journal of Psychology, 1922, 33, 481–510.

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phenomena there is, of course, much overlapping between the two sciences.

Our discussion of the relation between psychology and physiology should be interpreted as an emphatic denial of the still widely prevalent conception to which we have already had occasion to refer, namely, that psychology has its basis in physiology. A deeply rooted tradition it is that the operation of the brain and nervous tissues constitutes the causes and guiding principles of psychological behavior. Whatever plausibility this view ever possessed may be traced to the fact that the nervous system performs very intricate coördinating functions. This fact was expanded to mean that whatever the muscles did was the direct outcome of the demands of the nervous system. Now we well know that the operation of the nervous system must be considered as a coördinate process on a par with all the other mechanisms. The fact is that the nervous system no more controls the muscles and glands than the muscles and glands control the nervous system. All are parts of a total response to some simple or complex stimulating object or condition. Our final conclusion is, then, that psychology is more closely related to ecology or bionomics than to any other biological science, and if one insists upon making psychology a branch of biology, probably it is not unsafe to say that psychology is a type of ecological science.

Man, as we have seen, is an anthropological as well as a biological animal. Therefore psychology as the science of his activities must also be closely related to the humanistic sciences. It is the latter group of disciplines which constitutes the reflective setting of the distinctly human activities. In the contacts of the individual with other individuals, with the group, and with social institutions are found the occasions for the development of most of the more complex reaction systems and the use of them after they are acquired. The study of the person's behavior under various economic, social, political, religious, and other conditions brings to us the precise details concerning the more intricate actions of the human organism. The investigations of an industrial condition with its strikes, lockouts, and arbitrations, present us with much valuable data concerning the motives and the inhibitions of men in their daily contacts with family, moral, industrial, national, religious and social institutions. In recent years the fact has been strenuously forced upon us that many of the most serious maladjustments of the organism can be and indeed must be explained not in terms of physiological but of social conditions.

To the psychologist who neglects the humanistic or social side of persons may be laid the charge of the extremely faulty notions current in psychology concerning the motives and conditions of human actions. For instance the emphasis on the physiological factor in human behavior has led to the view that inborn traits of

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human nature are the efficient causes of such action. Naturally there is no incentive to study human behavior when it is merely the working out of such simple impulses.

The relation of psychology to the physiological and social sciences typifies the connections of psychology with still other sciences. Consequently we might think of all sciences as interrelated. Certainly psychology touches elbows with physics, not only at the point at which the latter can aid in devising and in using instruments, but in the common enterprise of attempting to understand why organisms perform particular reactions to particular stimuli. For it seems easy to believe that we shall understand our differential reactions better if we derive information from the physicist concerning the nature of our natural stimuli. Fortunately we have passed that bleak period of subjectivistic psychology in which psychologists did not accept what seems now a determined fact, namely, that the psychological reaction to a natural stimulus is a response to a physical object which exists with all its qualities. Hence, we may in the future hope to obtain much more information than heretofore concerning the reasons why certain objects have their peculiar effects upon psychological organisms. An attempt in this direction is the correlation of discrimination reactions of odor and taste with organic chemicals.

Because the science of psychology obtains its data in the various fields which we have been specifying, it is manifest that it must be considered as a coöperative science with anthropological, historical, and various biological and physical sciences. The coöperative contact of psychology, then, with the other sciences is based upon the fact that the psychologist is interested in the responses of individuals, while the other scientists describe and furnish information concerning the stimulating conditions. From the standpoint of psychology the objects and events studied by the various humanistic sciences are stimuli capable of arousing similar reactions in various, different persons. A totem, a festival, a play, or group dance are all stimuli to actions. Thus by a coöperative investigation of all phases of a reaction we learn indefinitely more concerning human behavior than would be possible without such coöperation. In the case of the biological sciences the coöperative advantages extend to a study of the anatomical and physiological concomitants of reactions as well as to the information which psychology obtains from physiology concerning the organic reflexes which constitute a prominent source of stimulation to action. And finally, as we have already seen, the physical sciences should yield much information through such coöperation concerning the character of natural stimuli.

The Application of Psychology

When the study of various psychological reactions yields the psychologist a set of behavior principles, it is to be expected that the latter may be used in a degree to control the reactions of or-

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ganisms. Such is actually the case, although the frequent sanguine descriptions of the applications of psychology must be severely discounted in view of the great difficulty of formulating principles of reactions that can be successfully employed, or for social or economic reasons would be employed. True application of a scientific principle we submit is merely the verification of the principle and a substantiation of the process by which it has been derived from the sorts of situations to which it is applied. Such application has nothing in common with any exploitation of a fact or an alleged fact.

So much is certain, then, that whatever principles can be applied must be absolutely based upon a critical investigation and interpretation of reaction data both of the individual and the social or cultural type. Possibly because of the economic principles involved we find that the most active steps in psychological application are taken when the results promise some personal gain, as in commerce. Again, in situations in which the individual may directly apply his psychological information to particular cases and observe the results, we find vigorous and numerous attempts at such application, for example in medical practice. In order to indicate the various types of applications we may suggest some examples in fields in which the principles of psychology are utilized, namely, (1) industry, (2) education, (3) the arts, (4) law, and (5) medicine.

(1) For practical purposes we may classify the contacts of psychology with industrial situations, as economic, technological, and personnel problems.

(a) Among the economic problems are the determination of the most favorable general conditions of efficient workmanship. Here we have the question whether men can ever be expected to accomplish their best work and to use their most intelligent efforts unless they are freed from the fears and distresses incidental to the handling of labor as a commodity. Can men ever become effective producers or develop capacities for work as long as they function as particular forms of machine attachments rather than craftsmen? Again, what is the value of having workers enjoy control in the administration and supervision of industrial processes? Would the condition of being a member instead of a tool of the industrial branch of human society make for greater initiative in the development of reaction systems and the consequent improvement of individual success? These are genuine psychological problems since they involve the principles of acquiring and perfecting reactional equipment. The genuinely psychological character of such problems have unfortunately been obscured by the faulty economic tradition that industry was not a factor in the development and operation of persons, but merely a means of profit-making. As a consequence, no attention was paid to the

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value of the human and psychological factors in the development of increased production. It might also be added that psychology may offer suggestions bearing upon the ethical phase of the economics of production, should that aspect of industry be made an issue.

(b) Among the technological problems may be mentioned the study of the most favorable surroundings for industrial responses. This would include hygienic conditions as well as the arrangement and safety of machinery as factors in human adaptation. Also the problems of fatigue, economy of movement, and the number and distribution of working hours may be illuminated by psychological studies.

(c) Personnel problems include the selection of persons best fitted to perform given operations. Psychologists have in a measure been able to devise performance tests to discover certain needed qualifications for particular tasks. Secondly, the determination of the best means of developing in individuals the required reaction systems is of course a psychological problem. Here might be considered the impairment of a worker's efficiency who is arbitrarily discharged when he is no longer profitable at his particular job. Finally, we might mention the effects upon the psychological development of workers who are not enabled to produce any particular article, but who spend all their working hours at some minute and uninteresting operation.

(2) Realizing more fully the nature of human individuals as organized systems of reaction patterns gives us power better to develop methods of acquiring these reaction systems and shows us the way to the acquisition of better reaction systems. These are the problems of *education*. Among the fruits derived from the application of psychological principles to educational methods are the following: (1) the realization that persons are not masses of plastic clay which can be molded to a set pattern, but the discovery that each person is by virtue of his family and other group surroundings a distinct individual and consequently must be allowed to develop himself, has added much to the value of school training. (2) Another point is that the child is looked upon as a member of future society and must accordingly develop suitable modes of responses for these purposes. (3) Most important perhaps of all that psychology can teach us concerning education problems is that the person cannot become a good and useful citizen unless he develops such reactions of thought and the use of reason as will prevent him from becoming an inarticulate complier with all thoughts and acts imposed upon him by the mass movement of the group in which he lives.

The detailed working out of these applications distribute themselves throughout the entire process of education. Beginning with the study of the individual's responses to the physical surround-

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ings, such as ventilation, light arrangements, and the kind and amount of nutrition best suitable for the individual's development of reaction systems, the psychological applications soon carry us to the awakening and employment of interests for the study of the various branches of the curriculum. In the classification of pupils for the acceleration of the teacher's work and the prevention of the retardation of the brighter pupils, is found a fruitful place for the employment of psychological tests.

(3) In the study of *art* a growing place is accorded to the data which can be obtained from a study of reactions to stimuli. To the problems of the appreciation of art objects psychology brings much information concerning the factors which determine the pleasingness or displeasingness of certain objects. What color combinations call out pleasant reactions? What are the fundamental distastes for symmetrical arrangement and what means may be employed to overcome such distasteful reactions? In general, are aesthetic responses built up and modifiable or are they unique activities permanently abiding in the reactional equipment of the individual? Such are the scientific problems upon which psychology can throw some light by the study of the development of our appreciation in the various cultural periods and by certain experiments in the laboratory. The understanding of psychological principles undoubtedly throws light upon the merits of impressionism in painting, realism in sculpture, and imagism in poetry. Although it may always be true as heretofore that the psychological principles employed are mainly derived by our casual observation we cannot but believe that a more critical study of our reactions to aesthetic objects will add materially to the formulation of workable aesthetic ideals.

As regards the specific problems in the creation of art objects the contact of psychology with aesthetics is most helpful in the light it throws upon the nature of creative imagination. At this point emerge such questions as the influence of the surroundings upon the creative artist, the advantages or disadvantages of abiding by established precedents in technique, choice and treatment of subjects. Incidentally, the psychological investigations of aesthetic problems make information available covering the kind of art training which should be developed for children.

(4) Manifold are the applications of psychological information in the various fields of *medicine,* and these applications increase as we realize more and more the organismic character of persons. That is to say, when we do not consider the person as a series of separately functioning organs, but as a unique whole, operating as a unit, we find that many illnesses are disturbances of the individual's reactions to his surroundings and are not owing to defects in organic structure. Thus, for example, many digestive disturbances are not at all due to defects or defective working of

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the internal organs, but to a general maladjustment of the person and his surroundings. Again we find that much of the value of therapeutic agents lies in the methods by which they are administered. The confidence one has in the physician is recognized as a potent factor in improving the reactions of the individual.

Quite aside from these general applications, psychology comes into very intimate contact with medicine where the abnormalities are concerned. From the standpoint of reactions to stimuli we can gain a better insight into the conditions responsible for such abnormalities as feeblemindedness, hysteria and insanity.

Among those classed as feebleminded are many individuals who because of faulty surroundings and undernourishment build up defective reactions and fail to develop many reaction systems which should form part of their behavior equipment. Such persons are unable to make proper adjustments to their surroundings and consequently become encumbrances upon the remainder of society. A careful study of the conditions responsible for such faulty development must offer good suggestions for avoiding such abnormalities. Much the same situation is found in the case of various insanities. The so-called functional disorders are due to the patient's building up faulty reaction systems of particular types. By understanding these actions and the means whereby they are developed, we may be able both to prevent these conditions from appearing and to overcome them when they have appeared. In recent years there have developed positive psychological techniques designed to improve or clear up entirely hysterical and related abnormalities, such as dual or multiple personality. At the basis of these techniques lies the observation that some types of exaggerated reactions, such as fear or anxiety, may fail to coördinate with other reactions and thus prove to be the source of a general dissociation of personality. In this way the person may become entirely unable to adapt himself to his surroundings. Special emphasis is laid upon such problems by the movement which has been widely familiarized under the name of psychoanalysis.

(5) The formulation and administration of *law* as touching most profoundly the human individual may make use in many ways of information derived from a study of human reactions. Some special problems here are the nature of intention and the actual performance of a voluntary action. What is consent and under what conditions have we clear-cut and indubitable coercion? The problem concerning the treatment of criminals and the placing of responsibility by considering the normality or abnormality of the individual's development have through deepened psychological information taken on entirely different proportions. If, as all evidence appears to indicate, there are no absolute traits which make for criminality but on the contrary these activities

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are developed through definite stimulating circumstances, then the modes of dealing with the persons coming under the notice of the law courts must differ.

In closing this section we might refer again to a point made before that we must not think of the psychologist as an omniscient individual who with his science can aid all other people. Rather, we must consider the psychologist as able to coöperate with other workers in the various fields of human activity. By thus arriving at verified facts which may be further elaborated into principles, he may suggest some means of applying them in the fields from which the original facts came. In making applications the psychologist does not merely supply fixed principles of behavior, but at the same time he is deriving the information necessary for making further applications in the particular situation.

The Development of Psychology

In common with all other sciences psychology has passed through a succession of stages each presenting changes in point of view concerning subject matter and method. Probably because psychology is concerned with the most intimate of all scientific phenomena it has had greater difficulty to emancipate itself from the influences of presuppositions generated by the mass of social traditions among which it developed.

From the earliest period of organized knowledge thinkers attempted to account for the differences between the action of human (psychological) beings and other types of objects. Accordingly, one of the first recorded views ascribed this difference to the possession by human beings of a peculiar principle, substance, or force as it was variously called. This more refined substance or living principle (soul, entelechy) was thought to be unlike the more definite and visible portions of organisms and was considered as responsible for their vegetative (metabolic), sensory, and thought functions. We may consider this conception as approximating the situation in the period of Greek science. When Aristotle's doctrines were re-interpreted by the thinkers of Western Europe the particular conditions of intellectual life favored the absolute division of the organism into body and soul. The student need only be reminded of the cultural conditions in the Alexandrian (called the Hellenistic-Roman) and Mediæval (Christian) periods to appreciate how appropriate it was to think of the soul as a simple entity and therefore immortal. It was supposed to suffer only a temporary residence in the body, and to leave the latter finally to its exclusive deterioration.

With the advent of the Renaissance, marking the decline of other worldliness, and the development of a greater interest in nature, psychology took on a changed aspect. The world was thought of as composed of two sorts of substances, known things and the knowing mind, or extension and thought, as Descartes (1596–1650) described them. The knowing principle was called

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mind, and the emphasis upon the religious properties insisted upon during the preceding period was given up. Of especial importance it is to notice that the Cartesian formulation is a metaphysical exposition; that is to say, Descartes in his time was interested in a restatement of world problems, an explanation of the stuff or contents of the world. Thus the soul was translated into thinking stuff to coördinate with the materials constituting the subject matter of the mechanical sciences of the day.

When social and intellectual conditions influenced the change, men began to think more in terms of human activity. Psychology then became more a science of human nature. In the constitution of the human individual the mind was considered as the fact or thing which possessed the faculty of perceiving, thinking, and imagining, etc. To these knowing faculties was added the faculty of will, all of which were presumed to control all the actions of the individual. Thus psychology began with Locke (1662–1704) and others an intellectualistic tradition, since the will itself was made into a controlling idea which has never been completely extruded from the domain of psychology, although Tetens (1736–1805) and Kant (1724–1804) added to the intellectual and will faculties another called the faculty of feelings.

When the atomic theory in the nineteenth century began to dominate the minds of scientists, psychology took on a new complexion. The doctrine of a unified mind became obsolete and was transplanted by the idea that the controlling forces of human activity were merely discrete elements of knowledge or ideas, that is to say, flashes of awareness. This was the period known as Associationism. As Berkeley (1648–1753) and Hartley (1704–1757) developed the doctrine, what was formerly knowing principle in action became a series of separate qualities of objects, called by them sensations which they indeed thought actually composed the objects. A cherry, for instance, was presumed to consist of the sensations of red, sweetness, roundness, etc. This doctrine still continues to be a prominent factor in current psychology in some form or other.

The tenacity with which the analytic psychology has persisted is accounted for by the support it received from the development of the physiology of the sense organs. When in the middle of the nineteenth century physiology made great strides and became a laboratory science, much attention was given to the studies on nerve action and sense organs. Experiments were made upon the sense organs with the result that the correlation of the discrimination of colors with the activity of the eye, tastes with the operation of the taste buds, and temperature and pressure with the functioning of the cutaneous receptors, gave credence to the assumption that "consciousness," the new name for mind, was a structure of simple elements, each of which was a sensation or a feeling.

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Hence arose the structural movement in psychology, and for a long time, even down to the present day, scientific psychology has to a considerable extent consisted of the investigation of the facts of simple discriminations. From our present point of vantage it may readily be seen that such experimentation was merely making the reported qualities discriminated, sometimes into psychic stuff, and sometimes into psychic functions. The phase of the reaction which was discrimination of the qualities of an object was made the structural element of the mind, although psychologists well knew that objects were not in the mind or composed of mind stuff, and, further, that objects were not composed of elements at all.

As the subject matter of psychology was considered to be consciousness or knowledge elements it was possible to study it only by a special method different from all scientific methods. The method of psychology was presumed to be "introspective" or a consultation of one's own knowing about things observed.

Such were the intellectual backgrounds of the new scientific psychology. Soon laboratories varying as to completeness of equipment were established in order to foster investigations of the simpler, sensorial sort. From the first founding of a laboratory by Wundt in Leipzig in 1879 to the appearance of laboratories in almost every substantial university, the work of extending the original physiological researches rapidly grew apace. Work upon the so-called higher mental processes was much hindered of course by the doctrine of the separation of mind and body, but because the workers were after all really studying the responses of organisms to particular stimuli, enough of a foundation accumulated to serve as a basis for much of the recent work on memory and learning.

The reader may well ask how the doctrine of detached mental states could appear plausible to psychologists. We have already indicated that because the investigators were actually studying complete reactions of persons their theoretical deficiencies did not trouble them so very much. Especially was this true, since the psychologists who were interested in the more theoretical phases of the subject soon came to make use of the nervous system as a means of avoiding the difficulties involved in believing in a mind detached from the rest of the person. This they did by thinking of the nervous system as the mind which thus substituted for the psychic elements or functions, in the sense that the brain was presumed to control the actions of the organism. At other times, however, the nervous system, especially the brain, was made merely into an invariable accompaniment of the mental activities in spite of the fact that since the former is physical it can really have nothing to do with the mind.

Following in the trail of this type of doctrine came the various problems concerning the relation of mentality to the physical

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body. Here the floodgate of speculation was thrown open and many were the varieties of theory explaining how the mind was associated with the body. Sometimes the mind was presumed to operate upon and influence the body to act, or it was asserted that the body operated upon the mind, or both forms of actions were assumed at once. On the other hand, it was believed that two such distinct types of things could not influence each other and the most prevalent view became that of parallelism. The operations of mind and body were assumed to be two parallel types of activities, neither of which could have any connection with, or influence upon the other. And because the nervous system became the asserted means of connection between the mind and the body, psychologists began to speak or write much of psychoneural and psychocerebral or psychocephalic parallelism.

About the same time that structural psychology was developing, mainly in Germany, psychologists in Great Britain were much influenced by the development of the doctrines of biological transformation. Because the emphasis in this movement was upon the biological actions, organisms as integrated wholes were considered more the objects of investigation. From this situation as a basis we may trace the origin and development of animal or comparative psychology. Being thus influenced by Darwin (1809–1882) and his co-workers, psychologists began to develop a functional conception of the mental life. Instead of looking upon consciousness as in any sense an element or a structure of knowing materials they considered it as an adaptation or adjustmental function in the organism which possessed consciousness. With many differences in detail of course, this simulates closely the Aristotelian doctrine. Prominent among the adherents of this view were Spencer (1820–1903) and Bain 1818–1903 in Great Britain, and James (1842–1910) in this country.

Because the functionalists, as the members of this group may be called, no less than the structuralists still considered consciousness as something different and distinct from the body, and also since such consciousness with all its reputed power was admitted to be intangible and indescribable, a movement arose within the last fifteen years which has attempted to leave entirely out of consideration any form of consciousness. This movement became known as behavioristic psychology and it based itself upon the observations of the operation of the totally integrated physiological mechanism. For such a psychology there was left to be investigated only processes of simple habit formation. The problems of sensation of the older structural psychology became transformed in the behavioristic psychology into studies of observing the action of receptors or particular muscular and glandular coördination (bodily organism as a whole) in the presence of colors, sounds, etc.

The development of this view has taken two fairly distinct

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though still interrelated forms. In the first development the objective movements have been considered as really complex and as being more than physical actions, thus comprising what are actually the behavior of organisms. In the second development it has been asserted that all of the complex actual behavior of persons can be reduced to physiological functions, so that the latter can be used at least as explanatory principles.

We come finally to the development of the organismic conception of psychology, which is the viewpoint of this book. Organismic psychology is based upon the premises that we must never admit anything into our scientific thinking but that which can be actually observed. Nor must we assume for our convenience that the part is the whole. The value of this viewpoint lies in the fact that only actually occurring phenomena are observed, and as complete a description of the facts as possible is made the basis for interpretations. Basing our investigations upon this platform we consider the subject-matter of psychology to be the concrete reactions which an organism makes to its stimuli surroundings. Naturally all the varieties of surroundings are considered; so that organismic psychology considers as part of its subject-matter not only the simple behavior to natural stimuli but also the complex adaptations to social and human institutions. For the organismic hypothesis there exists no mind-body problem, for these terms are considered as metaphysical abstractions and do not represent any real fact. The organism is a complex psychological machine and not a union of discrete elements or stuffs. Moreover, the causes of the organism's reactions are not brain or mental conditions, but the needs of the organism as dictated by the surrounding objects and events. In all such adjustments, as we have noticed above, the activities of the nervous system are integral factors of the total complex reactions. For such a view the explanatory features of the science consist for the most part in the detailed study of the reactional biographies of individuals throughout their various contacts with their actual surroundings.

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Our first suggestion of a perspectival sort concerns the general relationship existing between our specific psychological material and its philosophical background. Because of various historical and cultural conditions it is essential we believe for psychologists to be distinctly aware of the presuppositions lying at the basis of their work. Especially is this necessary in order to avoid unscientific errors and commitments of various sorts. Not that the physical scientist is absolved from such knowledge of his cultural and methodological perspective; but rather because, fortunately for him, he is dealing with comparatively simple materials he need not involve himself (although frequently he does) in hopeless misinterpretations.

Prominent among the untoward results accruing from the psychologist's disregard of his cultural and philosophical background is his blind admission into his work of pernicious folklore of all sorts.

At the very inception of experimental or so-called scientific psychology the primary interests, for the fostering of which exact statistical methods were employed, were religious and metaphysical in character. And so it stands in the historical records of psychology that the leading spirits in that province felt constrained as they took their places in the field, to criticize their predecessors in what was frequently a severe manner. Example, Wundt's comments upon Fechner[1] and the general psychophysical controversies (cf. Klemm, History of Psychology, 1914, Chapter IX.)

But this situation it may be said is both historical and to a certain degree wittingly and voluntarily done. That is to say, it might be asserted that true enough it was in Fechner's time that psychologists openly accepted a bad metaphysics, but that was long ago. Today psychologists refuse to discuss ultimate problems of that sort. Now it is our suggestion that it is precisely the dereliction of duty involved in neglecting to guard the frontiers of the science, as well as the failure to know the difference between what is an observable fact and what is a product of folklore thinking, which makes trouble for our science. Unless we know our cultural and methodological background, extraneous and undesir-

[1] Thus Wundt in his address on Fechner (Gustav Theodor Fechner, 1801–84, 1901, 84). "Das ganze Interesse Fechners gehört eben nicht der Psychologie als solcher an, sondern diese ist fur ihn nur ein Bestandtheil der Natur-und Religions philosophie," etc.

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able elements will persist in creeping in to make invalid much of our psychological work. How many such obnoxious elements are harbored by psychology today is suggested by the mere mention of instincts, native intelligence and other innate capacities, inherited emotions, and kindred materials. Folklore, we repeat, inevitably makes its way into scientific work when the scientist either does not realize that his material contains preobservational suppositions or hypotheses, or does not ascertain what pre-suppositions he employs and how they affect his gathering of facts and their interpretation.

A more specific influence of the neglect of the logical background of psychological science has been the practice of not working out completely the data of the science. In detail, this amounts to assuming that not the whole of the actual facts was observed or dealt with, but that whatever data were handled were only manifestations of the actual subject matter of the science. In earlier times when consciousness or the mind was considered to be the subject matter of psychology it was defined as unobservable and intangible, hence known only through its manifestations. Also, the relation of the mind to its manifestations, or the body to its actions, was presumed to be a mystery to be unraveled by philosophy. Today, psychology still harbors tendencies, intelligence, will, etc., which it is asserted can not be known or defined by the psychologists.

Such a viewpoint as this can only be considered as a defense mechanism which the psychologist builds up to shield him from a reality which he does not face. Such philosophy can only be considered as a last refuge and sanctuary into which the psychologist plans to escape from responsibility,—the responsibility, we may say, of interpreting his facts and making them into very definite materials of natural science.

To account for such a neglect of philosophical background we can only suppose that psychologists entertain the notion that philosophy is an unwholesome discipline concerning itself with unobservable materials far removed from the world of actual facts. But if this is their conception all the more should they be eager to search out all the implications of their data and methods so as to make their scientific material entirely separate and a thing apart from such crass metaphysics. But no, what is actually done is that psychologists merely close their eyes to a bad situation and in consequence permit what they would exclude from the main entrance to creep in under the folds of the tent.

Can it be possible that psychologists and other scientists are generally unaware that philosophy itself, as a part of the same cultural complex that makes exact science possible, has also developed and grown away from the primitive mystic disciplines which deal with unknowable and unobservable materials?

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Now as a matter of fact genuine philosophical investigation is far removed from such a condition that it can be used as an asylum into which to escape from scientific difficulties. Philosophy in common with all natural sciences has nothing to do with spiritualism and materialisms. Rather, genuine philosophical study constitutes the investigation of the same natural phenomena as any other scientific discipline, although philosophy of course treats such phenomena in a more general and exhaustive manner. Philosophy consists of conceptions and ideas constituting the orientation of a thinker toward the actual world in which he lives (cf. Dewey. *Reconstruction in Philosophy,* 1920). Accordingly, a philosophical background for a scientific work is primarily methodological in character. In this sense we are aided in a positive way by our philosophical principles to reject any consideration of data unless they are specific concrete facts open to observation in some form. As we have already seen, this means that it is precisely an assiduous adherence to a genuine philosophy considered as the logic of science, which prevents us from occupying ourselves with such verbal abstractions as consciousness, mind, sensations, native intelligence, mental states, etc. Is it necessary to say again that when we become aware of the genuine presuppositions of our science we will realize that our data as natural events can only consist of an organism's interactions with surrounding objects and never of invisible and intangible substances or powers.

A second perspectival placing of this work indicates its relationship to the experimental tradition. Here we must point out that the experimental tradition in psychology may be divided into two distinct phases, only one of which has any close connection with our work.

In the first place, experimental psychology signifies a particular viewpoint, a psychological basis which we may call a psychic structuralistic interpretation that developed as an accompaniment of the early emergence of psychology. This is characterized by the fact that Wundt (*Grundzüge der physiologischen Psychologie* (5) 1902–3) can make experimental psychology identical with physiological psychology. Two unacceptable situations arise from this viewpoint. In the first place, it tends to make psychological data into exceedingly simple materials, for example, simple discrimination reactions (called sensations) which are presumed to be organizable into more complex mental states (tones into clangs, simple clangs into complex clangs, etc. Cf. Wundt, *Outlines of Psychology* (3) 1907). All this leads to a hierarchy of mental structures constituting gradations of psychical complexes. This situation has historically arisen in the early development of physiological experimentation in psychology. In attempting to seize upon data that could be handled as observable phenomena as over against the unobservable stream of "inner sense," psychologists

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began to work upon elementary reactions of which an observable phase could be recorded.

In the second place, aside from being concerned merely with the very simplest types of psychological phenomena, this experimental or physiological-psychology tradition always assumes some sort of parallelism, for such work was conceived to furnish records of the physiological or accompanying features of the compoundable mentalities. This parallelism for the most part was presumed to go back to some sort of metaphysical monism.

So far as both of these unacceptable situations are concerned our work diverges widely from the experimental tradition. Psychology cannot be limited to such simple activities as we have indicated. Now that we deal exclusively with concrete interactions of organisms and their surroundings, we no longer need to "establish" observable phenomena as over against non-observable materials. Accordingly, we may study all types of activities, even the most complicated human conduct, and in fact we must do so in order adequately to survey the psychological province. It is needless to add that none of these activities can be considered as physiological functionings. Experimental psychology in the sense of structuralism or physiological experimentation is very different from an organismic discipline.

Again, insofar as experimental psychology is a parallelistic doctrine it cannot have anything in common with our organismic conceptions. But here it must be made plain that from the maze of parallelistic interpretations may be extracted definite organismic stimuli and response data, (cf. an article by the writer entitled, "Can the Psychophysical Experiment Reconcile Introspectionists and Objectivists?" *American Journal of Psychology,* 1922, 33, 481).

Most closely related is the present work to every experimental movement, insofar as the latter is independent of conceptions relative to non-observable facts. As it happens, the most unbiased experimental work has been done primarily with animals. (Cf. Watson, *Behavior* 1914). But as we have indicated experiments on human activities may also be considered as so unbiased, (cf. besides Wundt, Külpe, *Outlines of Psychology,* 1901; Ebbinghaus, *Grundzüge der Psychologie,* 1900; Ladd and Woodworth, *Physiological Psychology,* 1911; Titchener, *Experimental Psychology,* 1901–05; Dunlap, *Elements of Scientific Psychology,* 1922, and the most recent work available in the periodical literature, cf. *Psychological Index*). Experimental work on simple human reactions, when performed as independent objective data, must be considered as the lower part of a long scale of actions of which the upper portion contains the more complicated human behavior.

As a worker in what is primarily a field study the psychologist

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must value any available data critically observed. Accordingly, we may indicate the title of a few works containing collections of keen observations of human behavior situations.

Among older writers may be cited Locke, *Essay concerning Human Understanding,* 1690; Tucker, *Light of Nature Pursued,* 1768; Brown, *Lectures on the Philosophy of the Human Mind,* 1820; and Hamilton, *Lectures on Metaphysics,* 1859–60. More recent works containing splendid materials for the student of psychology are Lewes, *Problems of Life and Mind,* 1875–77; Carpenter, *Mental Physiology* (4) 1876; Ward, *Psychological Principles,* 1918; Stout, *Analytical Psychology,* 1896; and James, *Principles of Psychology,* 1890. Some of these, and especially the last, are replete with bibliographical materials sufficient for a liberal education in psychology.

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CHAPTER II

THE PRIMARY DATA OF PSYCHOLOGY

Before proceeding to our intimate study of the reactions of psychological organisms to their surroundings it is essential to make a thorough preliminary study of the data with which we shall be concerned. Our general survey of the psychological field has already sufficiently indicated that the data of our science consist of bipolar acts, one phase of which is the response of the organism, while the other is the stimulus object or condition connected with that response. What we mean by calling stimuli and responses phases of action is that no response exists without its absolutely correlated stimulus, and *vice versa*. Nor can we study or understand one without the other.

Among the primary data of our science, then, we place in a leading position the psychological act, or as we shall find it convenient to say, the segment of behavior, which comprises the two phases mentioned, namely, the response and the stimulus. In addition we shall discover that very little progress can be made in understanding psychological phenomena unless we add to our series of primary data the reacting organism, or as we shall say in human psychology, the personality. Accordingly, our work on the primary data must cover four topics, namely (1) the behavior segment (2) the stimulus (3) the response and (4) the personality. The last subject will be treated in the next chapter.

THE PSYCHOLOGICAL ACT (SEGMENT OF BEHAVIOR)

Let us begin our study by a consideration of the segment of behavior. From the standpoint of scientific psychology we look upon the behavior segment as an arbitrarily selected portion of the activities of a person or animal. Whenever the psychologist undertakes to describe a reaction or an organism he must, in order to have any description at all, divide off the adjustment in which he is interested as a definite portion of behavior. The segment of behavior is detached, then, from its predecessors and successors in the chain or stream of actions. In this manner the psychologist obtains, in spite of the difficulties of the material, a workable descriptive unit. Now when we consider the extreme complexity and manifoldness of human action we must agree that unless we include in our unit as many factors as possible we stultify our descriptions and make them too abstract for any use. Consequently, we find that the psychological unit or behavior segment is always the most conveniently isolated response to a stimulus, or series of

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responses to stimuli, which can be said to represent a definite, specific adaptation. Such an adaptation is exemplified by the reflex act of pulling one's hand away when it comes into contact with the hot radiator, by jumping out of the path of a flying missile, or by picking up a book.

Simple and Complex Behavior Segments

Obviously behavior segments or psychological acts differ very widely in complexity. These differences involve, of course, complexity in both the stimulus and response phases. To appreciate the relative complexity of behavior segments as depending upon the nature of the stimuli we need only ask whether the person is reacting to a quality of a single object, a whole single object, a person and his actions and attitudes, or to an event or catastrophe.

On the response side the complexity of behavior segments depends upon the number and intricacy of act units contained in the response. By an act unit we refer to the smallest, actually performed movement or other adaptation which the person makes to a stimulus. The single reflex movement and secretion responses that we constantly perform are examples of such unit reactions. To such unit reactions we give the name reaction systems. Now a segment of behavior can contain either one reaction system or many. When we have more than one unit reaction system in a behavior segment we call the response a response pattern or reaction pattern. Obviously then the response of the simplest type of behavior segment is one that can never be called a reaction pattern, such as the reflex situation in which there is only one reaction system, namely, pulling the hand away from a hot or an extremely cold object. The further identification of a reaction system and its distinction from a reaction pattern may best be accomplished by a comparative study of them.

Reaction Systems and Reaction Patterns

The majority of behavior segments comprise reaction patterns and thus contain a series of reaction systems or act units. Such a series may be well illustrated by the behavior segment represented by the reaction time experiment. Here the operator or experimenter presents a stimulus to the observer or reactor in the form of a sound signal or colored object. The response then consists of the following series of unit reactions: (a) attending to the source of the stimulus, which is of course indicated to him, (b) perceiving (seeing or hearing) the stimulus object, and (c) tapping an electrically connected key which records the reaction time by stopping a clock (chronoscope) that was started when the signal or stimulus was given. Since the experiment consists of determining the shortest time in which the individual can respond, it is essential that the response pattern should not be further complicated, or interfered with. Such a condition is, however, an impossibility, for in many instances, if not always, the reaction pattern is complicated by other and extraneous reaction systems. For example, the person may talk to himself, may think of his need to attend and respond

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rapidly, or of his probable record. Certain it is that in other situations at least, such extra responses as we may call by-play reactions, constitute a part of the behavior segment. To distinguish the important [1]—or source of interest—reaction systems from the by-play additions we will refer to the former as the central reaction systems.

Types of Reaction Patterns in Behavior Segments

Our study of the reaction time behavior segment indicates, then, that probably every behavior pattern can be shown to have in it at least two types of reaction sequences,[2] namely, the sequence consisting of (a) the central reaction systems, and (b) the by-play reaction systems. Now depending upon the number and kind of sequences of reaction systems in the total response to a stimulus, the response or reaction phase of a behavior segment constitutes a distinct pattern differing from those including other combinations. Accordingly, under the caption of types of reaction patterns we may discuss some of the chief forms of the great number of sequences or organization of reaction systems in complex human conduct.

Precurrent- Consummatory Reaction Sequence

In the same reaction pattern, namely, the reaction time experiment, we may point to another extremely important sequence of reaction systems, to wit (a) the precurrent response systems, consisting of the attention, and the perceptual reaction systems, and (b) the consummatory reaction system, namely, pressing the key. Doubtless the terms precurrent and consummatory do not require further explanation. In every behavior segment we can fairly well determine what reaction system finishes and rounds up the act or characterizes it as an adaptation. This determination is made upon the basis of the type of stimulus object or situation involved in the segment, since stimuli situations are more easily distinguished and differentiated than are the continuous acts which constitute our behavior. Naturally it is the final reaction system which gives the name to the entire behavior segment. Thus, depending upon the specific character of the final or consummatory reaction system the behavior segment may be a volitional, thought, habit, or emotional act. We should add here that there are behavior segments in which the last or finishing act is not an effective reaction system such as pressing a key, but rather a verbal action or an idea (implicit act). In that case we may use the distinctive term of final, instead of consummatory action, which connotes overt action. In actual practice, it will be found expedient never to use the term consummatory for thought actions, while the term final is used for both implicit and overt actions.

The precurrent reaction systems of a behavior pattern operate

[1] Important, that is from our present standpoint. In many cases, however, the by-play responses may be much more important.

[2] As we shall later have occasion to see, at least one other type may be described.

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therefore to bring about the final or consummatory reaction system. So in this connection we find that as a matter of fact the number of precurrent reaction systems is not limited to two as we have indicated, for we have taken an exceedingly simple case which itself may even be an abstracted and abbreviated description. There may be many precurrent reaction systems and moreover they may be of many types.

Preparatory and Anticipatory Precurrent Reactions

Of the different varieties of precurrent reaction systems we may distinguish two classes which we will name (a) preparatory precurrent reactions and (b) anticipatory precurrent reactions.

(a) Among the preparatory precurrent reactions we may place the attention reaction systems of our experimental illustration. Such reaction systems serve merely to prepare the person for the final or consummatory response. Also we may consider the perceptual reaction as a member of this class for it serves the same function. Effective actions which may operate along with the other two types form a third type of preparatory responses. For example, suppose that in our experiment the person should have to reach for some certain key rather than another, the movement toward that key would be an effective preparatory act.

(b) Anticipatory precurrent reactions are more complicated in function than the merely preparatory reaction systems. For the former not only prepare for the consummatory reaction system but also condition it as well. The best illustration of such a conditioning is probably found in the segment of behavior in which the final or consummatory action is delayed in operation until a preliminary problem-solving or reasoning activity is completed. Such a behavior segment is the voluntary action as well as every other in which the person may be said to act purposefully.

Personal and Impersonal Anticipatory Reaction Systems

The anticipatory reaction systems we have been describing may be called direct in that they condition the final response on the basis of the person's desires, interests, or ideas which are brought into relief by conflicting or incompatible stimuli conditions. Such reaction systems emphasize change or modification in the response and are not dictated by the stimuli. When it is the stimuli, however, that influence the person's anticipatory reaction systems we have an indirect or impersonal anticipation operating because of a close dependence of the anticipatory reaction systems upon the stimuli objects.

Thus, we have behavior segments in which one of two indeterminate stimuli may be looked for in a complication of the reaction time experiment. The subject may be told to press the left key when a green patch appears and the right key when a red patch appears. In this experiment a comparative discrimination reaction system may be considered as operating in more than the merely preparatory way which is the case with the perceptual reaction system in the preparatory situation. We might mention

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here the fact that various overt reaction systems may operate as indirect anticipatory reactions as well as the implicit discrimination action which we have just been mentioning.

In actual practice we discover that the two types of precurrent reaction systems do not always function in different behavior patterns, but on the contrary may both operate in the same one, in complex combination.

Auxiliary Pattern or Sequence.

Besides the two types of sequences of reaction systems already treated, namely those in which the reaction patterns constitute (a) central and by-play response systems, and (b) precurrent and final response systems, there is a third type in which the reaction systems may be divided into both (a) central and by-play and (b) precurrent and final on the one hand, and (c) auxiliary reaction systems on the other. This type of pattern or sequence is naturally much more complex and differs from the others in the fact that the auxiliary reactions may themselves serve as stimuli further to condition very decidedly the final reaction (which we will call definitive since it is influenced by the auxiliary reactions as well as by the original adjustment stimulus). To illustrate a segment of behavior which involves auxiliary reaction systems, consider the case of the painter who is stimulated to put certain pigments on the tree which he is painting. This action itself and its results serve to modify the next step in the painting process.

A Simple Reaction System Compared with a Complex Pattern of Response

Now we are prepared to see the difference between a behavior segment comprising but a single reaction system and one constituting a pattern of response. In the former there is lacking not only the complexity found in the latter, but all of the functional features, beginning with the central and by-play features, the precurrent and final functions and the auxiliary processes. In the behavior segment in which only one reaction system is found, all of these functions, in so far as it is possible, must be telescoped in the single reaction system.

The Complications of Behavior Segments, or Situations

All the complex behavior segments are tremendously involved but we have not yet studied the most complicated forms of acts that we perform. We might merely suggest then that what we have called a pattern of response may itself be a member of a chain of precurrent reactions which precedes some final adjustment. Thus we find that an emotional or volitional action, for example, each may itself be a response anticipator of a final adjustment. Again the final act of the pattern may consist of a series of reaction systems, especially if they are implicit or verbal language reaction systems. All of these more complicated behavior segments or acts doubtless should be characterized by a distinct name. For this name we suggest behavior situation. A behavior situation, therefore, should be considered as the most complicated type of segment including as it does a chain of behavior patterns.

But even within the domain of behavior segments proper we

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have not yet indicated the maximum complexity. We have yet to point out that any member reaction system of a pattern series may be an integration of simpler reaction systems. If, for example, a precurrent reaction to placing a book on the table is taking it out of a group of books, we can readily see that this latter sort may comprise a series of simpler acts or movements, for example, various eye-hand coördinations. No limit can be prescribed to the development of the integrations in human behavior, especially when we consider the enormous possibilities for the combination of implicit and overt behavior factors of various sorts.

The Scientific Significance of the Behavior Segment

Every investigator of psychological phenomena is severely impressed with the extreme variability and uniqueness of the complex series of processes constituting any complex human act. As a consequence it is extremely important to be able to identify an action, to characterize and define it. In such a way we can discover uniformities for purposes of comparison as well as predict what particular acts will occur under given circumstances.

First, we might point out that the identity and uniformity of a person's particular acts or adjustments depend upon the presence in the behavior segment of one or more particular kinds of response systems.

Consider the responses of a person in a tennis game in which certain stimuli in the form of a special play are offered him. Knowing something of the person and the conditions of his acquiring and retaining certain reaction systems, one may expect a particular kind of response play from him. Now although we may know nothing of the responses accompanying the tennis adjustments proper, such as the player's thought, whether related or unrelated to the game, his subvocal utterances and other by-play responses, which always form part of such a segment of behavior, still the central phase of the adjustment mentioned, or the tennis playing as a series of definite reaction systems characterizes for us the total segment of behavior. In this particular case the segment of behavior coincides fairly well with what we ordinarily call the "form" of the play, and the predictability phase of the person's playing will appear in the observation whether the player is or is not true to form.

From the nature of a behavior segment we may immediately infer another important factor, making for the identity and uniformity of behavior. It is, namely, the similarity of the stimuli and their settings, for it is obvious that the same objects appearing under the same auspices will call out the same responses.

Besides the essentially psychological factors already mentioned as conditioning the character and predictability of behavior others may be named, such as the actions immediately preceding and succeeding any given act, also the associability or dissociability (absent mindedness) of the individual with respect to sundry objects.

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Finally, at the time the actions are performed we must not overlook the influence of the precise hygienic conditions of the individual upon the general operation of behavior segments.

How important the pattern of response really is as a unit of psychological description may be seen from the consideration that only by studying the conditions of operation of reaction patterns in connection with their coördinate stimulational processes can we thoroughly understand psychological phenomena. The phenomena of delay of response as it operates in problem solving and reasoning can readily be understood by an investigation of the numbers, types, and arrangement of the reaction systems in the behavior segment, all in connection with the stimuli of course. Again, the problem of expertness of knowledge of different individuals with respect to some particular object may be discovered to be a case of the number and kind of implicit reaction systems referring to the object in the different behavior patterns of the individuals. Likewise the problem of depth of feeling with respect to objects, whether in the same or different persons, is to be solved only by an investigation of the type and number of specific reaction systems in the pattern of response called out by the stimulus object. Such investigation of reaction patterns and their comparison with reaction systems functioning alone may be expected to illuminate the problems of accuracy and rapidity of psychological actions through the use of the added information as to the original development of the behavior segments.

Finally we may suggest that the significance of the behavior segment conception may be emphasized by observing that what the psychologist calls illusions are merely situations in which certain reaction systems are being called out not by the appropriate stimuli objects, but by some other stimuli objects connected with the segment of behavior studied. Of course, when we attend to the stimulus, we might say rather that the particular stimulus object has called out an inappropriate response, but the mechanism is the same whichever way we look at the matter.

The Classification of Behavior Segments

In the above section we have already indicated that our different behavior segments, containing specific varieties and arrangements of reaction systems, constitute the differently named acts that we perform. Thus an act which consists primarily of overt reaction systems turns out to be what is ordinarily known as a motor response, while segments of behavior in which implicit reactions predominate are described by the conventional psychological term of thinking. Of course, in these complex segments there never is an exclusive series of one type of reaction system, but the predominant type colors the total act. Accordingly we may point out some typical classes of behavior segments.

Our classification, it must be observed, however, will stress those acts the differences of which are based more upon typical seg-

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ment differences than upon differences in reaction systems. That is to say, it is not our purpose at this point to classify behavior segments on the basis of their containing exclusively or primarily one or another type of reaction system. Rather we shall attempt to indicate a few specimen types of behavior segments according to the particular interaction of the response and stimulus factors. The classification of behavior segments on the basis of type of reaction system involved is really unnecessary, since we shall find it expedient to classify types of reaction systems in the section on psychological action units. We may now proceed to our arrangement of behavior segment types.

Immediate and Delayed Behavior Segments

In studying behavior segments we observe that some occur very promptly and immediately while others are delayed. Such delay or immediacy must be reckoned from the first contact of the reacting individual with the stimulus object to the completion of the final reaction system. These delays may last only a very short time or may cover a long period. In other words, we are not necessarily dealing here with an actual temporal situation, although such time differences are the marked features of delayed responses. The former situation is found in the case of a person looking over the billiard table before making a shot, while the latter may be illustrated by an action involving considerable prior deliberation. Now this difference in behavior segments is not merely the interpolation of a time interval between the functioning of the stimulus and the final response but rather the interpolation of precurrent responses before the operation of the final reaction.

The immediate responses can be best understood by observing that the segment of behavior in which they occur is limited to a single or a very few reaction systems. It is for this reason that there is a close correlation between immediate responses and the simple reflex type of action. Here the first action called out by the given stimulus is at the same time the final adjustment.

Naturally the interpolated activities are of all types and combinations but we may divide the whole range of delayed activities into two broad types based upon the fact that in the one all the interpolated responses are overt reaction systems, while in the other they are not. Since the attention and perception reaction systems are such constant factors in our behavior, in the sense that most of our activities by far are pattern actions, we must point out that the non-interpolated reaction systems are language or ideational reactions or combinations of these two. The interpolated overt reaction systems serve on the whole in simpler situations. Naturally the ideational or verbal language precurrent responses are more efficient and allow for a longer time interval between stimuli and responses, and as a result function in more complex behavior situations.

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One more distinction must be made to complete this classification of immediate and delayed behavior segments. When the delayed reaction covers a wide temporal interval we must distinguish between intrinsic and extrinsic interpolations. To illustrate, when a behavior segment covers a twenty-four hour period, as in the case of remembering to do something a day later, are we to consider all the actions occurring between the initiation and ending of the behavior segment as interpolated behavior? Decidedly not, for only such behavior elements as constitute essential features of the behavior segment in question[1] may be looked upon as interpolated response systems. But in other behavior situations, of course, whole behavior segments may constitute such interpolated actions.

In contrast to the immediate responses we find that in some segments of behavior there are series of responses resulting in a final adjustment. Doubtless the simplest of these delayed responses are those in which a definite attention adjustment represents the first contact of the person with the stimulus which is followed by a definite perceptual or ideational reaction or a series of such reactions; the entire set of processes finally culminates in a consummatory response. Clearly the line of division between immediate and delayed behavior segments likewise marks the differences between acts in which the responses are simple reaction systems, or reaction patterns. But the most important fact here is that the delayed acts constitute more complicated and more important behavior phenomena.

Process and Operation Behavior Segments

Some behavior segments constitute acts the responses of which are simple operations with respect to a particular thing or object which is the coördinate stimulus for such a response. But besides these types of behavior segments we have another which we may call the process type, the essential characteristic of which is that the response is a general form of reaction to a type of object or situation. In other words, the process behavior segments have as their stimuli components the type of objects whose individual members, though they differ in their specific identity, conform to a general type. Each type feature of these individual members has the stimulational function of calling out the process response. The process behavior segments are very numerous, and comprise a large number of classes. A very striking example is the activity of multiplication, in which we learn to perform a particular response to the type feature of the arrangement of integers and not to the particular integers as stimuli themselves. Again, in our very complicated social activities we have such behavior segments illustrated. For example, any elderly person may stimulate us to offer him or her a seat. Similarly, the acts of any person may

[1] Possibly this illustration would lose its value if we question whether this memorial activity constitutes a single behavior segment.

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arouse our proffer of thanks. Again, we acquire responses not to tamper with anything that is not definitely our own property. We might say then that the process type of behavior segment occurs in numerous positive and negative inhibiting situations. Still more striking examples of process behavior segments are the actions in which the person learns how to learn, or develops methods of developing still other methods for particular purposes,—to decipher codes, for example.

Informational and Performative Behavior Segments

A very practical distinction between behavior segments is that between those segments in which the response consists of an action or performance by which some change or modification in the stimulating objects is brought about, and others in which the response comprises an orientation or discovery of something with respect to the object, but not an action of doing something to it. To illustrate, we might consider that the same object, namely, a table, may serve to stimulate us in two different ways. If the behavior segment is performative we may move the table, place something upon it, or otherwise modify it or change our position with respect to it. On the other hand, if the behavior segment is informational we may merely discover that it has certain qualities, oak or mahogany, or that it belongs to some person, etc.

Protracted and Momentary Behavior Segments

Some behavior segments operate in a very short period of time, while others necessitate a longer period for their performance. But in this division we must differentiate between the protracted and delayed reaction, because in the former we do not have the same situation as in delayed behavior, namely that the final response is delayed in operation because of interpolated reaction systems. Rather, in the case of protracted behavior segments, because of the nature of the component reaction systems, the total behavior segment occupies a long time.

The difference, then, between the momentary and protracted behavior segments is illustrated respectively by the rapidity with which an individual attends to and perceives some game animal, for instance, and shoots at it, also by the situation in which the individual has heard some sad news which entails a behavior segment protracted and long drawn out.

Direct and Indirect Behavior Segments

By direct behavior segments we mean the type of action in which the individual is adapting or adjusting himself to an object that represents an immediate accomplishment of some sort. On the other hand, an indirect action is one in which the actor merely refers to or makes some gesture with respect to a stimulus object. It makes no difference whether the person is in direct contact with an object or not, or whether he reacts in a knowledge way or perhaps performs some manipulative effect upon a thing, in any case so long as he makes an actual immediate adjustment we call the behavior segment a direct one. Contrariwise, the indirect or gestural behavior segment is one in which, even when the object

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is immediately present, the person merely refers to the thing. Clearly, the indirect form of behavior is linguistic in character; we are describing in short the essential fact of language. Even when the indirect behavior segment results in a change or manipulation of the stimulus object, as may be the case, it is done by asking someone else to do it. Thus indirect action is mediate and not ever exactly an accomplishment.

Witting and Unwitting Behavior Segments

Certain distinct forms of behavior segments we can divide into the types called respectively witting and unwitting. In the former, the final reaction system is preceded by a series of precurrent reaction systems which refer to some past contact of the individual with the stimulating objects, or else to some phase of the object that is not then serving the stimulational function. As compared with the witting reactions the unwitting ones are lacking in these preliminary referential reaction systems and in general the final reaction system occurs promptly upon the appearance of the stimulus. On the whole, the unwitting behavior segment is not as effective as one in which some sort of definite appreciation of the nature of the stimulus object is required. This means to say, of course, that the unwitting behavior segments function in very different situations than do the witting ones. Naturally, the unwitting segments cover a wider range of acts, many of them deserving the popular designation of subconscious acts. Among the specifically distinguished reaction systems not found in the unwitting behavior segments are language and various forms of implicit reaction systems.

Volitional and Involitional Behavior Segments

By way of further characterizing behavior segments we will consider the differentiation between the volitional and involitional types. In general we might point out that the former are acts in which the final response, when it occurs, may be definitely considered as having been conditioned by precurrent reactions. These reactions represent of course prior contacts of the individual with the particular stimuli objects operating in the behavior segment. In the involitional case we do not find functioning any such control of the final reaction system by the precurrent ones. To a considerable extent the present types of behavior segments coincide with the ones described in the previous section, the only difference being that in the present instance there is a very definite conditioning of the final reaction system by the precurrent ones, as contrasted with the case in which the person is merely appreciating the character of the stimulus object or situation.

Intelligent and Unintelligent Behavior Segments

Here again we have a distinction between behavior segments serving to characterize them in general. In the intelligent behavior segments, as a rule, the final reaction is preceded by a large series of precurrent responses of an especially discriminative type. Intelligent behavior segments represent acts in which the final responses are preceded by the sorts of precurrent reactions we find

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in the witting segments, but in the intelligent situation they serve in a more effective capacity, for one thing—they enable the individual to perform actions in prospect and to determine the results of such action, before accomplishing them. A large share of this precurrent determining and prospective acting is accomplished through the fact that the behavior segment contains in it a good many language or verbal forms of reaction systems.

Adjustment and Adaptation Behavior Segments

As our last set of illustrative distinctions between behavior segments we may mention the difference between those constituting changes of position or attitude (knowledge or orientation) with reference to stimuli objects, and those which constitute definite adaptations. The difference amounts to this, namely, that in the adjustment behavior segment the person need not achieve any definite modification of his situation or status with respect to the stimulus object, while in the adaptation behavior segment it is just such a final adjustment or settlement that is achieved. Examples of these two sorts of segments must involve differences in relationship between the individual and the stimuli objects. For instance, a student may merely adjust himself to his assignment by looking it over or determining upon a time at which he will study it; or on the other hand, he may actually get to work and forthwith master the material. The former behavior segment or set of behavior segments we may consider to be adjustmental and the latter adaptational in character. Caution is here required. In no instance do we use the term adaptation or adjustment in the sense of survival or non-survival action. We refer in every case only to modes of action with respect to stimuli objects.

STIMULI, STIMULI SETTINGS AND CONTACT MEDIA

Behavior segments to be adequately described must not only be analyzed with respect to responses and stimuli but must also be considered in connection with the settings of those stimuli, as well as with the media of contact between the stimuli objects and the reacting individual. Accordingly, in this division of the chapter we shall make provision for these various factors.

The Nature of a Stimulus

A stimulus is entirely a functional affair. It refers to the operation of some object or thing or set of things which elicits a response from the reacting person. As we have already made clear, the stimulational function is a reciprocal phase of the response function, both of which together constitute the elements of an act or behavior segment. Stimulational functions therefore must be differentiated from the things or objects possessing these functions, for the same object may have several or many stimuli functions for the same person. Moreover, that same object may stimulate other individuals in still other ways. For instance, a rose as a psychological stimulus may function as something one

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person likes and another dislikes. Strictly speaking, then, we should always keep distinct the two different sorts of data, namely, stimuli objects and their stimulational functions.

To a very considerable extent psychological phenomena consist of the transformation of objects into stimuli; or to put the matter in other terms, psychological processes consist of making natural phenomena (objects, persons, customs, etc.) into stimuli objects which can then function to elicit responses. This transformative process actually consists of adding to natural objects a stimulation function or a characteristic which those objects then possess in addition to their natural properties and qualities. Frequently of course the stimulation functions of objects are built upon the basis of the natural properties of things, but this is not an essential circumstance at all. At the basis of changing objects into stimuli is the organization of specific responses to qualities, phases, or conditions of objects. And here we see a definite illustration of the statement that to a great extent psychological phenomena consist of making objects into stimuli, for the process of learning which is a central psychological phenomenon, consists precisely of the organization of responses to stimuli. This means of course giving functional character to objects.

When we ask what objects possess these stimulational functions we find that any object or thing may serve to stimulate action in psychological organisms or persons. Important it is to observe that by object or thing we designate any actual element in the surroundings of an individual, thus using the terms in an absolutely common sense manner. Among these elements we must include trees, stones, wind, air, persons, actions, events, temperature, laws, customs, morals, ideals, all sorts of events, conditions, circumstances, in short everything which influences our actions or to which we adapt ourselves psychologically. Nor are stimuli confined exclusively to objects as a whole, for in a genuine sense we also respond specifically to colors, tastes, odors, shapes, sizes, and other qualities of objects. To a certain degree the extensive range of adaptational situations indicates an important psychological difference between man and the other animals.

Equally significant among stimuli are the actions of persons and especially the actions of the individual himself. No inconsiderable proportion of an organism's activities can be directly traced to its own immediately antecedent reactions. This fact has been most exploited by psychologists with reference to the series of reactions involved in a train of thought. Indefinitely more striking than thoughts as stimuli, however, are the various reflex actions, especially of the secretory sort. Simply because in such instances writers mistake the ordinary biological-function factors of reflexes, such as the secretions of the reproductive organs, for manifestations of super-behavioristic forces, we find psy-

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chological literature replete with discussions concerning mysterious forces or drives controlling the actions of organisms.

But not only do one's own reflex responses serve as important stimuli for action, but other and more complicated reactions also function in this capacity. Thus, subtle linguistic responses and what are ordinarily called thinking reactions stimulate us to perform acts which encourage us to do other things, such as fortify our beliefs, and develop intellectual and other types of attitudes. In this connection we might add that much of the psychotherapeutic phenomena or suggestive cures depends upon the stimulation of actions by one's own prior or coördinate actions, whether these latter are self-aroused or stimulated by others.

Exceedingly prominent and effective as stimuli are surrounding conditions which are describable as requirements and needs. All of the various insufficiencies and lacks in the surrounding situations of the person are effective determiners of conduct of various specific sorts. Such needs may be looked upon as the lack of natural objects, for example, a rock when one's car is slipping down a hill, money when one must purchase something, companionship when one is lonesome, etc., etc.

Types of Stimuli

To cast further light upon the nature of stimuli we will throw them into a triple division the members of which we will name, universal, individual, and cultural types respectively.

Universal Stimuli

This first type includes the functions belonging to objects, or their qualities which stimulate the lower strata of psychological organisms in common with the human species. Another way to characterize this type of stimulus is to point out that it functions because of the natural properties of the object. For this reason, then, they produce the same effects upon all human beings because of the biological constitution of the latter. Undoubtedly, then, these universal stimuli operate in the more simple behavior segments, a fact suggested by the term universal, since they are simple enough to operate in every person's activities.

Individual Stimuli

By individual stimuli we mean the functions of objects peculiar to particular individuals. Typically the individual stimulus operates in a behavior segment performed by a person who has developed a specific type of reaction to some object. In the simpler situations individual stimuli may be illustrated by the kind of particular idiosyncratic reactions called out in persons by tools of various sorts. For example, the observation of different workers clearly indicates that the different tools they use have individual stimulation functions, as well as the functions common to similar tools.

In more complicated situations individual stimuli are illustrated by ideals of various sorts, and by different sorts of objects and processes to which individuals develop their own private responses. Typical of such objects are the stimuli which constitute the ap-

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paratus and techniques of inventors and research workers before their problems are finished and made public.

Cultural Stimuli

By our third type of stimuli we refer to the functions of objects that operate to call out behavior in communities and groups of individuals. To these objects, whether they are things, persons, laws, customs, opinions, etc., we may apply the term institution. Clearly we have in this type of stimuli also the functions which call out the reactions made to natural objects, but in this case the objects function not on the basis of their natural properties but because of characteristics which have been added to them through the fact that individuals of particular communities or groups have given them these functions by building up particular kinds of reactions to them. To illustrate a particular cultural stimulus, let us consider the case of a totem animal among the more primitive groups of individuals. We find that all the individuals in the group perform a prescribed conventional reaction to the animal. Similarly, among more complicated groups women as a class in general function to call out reactions of courtesy, chivalry, delicacy, etc.

Classification of Stimuli

The various stimuli functions which operate in behavior segments may be arranged on the basis of the specific characteristics of their operation. Therefore it is probably best to discuss the different stimulational functions as contrasting types.

Primary and Accessory or Adjunct Stimuli

By a primary stimulus we mean the original function of an object or its qualities which first calls out a particular kind of response, or which is responsible for the building up of a particular reaction in the organism. Possibly the best examples of primary stimuli are the functions of natural objects based upon their physical properties, which call out corresponding reactions of the individual depending upon his biological functions as affected by those properties.

As compared with primary stimuli the adjunct or accessory stimuli are functions of the same object, or parts of it, or of some other object, which in addition to the original stimuli, evoke the same reactions. The experimental demonstration of this type of stimuli is found in the now universally familiar conditioned reflex. The probabilities are that in our simple behavior a number of different objects may produce stimulational effects calling out the same reaction system. Thus in the case of the salivary reflex of the dog probably we might call out the same reflex by another stimulus in addition to the sound of the bell which is an accessory or adjunct stimulus from the standpoint of the visual or olfactory food object.

Direct and Substitution Stimuli

For the most part the primary and accessory stimulational functions operate when the organism is directly in contact with the object to which it is reacting. But in the case of human be-

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havior segments certainly, and probably in the case of some animal conduct, reactions may be performed both when the organism is or is not in direct contact with an object. When the person is not in direct contact with a thing to which he is adjusting himself we call the reaction an implicit one. Such reactions may be called out (1) either by the object itself or (2) by some other object or situation which may then be said to substitute for the original object to which the adjustment is made. A direct stimulus for an implicit act would therefore be the person of whom one is thinking, or the event in which one is planning to participate, and the substitute stimulus would be some object or condition remindful of the person or event. Clearly then the person must be in immediate contact with the original object or event in order to be directly stimulated thereby.

The substitution stimulus, therefore, is the excitant of a response originally acquired by contact with some other object. One goes to visit a very close friend because of being reminded of him by meeting a close friend of the former. In such a case the response is evoked by an object serving as a substitution for the object actually reacted to. Naturally enough we can trace out various conditioning factors which make possible the substitution of stimulating objects, among which are the resemblance, the common or similar use of objects, and the contextual relation of things.

It may be justifiably urged that our description of the substitution stimulus merely depicts the circumstances of any stimulus correlated with a recognition response, since every recognition reaction is indirectly aroused. Also, it might be said that every overt response involves a substitution of stimuli even though the stimulating object be the same, since every response succeeding the original adjustment must perforce be stimulated by a representative of the original object associated with the original response. In seeking for a trustworthy guide to distinguish between a substitution and a direct stimulus, we observe the following fact, namely, that whereas in the non-substitution situation the acting stimulus is one that would ordinarily call out the response in question because of an original coördination between the two, in the case of the genuine substitution, on the contrary, no such connection exists.

The operation of the substitution stimulus is clear-cut when we consider the delayed reaction in which there are several intermediary responses preceding the final actual adjustment. In such a delayed reaction some object evokes an implicit or incipient response, which in turn serves as a stimulus to some other incipient response, until finally the consummatory adjustment is made. We look upon the final adjustment as the adequate reaction to

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some object or situation, and as we see, it is in the end made to operate by some object or situation, other than the one finally adjusted to.

Adequate and Partial Stimuli

Among the various behavior segments we find that some of the responses are called out by some single object or circumstance which is quite sufficient to bring about all of the activities of the individual constituting the adjustment to that object. In other cases the object may only partially possess the function of calling out the response made to it, while other objects also serve to elicit the reaction. The former we call an adequate stimulus and the latter a partial stimulus. For instance, when someone wishes to induce me to accompany him on a fishing trip I am stimulated not merely by his request but also by the type of fishing, the need of a vacation, and so on. In this case we have two or more partial stimuli no one of which alone is adequate or potent enough to call out the adjustment response.

Adjustment and Auxiliary Stimuli

In the illustration used to differentiate adequate and partial stimuli we can contrast another set of stimuli functions, namely, adjustment and auxiliary. These two types are common to all behavior segments in which language operates. The fishing situation of our illustration constitutes the thing to which we adapt ourselves. Hence we speak of its function in eliciting our action as an adjustment or dominant function. On the other hand, the language activity-stimulus of the individual inducing us to react to the fishing situation constitutes an auxiliary or referential stimulus function. The language activity, in other words, refers us to the adjustment stimulus, and so we conclude that the language act is an auxiliary function. We must not further conclude, however, that the auxiliary function is the same as the partial function, since what is here called the auxiliary or referential function may be the adequate situation. Such would be the case when there is no question of my going fishing and hence I merely listen to the recital of someone else's success or other experience while on a fishing trip.

Unit, Constellation, and Serial Stimuli

In some behavior segments the response is brought out by a single stimulus function. In other cases the reaction is so complicated that it requires two or more stimuli. An example of this would be the case in which a chess player has to move in such a way as to adapt himself to two specific conditions. Whatever movement he makes may be considered as a double form of reaction. At the same time he is adapting the play to one of the conditions as well as to the other.

Again the two stimuli functions may be differentiated in their operation as dominant or subordinate stimuli. The ordinary case of a verbal request to do something (subordinate function) as compared with the reaction to the dominant or adjustment stimulus is an illustration in point.

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In more complicated behavior segments than we have indicated there may be two dominant or adjustment stimuli and several subordinate stimuli. And in behavior situations of a still more complicated sort there may be an even larger complexity or constellation of stimuli functions.

The constellation function we have discussed refers mainly to situations in which the stimuli are located in the same object or in closely related objects forming a larger function than a single stimulus. We will now consider a situation in which stimuli function in a serial relationship or chain-like connection; so that the activity correlated with them consists of a series of reaction systems to a chain of stimuli succeeding each other in some definite or indefinite order. To illustrate this type of stimulus function we will consider the individual who is performing a variety of actions in a protracted physical contest. Each act he performs depends upon the appearance of a new stimulus. Furthermore, the orderliness of his behavior is contingent upon the interrelation and organization of a series of stimuli. Possibly in every case the serial or chain stimuli functions operate in large behavior situations, although it is likely that segments of behavior may be complicated enough to contain such serial stimuli functions. Another way to differentiate between the serial and constellation stimuli is to consider the latter as present from the beginning and operating as they are from the first, whereas in the case of serial stimuli the later members may not be present and functioning from the beginning. Accordingly then in the serial stimuli operations each unit function will be an adjustment stimulus when it operates, although we may conceive of very complicated situations in which the serial stimuli functions are accompanied by series of auxiliary stimuli.

Exogenous and Endogenous Stimuli

A very useful division between stimuli functions is to consider whether they are objects or conditions outside of the individual's activity, or whether they comprise conditions or activities of the individual himself, either his gross reflex responses, or more subtle implicit acts. In every complicated situation, of course, the two operate in conjunction and every constellation of stimuli probably contains a number of elements of these types.

Apparent and Inapparent Stimuli

Still another important distinction between stimuli is that between the stimuli functions belonging to objects which are observable and directly visible, and those which are not apparent either to the reacting individual or to an observer. For the most part the individual is in such contact with stimuli objects that either he or another observer may be certain of what that stimulus is and of how and when it operates. But in many cases the individual himself cannot say what the stimulus was that aroused a particular reaction in him. Probably the most striking instances of such inapparent stimuli are those which arouse ideas and memory

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reactions that are ordinarily described as inspired. Very frequently a person experiences the situation of having an idea "pop into his mind" but even with considerable searching we cannot discover how it is he was stimulated to perform this particular reaction under the present circumstances.

Media of Stimulation

Especially important is it to distinguish stimuli functions and the objects and conditions performing such functions from the media of contact operating to connect up the reacting person with the objects performing the stimuli functions. By media of stimulation or contact we mean the light or sound which enables the individual to get into contact with stimuli objects. To illustrate, you are asked to go into the next room to get a certain book. Now in order to be able to get the book it is necessary to use light as a medium or an instrument to perform the reaction, as for example, if it is necessary to distinguish some visual feature of it, or to react to it visually, that is to say, to see its size, color, title etc. In the absence of this light medium no visual reaction can take place. The same condition prevails with respect to every other type of medium which is essential for the individual's contact of a particular sort with the stimulating object. Thus without the medium of air waves we cannot perform hearing reactions; without the tissue-lacerating medium we do not perform pain responses. It is important to observe, however, that in our every day contacts with objects the mere absence of some specific type of medium does not preclude the occurrence of a response to that stimulus object. Thus in the absence of the light medium I may still be able to reach and obtain a book, but in this case the contact is through a tactual medium rather than through a visual one.

This distinction, as important as it is, has traditionally been overlooked by psychologists who have made the great mistake of confusing the media not only with the stimuli functions but with the stimuli objects as well. As a matter of fact, unless we do distinguish between these various things we are very liable to assume that even the physical objects exist only as vibrations outside the "mind," whereas the various qualities of these objects exist inside the "mind." A common sense criterion by which to judge the merits of the two views implied here, is the observation that at no time is any one of the various media absolutely essential in order to make some sort of reaction to the book in our illustration. That is to say, if light media are absent we may react to it by touch, etc. Of course when the book is entirely absent and no medium is possible for actual contact with it we may still respond to it implicitly through the instrumentality of a substitute object. The impulse to call the substitute object a medium of stimulation may be checked by the consideration that if the sub-

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stitute stimulus is a medium it is an entirely different sort of thing.

Aside from the very different methodological background at the basis of the view we reject, it has another basis and that is, that in some cases the stimulus object, the stimulus function, and the medium of contact may all coincide. This is the case when a particular sound is being reacted to. Doubtless there are many other such cases, but even in those instances, to lose sight of the genuine distinction between media and stimuli spells disaster for the whole psychological system.

How important are the media of contact or stimulation may be inferred from the fact that changes in the media introduce all sorts of possible complexities in the reaction situation such as the distortion effects which are especially well exemplified by the stick bent in water. On the other hand, however, no quality of the response can be attributed to the mere presence of the medium of contact, but must be referred to the stimulus function or to the properties of stimuli objects.

Types of Media

Our description of contact media has already suggested that media vary with different sorts of objects and the correspondingly different sorts of responses. Thus light media belong to situations in which the stimuli are visual objects and the reaction involves the eyes of the reacting person. We may further point out that media fall into types on the basis of their functional character.

Some media serve as connecting links between persons and distant objects. Here the media can be readily observed to be bringing the person and the object into functional contact. Among such media are light and sound, each of which represents a distinct type of radiation. Other media operate in much closer proximity between the reacting person and the stimuli objects. Among such very proximate media may be mentioned those for pressure and taste reactions. These it may be pointed out consist of mechanical (pressure) and chemical (taste) processes. In the latter case whatever serves as a taste stimulus must be capable of chemical solution. Still closer media we find in pain behavior segments, for here the media are pricking, cutting or otherwise lacerating or injuring tissue. All the media for the stimulation of internal or organic reflexes must naturally be very close. So close indeed are the media that unless great caution is exercised in their study we are likely to confuse them with reactions.

The Stimulus and its Setting

An objective study of human reactions must include in its program of investigation, in addition to the media of stimulating objects, the settings of the stimuli things and conditions to which adjustments are made. For it is an indubitable fact that the person is stimulated not only by things but also by their setting

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or background. From a behavior standpoint the setting of the stimulus object is of extreme importance in influencing the behavior of the individual and in conditioning in a large way what the person will do and how it will be done. A striking illustration of this fact is found in the widely varying reactions of the same individual to a social outrage when the stimulus is in and out of a mob setting. Plainly, whatever differences there are in a person's behavior to the same stimulus object may frequently be accounted for on the basis of varying conditions of the stimulating situation.

Illusions, when they occur, are to a considerable extent unexpected forms of response, explainable upon the basis of the modification in the setting. Thus we may account for errors in reading by observing that the reaction which occurs is due to the failure of the stimulus object to be coupled with its customary associates. The phenomena of contrast to a very considerable extent can also be described in terms of changes brought about in stimulating objects by the proximity of various kinds of surrounding things.

Here it is exceedingly important to point out the rather tenuous line dividing off the settings of stimuli from the stimuli themselves. In many cases the same object might serve as a setting for a stimulus object while also operating as an auxiliary stimulus. This latter point is very significant, namely, that when there is a coincidence of function between the setting and a stimulus, the latter is never, of course, an adjustment stimulus but some sort of auxiliary or subordinate stimulus. This fact is almost evident, since the entire matter hinges upon a type of function. We might indicate that the decision, whether in a particular instance we are dealing with a setting or a stimulus, can be reached by ascertaining whether the object serves to induce a kind of action, or whether it merely conditions action induced by some other object or condition. Another more theoretical criterion concerns the question whether we can correlate a reaction system with the stimulus object.

RESPONSES (REACTION SYSTEMS)

The adjustment unit of a behavior segment is the operation of a reaction system. A reaction system we have defined as the smallest unit reaction factor of a behavior segment. As a typical reaction system we might cite again the withdrawal reflex behavior in which the hand is jerked away from the hot radiator. Our reaction system here includes the working of the hand, shoulder, and perhaps the head. The parts comprising the reaction system we presume to be the essential parts of the person involved in the act. Now since as a matter of fact it is always the whole

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person who reacts, the reaction system is actually a scientific abstraction.

Analysis of a Reaction System

By virtue of the fact that this unit reaction system is after all always a specific act of an organism or person, a particular way an organism or person acts as a whole, it can be analyzed into a series of component functions. These components represent logically derived elements of a single reaction of an organism to a stimulating object. They are not separate functions or actions, nor can they operate alone. The response system in its totality is then a unitary organismic [1] adjustment to a stimulus and is abstracted from a pattern of response in a segment of behavior; each reaction system, however, represents a specific way in which a person reacts, and therefore is an actual scientific fact. In the following table are summarized all of the salient features of the reaction system:

1. Discriminative phase.
2. Conative phase, the preparatory attitude of the organism brought about directly through the media of stimulation.
3. Affective factor, tension, strain, relief, pleasantness, etc.
4. Action of receptor mechanism.
5. Action of afferent transmission system, (nervous conduction).
6. Action of central adjustors (synaptic coördination).
7. Action of efferent transmission system, (nervous conduction).
8. Action of effector mechanism.
9. Muscular phase.
10. Glandular phase.
11. Skeletal phase.

(1) The Discriminative Phase

The discriminative phase or function of a reaction system is founded in that characteristic of psychological phenomena which we have designated as the differential response. This phase is an elementary fact of the psychological field precisely as is the fact of electro-static induction in the field of physics. Normally whenever the individual reacts to some object or situation the reaction is definitely coördinated with and adjusted to that object or situation. Through a person's constant contact with numerous different objects his responses become so specialized and unique as to merit the name of knowledge, and when the responses are not only discriminative but anticipatory also, the reactions can be called intelligent and reflective.

In the actual contacts of the person with surrounding objects we may describe a series of different degrees of discrimination, all of which are based upon the number of the object's qualities influencing the reaction and the intensity with which these qualities produce their effect, as well as the influence of the object's setting

[1] By the term organismic we mean here the unit operation of a person's responses to and in connection with a stimulus.

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or background. In some cases the person appears to be merely aware of the presence of a stimulus, for example, an obstacle in his path, but is not able to say what that object is. In this case we might consider the person as barely differentiating between various objects, the sidewalk and stone for example. In other cases, the person may definitely identify the object, and in still other instances may know and fully appreciate the nature of a thing and its relation to other objects. Clearly, the more complex form of discrimination and knowing depends upon the development of complex patterns of response, but the point is, that the most intricate reactions are developments from simple reaction systems. A further development of the discriminative factor through increased contacts of the organism with surrounding objects may be considered as a more complex integration of the organism's adaptations to particular classes of things. As a consequence these responses deserve the description of intelligent action.

2. The Conative Phase

By the conative component or phase of a reaction system is meant the susceptibility of an organism to vary its position and attitude toward a new stimulus object. Frequently this change of action may be traced back to the influence of the medium of contact connecting the person with the stimulus object. In the simplest situation light, air or heat radiations coming into contact with the organism may put it into a state of preparation for action upon some new stimulating object. In more complex situations new contacts, because of objects coming into the presence of the acting individual or the individual moving into places where objects are located, may be the primary condition for the change of response. To a certain extent this preparation for action may consist merely of the sudden or gradual cessation of another action. In a genuine sense we might think of the conative characteristics of reaction systems as the factor which influences the person or organism to react to any given stimulus at a particular time, the factor, that is, which refers to the set of the organism and the precise means in which this set is brought about. In many cases it is precisely the ease with which an organism can be set for a response to some stimulus that conditions the occurrence of the adjustment at all. Moreover, any reaction may be decidedly modified by the mode of getting set. Thus the jerkiness of a pain reflex may be ascribed to the way in which the medium of stimulation influences the organism to prepare for an adjustment. In general, the direct contact media of stimulation bring about more active and prompt preparation for responses. Very important in influencing the form of the conative factor in reactions is the number of receptors in contact with media of stimulation at the same time.

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3. The Affective Phase

The affective factor or feeling phase of a reaction system refers to the general condition of the organism before a present stimulation, which condition greatly modifies the present reaction. Also the organism is conditioned by the present response and carries over the feeling to future conduct. The feeling factor may be described as calmness, relief, strain, tension, pleasantness, excitement, satisfaction, etc., and depends to a considerable extent upon the person's physiological condition.

In general, it must be observed that the three components of the response system which we have been describing refer much more to the functioning of the organism as a total unit than is true of the other components. Strictly speaking, of course, none of the components can be considered as anything but an abstraction from a total unitary activity. In other words, these components or phases are merely functional descriptions of responses that really have no parts. It is possible, however, in all but the three cases specified, to correlate the reaction components with the activity of a part of the organism, that is to say, with specific anatomical structures, (glands, muscles, end organs, nervous structures).

4. The Operation of the Receptor Mechanism

The receptors constitute (a) a specialized arrangement of cells, forming organs, or (b) nerve endings, sensitive to other forms of stimulation media. These receptors, situated in various parts of the organism, serve as the special points of contact between the person and the surrounding objects. More than twenty types of these receptor organs are found in the structural equipment of the person, and they may be classified in two ways.

A. The first classification divides the receptors into two types: (1) the interoceptors, that is, those which have their contact media within the body wall. Among such receptors are the nerve endings functioning in the acts involving digestion, respiration, circulation, excretion, and reproduction. Practically speaking, the stimuli for reactions involving these receptors are reflexes, such as periodic contractions of the muscle wall of the stomach or other organ, or of the whole organism, etc. Moreover, from a psychological standpoint, the reactions involving the interoceptors are stimuli to more complex behavior of the person. In contrast to the interoceptors, the (2) exteroceptors are end organs sensitive to media found outside the organism. In this class we have the various receptors of the skin and muscles, besides the taste buds, eyes, (retinæ) the ears (organs of Corti), etc.

B. The second type of classification of receptors puts them into four classes. (1) The proprioceptors which include nerve endings in the muscle spindles and in the tendons, and the semicircular canals; (2) the exteroceptors of the first classification, with the exception of the taste buds and olfactory end organs; (3) the general visceral receptors, that is, all of the interoceptors of the first

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classification; and (4) the special visceral receptors, the taste buds and the olfactory end organs. The second classification thus differs from the first in dividing the exteroceptors into three parts, that is to say, separating the propriceptors from the other receptors and also putting the taste and smell receptors into a separate class.

The distinctive rôle which the receptors play in reactions is that of enabling the organism to localize contacts with things, and in connection with the nerve conduction apparatus to coördinate the person for a directed response to some object. In every act there are always many receptors operating even when it involves only a single reaction system.

In our attempt to indicate the place of the receptor mechanism in a reaction system we have had to stress the organ rather than its function, but it is, of course, the function of the organs in each case in which we are interested. Naturally, the function and stimuli of organs cannot be separated but there is danger of falling into the error that an organ and its function can operate as a unit alone. The fact is, of course, that in psychology they are only of importance as unit functions in reaction systems. Perhaps this consideration is of more importance in considering the neural functions, but the warning may be equally necessary in this connection.

5. The Afferent Conduction System

The efficiency of psychological reactions are in great part owing to the localized contacts with objects, and the rapid coördinating actions of the organism following from the fact of the localized contacts. This means in effect that the responses of the person involve an elaborate transmission function referable to the apparatus which connects (1) the receptors with a coördinating center and (2) the coördinating center with the muscles and glands. The former apparatus is called the *afferent conduction system* while the latter goes under the name of *efferent conduction or transmission system.*

Typical of such afferent transmission apparatus is the optic tract that conducts nerve impulses from visual receptors (retinæ) to the various coördinating centers (cerebral) which operate in visual adjustments. Other representative afferent transmission systems are the auditory, (from inner ear to brain, the olfactory (from mucous membrane in the nose to brain), and the temperature path from the receptors in the skin to the coördinating center in the spinal cord, and up to the brain.

Obviously some afferent transmission systems are longer and more complex than others. For example, the afferent olfactory tract is very short, since the receptor is located very close to the brain centers. When the afferent pathway is very long it has a series of relays; that is to say, the neurons over which the nervous impulse passes will conduct the impulses to a nucleus which is the

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first coördinating center in a series of which the cerebral cortex would be the last one. Impulses originating in a skin receptor are relayed first in the spinal cord, then in the medulla, next in the thalamus, finally reaching the correlating centers in the cerebral cortex.

The fundamental fact about the afferent conduction mechanisms, as we have already indicated, is that they contribute through the transmission of neural impulses to the coördination of the whole organism for unified responses. To indicate how the transmission functions of the reaction system operate we might briefly describe the neurons, namely, the connecting cells which are distributed throughout the entire organism and which perform these functions.

The neuron is a cell consisting of a cell body which is probably the nutritive part of the cell, and which has branch fibres coming off from nearly every part of it. In the typical cell the dendrites and axones appear at opposite sides of the cell body. The dendrites are tree-like processes branching out in various directions. The axones consist of a central axial fibre called the axis cylinder which is covered with a sheath called the medullary sheath and sometimes has also an additional covering called the neurilemma or sheath of Schwann. The axones end in a branching process called the end brush and there are also rectangular branches coming off the entire length of the axone. The presence of white and gray matter in the nervous system is owing to the fact that some parts of the neurons are covered with a white covering (medullary sheath) while other parts are the uncovered cell bodies which are gray in appearance.

From what we have said about the coördinating functions of the conduction apparatus it is clear that the neurons can operate only in chains. The neural impulse is transmitted from one neuron to another, and the point at which the neurons are functionally connected is called the synapse. Plainly, the synapse function is the base for the coördinating properties of the nervous system. A center is merely the place for a complex synaptic coordination. Again in the actual operation of the transmission apparatus the neurons always function in large groups called nerves or tracts. Impulses carried from the periphery of the body to the brain and spinal cord centers and back again travel over nerves, while the conduction of impulses within the central nervous system is the function of fibre tracts. Aside from the synaptic centers the central nervous system consists of transmission tracts. Thus the spinal cord is both a system of centers and a complex of conduction paths. Of the nerves organized from peripheral neurons there are thirty-one pairs, carrying impulses to and from the spinal cord and twelve pairs performing the same function for the brain.

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6. The Synaptic Coordination Functions (Centers)

The central adjustors are the places within the organism in which the coördinating functions are performed. This function of correlating the actions of the whole organism consists entirely of a collection and distribution of neural impulses. We must note that in our analysis of a psychological response which is a unitary and whole action of the person, we are considering for investigative purposes some of the physiological or partial functions. Now the physiological function of the nervous system is to integrate and unify the various organs, thus individualizing the organism. From the various organs come the sensitizing neural currents to the various points of synaptic connection; here the impulses are summated and efferent neural impulses traveling to the various muscles and glands complete the arcs, resulting in the organism's presentation of a united front to the object which stimulates it.

Central adjustor mechanisms, therefore, play a definite and important part in every reaction of an individual to his surroundings. What conditions the operation of the specific receptors, transmission apparatus and muscular and glandular actions, are the various kinds of reaction systems which the organism possesses for its adjustments to surrounding objects and conditions. It is consequently clear that the organization of receptors, centers, and transmission apparatus is part of the biological equipment of the person, while the actual operation of them in functional systems is brought about by surrounding objects. In other words, the person coming into contact with particular sorts of objects acquires reaction systems which are the adjustments to those objects and which are later put into function whenever the coördinate stimuli objects are again encountered.

If we suppose that the nervous system functions in parts, which is not at all the case in actual behavior, we may then consider that there is a hierarchy of centers from the simplest to the most complex. The simplest are located close to the point of stimulation, and either serve as a relay connection in a chain of synapses or do not provide a very large range of synaptic connections. Aside from the purely relay centers called nuclei, we may isolate three ranges of synaptic coördination. (1) The simplest to which we have referred we may call the local type of center. (2) Another point of synaptic coördination allowing for a larger range of connections we may call a distance center, while the third (3) and most effective point of neural coördination may be termed the main type of center. If we do not carry the analogy too far we might consider the neural centers from the standpoint of number of connections as similar to the local and long distance telephone central station. To illustrate the working of the hierarchy of centers we call attention to the fact that impulses coming from the receptors in the skin can be coördinated in the spinal cord, which may be considered the local center, in the brain stem and

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especially in the thalamus. The cerebral cortex constitutes the main centers for synaptic coördination and here the most subtle and complex physiological phases of human adjustments are integrated.

As a series of central adjustors the cerebral cortex which composes the outer layers of the cerebral hemispheres can be determined to be the highly interconnected terminals of the afferent and efferent transmission systems. And so the cortex is a general point of synaptic coördination which in the most complex and effective way serves as a factor in the responses of the individual to his surroundings. Each of the terminals of the transmission tracts (called projection fibres) is intimately related to all the other terminals. In this way, through the conduction apparatus the whole organism is related and interrelated in all of its parts.

7. The Efferent Conduction Function

In an analytic description the integration of muscles and the excitation of glandular action may be considered as mediated directly through the functioning of the efferent transmission system. The functioning of the efferent neural mechanisms may be logically considered as more directly bringing about the actual movements and secretions which constitute the more visible factors of a so-called motor response. Through the collection of impulses and their redirection in the centers, arises an integrative activity that is finally consummated by the distribution action of the efferent pathway. The function of the final common path illustrates excellently the place and function of the efferent transmission activity in the response system. But obviously the condition for the operation of specific muscles and glands as well as their innervating neural mechanisms must be the coördinated stimuli objects and conditions.

8. The Action of Effector Mechanisms

The effectors as the terminal organs at the efferent end of the neural arcs correspond structurally to the receptors at the efferent terminals and function as the distributing mechanism of the neural impulses. Only in case of the motor plate found in striated muscles is there a definitely developed organ; in all other cases we find plexuses of nerve fibres branching around the muscles or glands. Because of the absence of distinct effector organs, the muscles and glands are themselves frequently referred to as the effectors, while sometimes the efferent transmission apparatus is included also.

9. Action of Glandular Components of Reaction Systems

Only recently have psychologists begun to realize the extreme importance of the glandular activities in the adjustments of the person to his surrounding stimuli. Previously, glandular activities were considered to be merely physiological processes unrelated to psychological reactions. No action of the person, however, is uninfluenced by the secretory mechanisms. Possibly it is the secretory processes which dominate so completely the responses to desirable and attractive stimulating objects. It is entirely safe

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to say that a very great part is played by the secretory processes in all feeling responses. Not only are the glandular activities prominent as components of reaction systems, but the reaction systems, compromising secretory processes can and do become immediate stimuli to other reaction systems.

The glands can be divided into two types, (1) those having ducts through which secretions are discharged and (2) ductless glands, the secretions of which are directly transmitted from the cells to the blood or lympth stream. Most of the duct glands also function as ductless glands. When the secretion is transmitted through a duct the process is called external secretion, while the ductless glands are considered internally secreting.

A. Among the duct glands may be considered the three pairs of salivary glands, secreting salivary fluids; the pancreas; the liver; the lachrymal glands and the sex glands.

B. The list of ductless glands includes the thyroid and parathyroid glands, the suprarenal glands, the hypophysis, and the pineal gland. Each of these mechanisms has great influence upon the growth and general well-being of the person, while the duct mechanisms influence directly some particular organic function and so play larger parts as components of movement responses.

10. Action of Muscular Phases of Reaction Systems

The muscular mechanisms consist of various extensions and reflexions of the muscular tissues which constitute the contractile function of the muscle cells. Two types of muscular activities are correlated with two types of muscular tissue, namely the striped and the smooth muscles. The responses in which the striped or skeletal muscles function are the changes in position, balancing in space, changes in facial expression, chewing, speaking, and the movements of the limbs as in reaching and walking. The smooth muscles are primarily operative in the activities of the vascular apparatus, the digestive functions. In general the smooth muscles are the contractile tissues of the visceral mechanisms.

11. The Skeletal Phase

Because all actions of the individual involve the skeletal factors, we are accustomed to disregard them. But for those who are constantly insisting that the psychological datum is a response to a stimulus and that the psychological analysis is a descriptive summary of an actual action of the organism no phase can be omitted. Again, the customary omission of any mention of the skeletal factors, which omission by the way is usually based on the fact that in many cases, such as the so-called non-motor activities, the specific function of the skeletal apparatus is not evident, makes it all the more necessary to include them. For we must strenuously guard against the traditional implication that the factors of an action bear a graded relation of importance to each other. This tradition appears in the assumption that the brain and nervous

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mechanisms generally are of more primary importance than other phases of an action.[1]

Finally, we must observe that while all the components are factors of every reaction system, the various reaction systems vary in the prominence of the different components. Thus, a given reaction system may be characterized by the overwhelming presence in it of the glandular action, or it may consist primarily of the operations of the skeletal musculature, while the glandular activities are not especially in evidence. In every case, of course, the particular character of the reaction systems depends upon the present and past contacts of the person with particular kinds of stimulating objects. It is to be remembered, however, that certain of the response systems of the reflex sort involving both visceral and skeletal mechanisms as the primary factor, are based upon the individual biological organization and not developed by the person's contacts with his surroundings.

The reader must mark the following point with most careful regard. While it is entirely proper to emphasize a particular form or way in which the person acts under the term reaction system, let it not be thought for a moment that the individual can operate in parts. Such is not at all the case. It is impossible, for example, for some part of the nervous system to be working by itself at a particular time. The fact is that nothing less than the whole nervous system can function, and as we have repeatedly said, this is true for the whole organism. Nevertheless it is quite true that the performance by the individual of specific actions means that in our description certain phases of the individual more closely in contact with stimuli objects may be emphasized.

The Classification of Reaction Systems

Naturally, such complex phenomena as response systems cannot be simply classified or described from a single standpoint. We propose, therefore, to enumerate the outstanding characteristics from several logically uncoördinated angles. Such a classification is much more a functional description than an actual definite division; in other words, it is more an attempt to establish *differentiations* of reaction systems than to order those definitely established. Also, according to the suggestion made while classifying behavior segments, namely, that we would omit from that classification those segments whose names are owing to their containing exclusively or primarily one or another type of reaction system,

[1] The reader who desires to acquaint himself with the anatomical and physiological facts connected with the operation of reaction systems, will find the following excellent books indispensable. C. J. Herrick, "Introduction to Neurology" (2), 1920; J. D. Lickley, "The Nervous System" 1912; K. Dunlap, "Outline of Psychobiology" (2), 1917; C. S. Sherrington, "The Integrative Action of the Nervous System" 1911; S. W. Ranson, "Nervous System" 1920.

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the present classification of reaction system types will contain divisions that really concern behavior segments.[1]

(1) Primary and Derived Reaction Systems

Since the psychological organism is at the same time a biological organism and therefore comes into the world with a definite biological organization and biological adaptations, we find that it possesses a few comparatively simple types of reaction systems as soon as it begins its reactional career. These we call the primary reaction systems. These exist, let it be carefully observed, because of the biological construction (anatomical and functional) of the organism. The stimuli for such reaction systems are available only because of the organism's biological organization.

As examples of primary reaction systems we cite the actions described as reflexes as well as a great many random movements. The reflexes are highly organized, permanent features of the organism's behavior equipment, while random movements constitute the genetic prototypes of many different sorts of reaction systems. For the most part we must look upon primary reaction systems as operating as maintenance responses, as acts keeping the person alive and in well being.

Derived reaction systems are acquired during the course of the individual's active contacts with objects and conditions. This contact with things constitutes a higher degree of relationship than in the case of primary reactions. The point is that we have here behavior segments organized less under the influence of biological factors and hence the activities are more typically psychological. It is in the acquisition and operation of such reaction systems that the analysis between man and the lower animals breaks down. Examples of these reaction systems are, of course, all the acts called habits, skill, and informational responses. Especially good examples of derived reactions exhibiting complex behavior, but independent of biological factors, are language responses.

(2) Actual and Potential Reaction Systems

Another mode of classifying reaction systems is the consideration of them as actually occurring responses in the presence of their adequate stimuli, or as latent forms of adaptation to surrounding objects when the stimuli are not operating. Under the former heading we place all the actually functioning responses of the organism at the moment. The latter class includes all those responses which the individual performs when surrounded by the different objects and persons constituting the coördinate stimuli of such reactions. Obviously we cannot at any instant acquaint ourselves with the complete adaptational equipment of any individual. Hence arises the necessity for performance or efficiency tests. Apparently the difference between the two types of re-

[1] We may point out here that to a considerable extent a behavior segment classification is a functional one while a reaction system classification is primarily morphological.

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sponses reduces itself to a distinction between behavior equipment as operative and as inoperative at any particular moment. This distinction refers of course to the question whether the person is or is not in functional contact with the objects possessing stimulational functions for him.

In other words, by the term latent response we mean only that the person as a psychological machine may be expected to respond in a certain way whenever he is offered a particular stimulus, provided he has acquired the necessary response system and that it is not for any reason prevented from operating. All this, in precisely the same sense in which the automobile salesman informs us that his machine will operate under definite stated conditions although the automobile may not at the time be actually running.

Naturally the range of potential responses includes all of the various action systems, which, when they occur, exhibit to us the precise nature or character of the person. That is to say, it involves not only the reflexes and simple habit responses but also the most complex social and intellectual activities. Let us observe at this point that whenever the terms tendency or disposition are properly used in psychology they must refer to just such particular latent reaction systems which constitute the capacities of the person when those systems are not acting and which are the performances of the individual when they do function. Immediately upon the presentation of their stimuli these latent response systems are aroused to activity and become actual responses. Offer an individual the stimulus 2 x 2 and immediately the verbal or graphic reaction system necessary to produce 4 is put into operation.

(3) Temporary and Permanent Reaction Systems

One of the most obvious facts about reactions is their constant waxing and waning. The former phenomenon finds its best illustration in knowing what you have learned, while the waning character of reactions involves the process of forgetting. Many response systems there are which remain permanently with the individual and operate in the presence of their adequate stimuli. These responses we call permanent and they are illustrated by the informational and skill reactions that give character to the person.

Among the temporary reaction systems are the memorial actions that are pressed into service for a given, limited period. These temporary responses do not disappear completely from the reactional equipment of the person, but are merely disengaged from the stimulating situations to which they once were attached. Familiar psychological phenomena throwing light upon the nature of permanent and temporary responses are amnesias and aphasias. Such behavior illustrates conditions in which parts of the permanent, reactional equipment of the person are temporarily lost, or operate as though they were really temporary response systems.

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(4) Effective and Non-Effective Reaction Systems

A distinction between reaction systems of considerable importance is that between responses resulting in some effect upon the stimulating object and those that are not so effective. The former reaction systems may be considered as the actual manipulative functions in which the external skeletal musculature is prominent. Typical of such reaction systems are kicking, throwing, and biting. In both cases, we must notice that the external skeletal muscles may operate, but in the non-effective reactions the activity may be merely expressive, namely, producing an effect upon the object. To illustrate, while pointing at some object or speaking about it we may be reacting with reaction systems in which the external skeletal muscles are emphasized but with an entirely different result so far as our stimuli objects are concerned. The most striking of such non-effective reaction systems are of course implicit responses, such as all the complicated knowledge responses and the partially implicit responses such as looking, hearing, etc. Also the effective reaction systems in patterns of reactions usually constitute the final or consummatory responses. In making this distinction reaction systems are met with which are difficult to classify as effective and non-effective and which probably belong to an intermediate class. Exemplifying such probable intermediate reaction systems are the cases of jumping over an object, in which instance the activity may be considered as definitely manipulative, but productive of no effect upon the stimulus object.

(5) Affective Reaction Systems

What may be considered as a class of non-effective reaction systems are those we call affective responses. The most prominent feature of these activities is that instead of producing some effect upon the stimulus object the contact with the latter results in some change in the person. Such changes may be considered in their most elementary form as a heightening of the general behavior tone of the individual. He may become vivacious or the changes may be described as feeling pleasant or unpleasant, excited, or calm. A great many of these changes in the person may be induced by various stimuli objects. On the morphological side, to a great extent the effective reaction systems consist primarily of visceral and organic activities rather than of the functioning of external skeletal muscles, although the latter are of course not entirely excluded.

(6) Overt and Implicit Reaction Systems

Probably one of the most important distinctions between reaction systems is that between an overt action representing a response system to a stimulus immediately present, and the implicit reaction in which the stimulating object is not immediately present, but is substituted for by some other object or situation. Such a substituting object we call a substitute stimulus in contrast to the stimulus for an overt reaction system called an adjustment stimulus. Obviously there cannot be a reaction system unless

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there is a stimulus present. However this distinction between overt and implicit reaction systems is exceedingly important because it marks off types of psychological action which must be differentiated in order to understand the activity of the individual. It is important to observe here that the distinction is purely a functional one and that from the standpoint of morphology or the particular organization of factors involved, the implicit and overt reaction systems may be exactly alike.

(7) Verbal and Non-Verbal Reaction Systems

Because of the importance of verbal activities and language in human conduct it is perhaps worth while to make a special point of the fact that many of our reactions comprise verbal forms of reaction systems. In this sense the verbal reaction system contrasts with every other type. To a considerable degree we might correlate the verbal reaction system with the operation of primarily head segment and thoracic functions. In fact it is probable that the verbal reaction system, even more than the implicit thinking activities, consists primarily of head segment responses. The main point to observe here is that some reaction systems, which may be considered as a definite class, need not involve any but the functions of throat and mouth parts of the individual together with the respiratory functions which go with them.

Obviously the non-verbal reaction systems are all those which involve primarily the operation of other segments of the individual. The results of course, in these cases differ markedly; for example, the verbal reaction systems operate in adjustments called substituting reactions, whereas the others are more concerned with direct adaptations of various sorts.

(8) Apparent and Inapparent Reaction Systems

An important distinction between reaction systems is that between those clearly manifest to the outside observer, which we call apparent reaction systems, and those that are not observable to the non-reacting observer, which we call the inapparent reaction systems. The all-important point in this distinction is that as a matter of actual fact there are certain acts I can perform which no one else at the time will know that I am performing, precisely in the same sense that no one knows accurately whether I am digesting something at the time or breathing at a particular second. In other words, what we have here is merely a difference between different ways in which the actual individual can adapt himself to his stimuli. There is no difference in principle between these reaction systems but only a difference in the actual descriptive character of them.

The inapparent type may be illustrated by the act of thinking over something I have heard, or by dreaming or musing, whereas the apparent reaction systems are exemplified by some act of throwing or picking up an object. No absolute line divides off these two types. For example, by close scrutiny of the individual at the moment of acting, and by intimate acquaintance with him

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so that I know what his behavior equipment is, it is possible that he will not perform many actions of which I need be entirely ignorant. With strangers, however, I can very easily be misled as to what kinds of actions they are performing or whether they are performing any at all. Possibly another way to indicate that we have here merely an actual description of types and not absolute differences of behavior principle is to point out that in many cases reaction systems are inapparent to the reacting person himself. That is, the fact that the action is not apparent to the observer does not mean that it is at all different from any other reaction system.

Development of Reaction Systems to Complex Segments of Behavior

We have already sufficiently pointed out that the actual unit of human action is the segment of behavior and that usually the response factor in the segment is a pattern of response and not a single reaction system. We have also suggested that the various patterns of response comprise every possible combination of reaction systems. Another fact of extreme importance is that the reaction systems themselves can be developed in several ways to become larger and more complex forms of actions. In the first place, during the course of the individual's contacts with stimuli objects and conditions single reaction systems may become organized into patterns to form the responses of complex behavior segments. To illustrate, the psychological life of the infant at many points consists primarily of the association of simpler unit acts into more complex ones. Language, walking, and eating all exemplify this process. Here we conceive of the developed behavior as being either precurrent or consummatory, but probably not both.

Another way in which particular reaction systems come to be developed into large behavior segments is by the reaction system being divided up into phases some of which are precurrent and others final or consummatory. Thus the child in his first contact with a burning candle may perform only a single reflex act consisting of a single reaction as seeing—touching. This reaction may be considered as later divided up into a precurrent seeing and a consummatory touching which may be inhibited or substituted for. The consummatory reaction system would really be then a withdrawing response.

Both of these forms of development are probably very frequently interrelated so that our complicated behavior may be developed on the basis of both processes simultaneously.

To this analysis of the reaction system it remains only to add here that although every psychological action consists of one or many of these reaction systems it is not frequently possible in actual practice to isolate the specific component factors making up a reaction system. Also it follows that when we are dealing with a complicated action it is entirely unnecessary to attempt to

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specify all the actual reaction systems present. To illustrate, in speaking, our interest is in the actual performance of customary referential responses to specific stimuli rather than in the particular muscular, neural, and other factors involved in such action.

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Our survey and description of the primary data of psychology indicate that the present treatise is definitely a part of the generally current objective movement (cf. Kantor "The Evolution of Psychological Textbooks Since 1912," *Psychological Bulletin* 1922, 19, 429). It is necessary, therefore, to place this work more or less exactly in its general perspective as regards this movement.

To describe psychological phenomena as specific interactions of organisms with particular stimuli at once withdraws our work completely from the psychologies dealing with consciousness or mentality in whatever form the latter are presented. All of the treatises so far mentioned in this book are illustrations of such systems. More closely, therefore, is the present work allied with those writings which sail together under the pennant of behaviorism. In this sense we assume that the term behaviorism signifies a well defined effort among psychological workers in many countries to get away from the spiritualistic tradition.

But no less is this treatise opposed to the views that reject the study of consciousness or mental factors, and therefore confine themselves to the observation of the organism's movements and actions (for example Bechterew, *Objective Psychologie,* 1913; Pawlow, *Science,* 1923, 58, 359). As we have already indicated such views are not thoroughly objective so far as data are concerned, but are rather based upon the thoroughly commendable desire to keep within the bounds of exact observation. The objection to such a view is that the worker assumes the existence of some other factor than the physiological, but neglects it. When such a worker is a physiologist or a neurologist, to a certain extent no harm of an observational or interpretative nature is done, but such a view is not at all satisfactory for the psychologist. The latter cannot admit the existence of any mental factor, while at the same time he realizes that the assumption of a purely physiological organism is also not an exact description of any datum studied.

Furthermore, this work is not to be connected with the theory that the functions ordinarily called mental or conscious are merely the actions of the nervous system (Meyer, *The Fundamental Laws of Human Behavior,* 1911; *The Psychology of the Other One,* 1921) or of the whole biological organism (Loeb, *The Organism as a Whole,* 1916; Watson, *Psychology from the Standpoint of the Behaviorist,* 1919; Abbot, "The Biological Point of View in Psychology and Psychiatry," *Psychol. Rev.,* 1916, 23, 113). An

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excellent bibliography of the whole objective movement may be found in Roback (*Behaviorism and Psychology,* 1923). This view meets with much the same objection as the one just discussed. For the biological view in its turn does not take account of the essential psychological facts of human and infrahuman conduct. The biological view nevertheless contains a basis that could well be developed into a thoroughly organismic theory. But until such a development takes place, the position from a psychological standpoint is faulty and very different from that of the present treatise.

The perspectival relation of the viewpoint of the present volume to that of other objective theories is well indicated in the consideration of the problem of the causes or conditions of responses. Because in recent times the causes or conditions of psychological action have been transferred from the mind, which produced an effect on the body, to some phase of the body, it seems difficult for the idea to gain currency that such causes or conditions lie only in the stimulating circumstances. Decidedly it is the latter that bring about the development of reaction systems and their later operation. In our view, therefore, no other psychological cause or condition exists. To look for any other cause or condition of psychological activity aside from stimuli conditions means inevitably to look for mystical forces or powers, even if these are located in the neurons, or the "body" (cf. an article by the writer entitled "The Organismic vs. the Mentalistic Attitude toward the Nervous System," *Psychological Bulletin,* 1923, 20, 684 and references therein).

It must be admitted, however, that investigations of the interactions of organisms no matter how exhaustive, still leave open the problem as to why organisms develop interacting functions, or capacities to react to surrounding objects, or in other words, why there are psychological organisms at all. If by this question one merely expresses a desire to be told immediately something which is not known and the detailed answer to which perhaps can never be given, then we cannot consider the question as a legitimate query of science. Still farther from the scientific situation is the query when the questioner wittingly or unwittingly presupposes some creative power which has brought the thing (psychologically reacting organism) into being. A genuine scientific question can only be thought of when the origin of a psychological organism is considered to be the complex product of an extensive non-vitalistic development of simple biological beings into the more complex biological organisms capable of performing differential responses to things as stimuli. Throughout the entire development we must assume that it takes place through prepsychological contact of the organism with surrounding objects and conditions.

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CHAPTER III

THE PSYCHOLOGICAL INDIVIDUAL, OR PERSONALITY

The Problem of Personality

The conception of personality is probably the most important instrument or working principle in the whole range of psychology. In the first place, as we have already suggested, since every reaction that we perform represents some phase of operation of the person, personality constitutes one of the essential psychological data. Here we touch upon what we must consider as the cardinal principle of a scientific psychology. It is this, that whatever we consider as the actual fact to be studied we must look upon it as an act of a person or a psychological organism to some definite stimulus. Unless we tenaciously adhere to this principle we are almost certain to plunge into some serious methodological error and, worse still, some downright falsification of fact. In every instance then we must consider reaction systems and responses as abstractions from the actual behavior facts of a particular person.

But no less important is the conception of personality when we observe how frequently we must know in advance what sort of reactions to expect from a person before those reactions actually occur. This means we must know the kind of personality with which we are dealing. No prediction of psychological activity is possible without knowing what the individual is like with whom we are concerned. Furthermore, the only possible method of studying and describing actions which are not actually occurring at the moment but are delayed in their performance, that is to say, those that last over for some time, is to deal with the individual or personality in whom such delayed behavior is potential. Among such delayed behavior, of course, are all the memory activities, the wants, desires, and ambitions of the person.

Once more, the personality conception is of invaluable use whenever there arises a question of a person's intention, for example in the attempt to fix or determine the responsibility for actions. In other words, we must know with what sort of person we have to deal. Especially striking is this point when we have occasion to determine whether the person is normal or is becoming abnormal or insane.

Finally the problem arises concerning the progress a person is making in some learning situation, in the acquisition of skill or information. In order to know what his rate of progress is, one

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must know the status of the person at the beginning of the learning as a criterion for the judgment of such progress. Again, in judging the intelligence of a performed action, it is essential to know the individual's general psychological status, to be familiar, in other words, with his behavior equipment.

The Nature of Personality

What then is personality from the standpoint of scientific psychology? The answer is that we cannot consider personality to be anything other than the individual's particular series of reaction systems to specific stimuli. This series of reaction systems we may refer to as the behavior equipment of the individual. Let us observe that what is referred to here is the actual response which the individual makes when in contact with particular objects in his surroundings. For example, each person has his own equipment of knowledge and skill reactions. It is these variations in behavior equipment which constitute the central facts of individual differences. In detail, we know that certain individuals can answer more questions with respect to the nature and motions of the stars, (astronomers, compared with non-astronomers, or better astronomers as compared with poorer ones); certain persons know all that is known about electricity; others know less, and still others nothing about such phenomena. The same may be said of individuals with respect to every type of knowledge. Again, some persons can paint or draw pictures; others can design buildings, while others cannot do these things at all or not as well. Still other individuals can work out the problem why the automobile will not run, while others cannot, or if they can, they cannot repair the defect as well as another, or perhaps not at all. Each of these different persons[1] can do or know some things that the others cannot do or know, and vice versa. The illustrations given are of course only samples of what occurs in the whole range of human behavior. It is a question of whether persons possess in their behavior equipments the requisite reaction systems for responding to certain stimuli objects. The essential fact here is that all of the knowledge, skills, capacities, and abilities that we have, constitute specific forms of reaction systems to particular stimuli, reaction systems that are organized into reaction patterns which, with their appropriate stimuli objects and conditions, constitute specific forms of behavior segments. Personality, then, from the psychological standpoint, may be summed up as being the totality of a particular individual's reaction systems, in fine, everything that the individual does and can do. But every one of these reaction systems refers to some specific factual activity of the person. Furthermore, any specific personality in its identity and operation comprises absolutely every phase of the person's psychological character.

[1] They need not be different persons but the same individuals at different times or in different situations.

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It is especially important to note that the nature of personality from the psychological standpoint is an entirely different thing from that of the legal, ethical, physiological, anatomical, or physical conceptions of personality, although all these overlap. In other words, the term personality is not exclusively a psychological term, nor indeed does it belong to psychology because of a prior establishment of usage.

When we consider that for a physicist the person is nothing but a congeries of molecules and atoms or electrical charges, for the lawyer an object in which certain rights and obligations inhere, the character of psychological personality as well as its differences from those other conceptions are manifest. Similarly, the physiological and anatomical conceptions differ markedly from the psychological. In the former case the person is looked upon as an adaptational machine in the sense of being a kind of organized individual capable of making adjustments to environmental conditions, maintaining itself by the operation of its alimentary mechanisms, maintaining its species by the operation of its reproductive apparatus, etc. In each case the stress is upon the mechanism, and the environment constitutes only occasions and opportunities for action. Now as over against this situation, the psychological personality as a series of reaction systems is a product of the operation upon it of specific stimuli, not biological environment. Still less does the anatomical conception approach that of the psychologist, for under this conception the person is merely a series of cells, tissues, and organs organized therefrom.

The ethical conception of personality, dealing as it does with individual conduct, approaches so far the psychological conception, but it is limited to a specialized type of conduct of a very elaborate sort, and has nothing to do with the great mass of activities which are the occupation of every psychological individual.

To understand fully the nature of psychological personality it is not only necessary to distinguish this from the other types of personality an individual may be, but also to observe the common factors between such types. Thus, of course, the sum of reaction systems spoken of belong to an anatomical individual, say of a certain sex, height, weight, color, etc. Also, these acts belong to a particular physiological mechanism, ethical, and legal personality, etc. Probably the whole matter may be illustrated by imagining a particular person (John Doe) placed under the investigative observation of a physiologist, anatomist, lawyer, psychologist, etc.

The Biological Factors of Personality

Since we are dealing with the actual individual and his various responses, it is obvious that the psychological personality has a very definite biological foundation, in the sense that the psychological individual is at the same time a biological organism. But this fact, as obvious as it is, has still been the subject of serious

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misinterpretation. In the first place, because psychological phenomena were assumed to be various other things besides reactions of actual persons or organisms to specific stimuli objects, such phenomena were considered as based upon, rather than including, the biological operations of psychological individuals. Accordingly, the biological factor of personality has been transformed into an explanatory principle and employed to account for the development and functioning of the psychological personality, the latter being presumed to be some sort of mental structure. It is needless to say that not only are there no such personalities as can be correlated with the biological features of an individual but there can never be assigned such explanatory functions to the actual anatomical and physiological phases of a person. Clearly, such a view assumes that we can divide off the person into parts, one of which can influence, and be influenced by, the other.

Such assumptions we consider as absolute fallacies. We must assert the impossibility of allowing for the existence of a bodyless mind or a mindless body whether related or unrelated to each other. Furthermore, assuming that it is not intended here to separate a mind from a body but to consider the biological influence to be exerted by the neural, muscular, and other components of a reaction system upon its other phases, we must still reject any such view, since this again involves an impossible severance of the parts of an absolutely unitary event. In this sense no biological conditions exist separate and distinct from some other kind; either the reaction when it occurs is entirely a biological event or entirely a psychological affair.

Most certain it is that we must look upon the psychological fact in every case as the complete and total operation of an individual with respect to some specific object or situation. No division of any sort actually exists between the different phases of a single action. It follows, therefore, that the development of the individual and his activities depends upon the coördinate development of his contacts with objects and situations. The cause or influence of development is then the series of stimulational situations with which the person is in contact, and not any determining causative biological characteristics.

Again, possibly the separational misconception is based upon the fact that a single organic reflex may stimulate us to plan a meal, a condition which frequently occurs. But here our reflex action is a definite unified personality behavior operating as a definite stimulus to the performance of another action which is in principle an identical but in detail a different psychological event. No basis exists actually in this situation to constitute a foundation for a separation doctrine.

Upon what kernel of fact, then, has such a misconception developed? We answer that since the psychological organism is to

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a certain extent ontogenetically first a biological organism, in the sense that before there is much of a psychological personality equipment the individual exists and functions as a biological organism, the biological factors may then be thought of as the raw material for building up a psychological personality. Thus the strength and endurance, at least, of the building must depend upon the kind of material available. This conception is, of course, valid and valuable if properly employed.

Accordingly in at least three particular ways we may ascribe conditioning factors to the biological organization of the individual as he operates in his psychological development.

(a) In the first place, the biological factors of personality exert a negative influence upon its development and operation. Let us consider some obvious illustrative facts. A person of slight stature will not be able to build up behavior equipment to perform certain actions which one of heavier stature will be able to acquire and perform. Not having well-nourished muscles one cannot perform certain activities which become the exclusive prerogative of better nourished individuals. Likewise, the shortness or tallness of the person, the length of arms, legs, and fingers will prevent him from doing certain things that the person having different anatomical characteristics will be able to perform. Again, an individual who has defective ear mechanisms should not attempt to develop musical traits in which normal organs are requisite. Similarly, an individual having color blind retinæ should not attempt to prepare himself for a career in which the distinction of hues is a prominent element. All these biological factors clearly do influence personality development and operation but only in a negative way, for observe that the mere possession of the anatomical characteristics of an athlete does not mean that the individual will be an athlete, but rather that he will not be prevented from being one.

Likewise, injuries and truncations of the organism of various sorts may leave it deprived of the ability to perform the type of reaction system which involves the injured or lost anatomical parts. But here again the biological influences are entirely negative in character. Without the anatomical part the reactions cannot be performed but with them the actions need never be acquired or developed.

No evidence at all exists which indicates that the person's particular anatomical or physiological make-up determines in any sense his type of positive development, his intelligence, skills, capacities, etc. Those who hold to a theory of influence of body on mind, or mind on body, attempt to assert that there may be indistinguishable differences in the nervous mechanisms determining the particular sorts of development, but such assertions are clearly ungrounded attempts to establish a theory. We can read-

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ily convince ourselves of the imaginary character of the neurology employed for the purpose.

(b) More positive influence on personality development and conduct may be ascribed to various physiological functionings of the organism. Such influencing biological conditions we may trace back to the individual glandular organization and operation. Doubtless the type of glandular action of the individual exerts a developmental influence upon such personality traits as we call temperament, disposition, etc. In other words, a temperamental trait refers to the fact that the individual performs behavior patterns in a particular way; so that we apply the terms phlegmatic or choleric, quick or slow-moving, etc., to him. Although such biological influences we call more positive, we must carefully observe that after all they constitute merely conditions for the operation of behavior equipment and do not determine in any causal or absolute way the development of particular characteristics. We do not, however, deny that the type of personality that finally develops is not influenced by the biological functions of the individual; that is to say, the individual may build up reactions of moving slowly, speaking deliberately, because of his physiological organization, but, as we have already said, this is the influence of a condition, not of a determiner in any sense.

(c) Still more positive influences of biological factors upon the personality equipment and functioning are those which serve as stimulation factors for the building up and operation of reaction systems when the person is developed to any given stage. The conditions or influences here are not on the side of the response but on the side of the stimuli factors of behavior segments. As a case in point, we may cite the influence upon the individual's behavior of the sex glands' activity, and in general the operation of the biological factor of reflex mechanisms which makes the individual uneasy and restless. The activities thus influenced are describable as wants, desires, etc., which lead to the development and functioning of behavior equipment of various sorts.

In this connection we must point out another very important stimulational influence upon the individual of his own biological organization and condition. As an example we may refer to what has been called the compensation for organic inferiorities. The principle here is that a person who is defective through prenatal or postnatal injury will be stimulated by this inferiority either of appearance or function, to build up behavior systems which will conceal it or compensate for it. For instance, a person born blind or made blind soon afer birth may be stimulated by his anatomical defect to become a great orator or lawyer.

This compensatory stimulational function operates in other ways A person may be stimulated by his own biological characteristics to perform a certain action which is considered as ad-

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mirable. For instance, the individual possessing a slim form, which may be admired by others or by himself, or which merely represents a customary ideal, will be stimulated to acquire all sorts of gymnastic traits in order to maintain himself in the desirable condition.[1] At this point we might indicate that as a matter of fact a good deal of the individual's biological conditions may be traced to the influence of psychological activities, but only in so far as we have indicated in this illustration.

An entirely different type of biological influence upon personality development is exerted by the person's anatomical characteristics which serve as stimuli to other individuals with the result that the person possessing the biological characteristics is given various sorts of opportunity to develop behavior of different types. To illustrate, the personal appearance of individuals is very frequently the open sesame to stimulational opportunities which may result in his building up a large series of specific reactions. Not surprising is it then that the statement is made that the personal or anatomical appearance of the individual has much to do with the development of intelligence, and moreover of a particular type of intelligence. At this point we might suggest that the biological or anatomical characteristics of one person prompt another individual to offer the former stimulational opportunities in exactly the same way that the first person's previously acquired skills or capacities would prompt another individual to provide the former developmental advantages.

Once more we may repeat that the biological features of personality cannot be employed as explanatory principles. How disastrous such a proceeding may be is excellently illustrated by accounting for the differences in behavior of men and women (intelligence, feeling traits, etc.) on the basis of their anatomical and physiological differences. All the misinterpretations involved here are of course as hopeless as they are inevitable, since as a record of fact the greatest of biological differences (as between the sexes for example) has no immediate influence upon psychological activity.

The Development of Personality

If psychological personality consists of the behavior equipment of the individual it follows that the status of any individual personality at any particular time is the result of a very elaborate development of reaction systems and their organization. This development we will call his reactional biography. From earliest infancy the individual must begin to acquire specific types of reaction systems, resulting in adaptational contacts with the great complexity of objects, persons, and situations which are the inevitable surroundings of the human individual. It is exceedingly important to observe that every phase of distinctly human be-

[1] This cannot possibly be interpreted as meaning the influence of a mind, distinct from the body, upon the body.

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havior equipment must be thus acquired during the behavior life of the individual. All of the activities having distinct identities and names are then included under this heading. Moreover, it is this group of activities which may be frankly considered to comprise practically all of the behavior equipment of the person. For the human complement of activities depending upon the individual's biological make-up and adaptation counts for but little in the total equipment of his personality.

When we turn to investigate the conditioning principle which influences and determines the specific kind of personality developed, we must examine the specific conditions surrounding the person. We must consider the kinds of objects, peoples, and circumstances which constitute the things to which he must adapt himself. In other words, whatever circumstances of a natural, ethical, social, economic, artistic sort, etc., surround the individual will be in some way or other the stimuli conditions which eventually will have reaction systems correlated with them. And so we might look upon these different surrounding conditions and situations as the conditioning factors which will result in one type of personality in one situation and in a different type in another.

How extremely important surrounding objects and conditions are in determining the type of personality equipment the individual will develop, may be observed in the fact that the infant possesses hardly any personality equipment, and therefore must build up on the basis of its surrounding conditions whatever personality equipment it comes to have. Furthermore, the behavior equipment that the infant does have in the early days of its life is very meagre and for the most part dependent upon its biological make-up and adaptation, and in consequence of very little influence on the future development of behavior equipment.

From the observation of the very young individual with its complement of very simple personality equipment and from the fact of the constant and continuous development of behavior equipments we may come to the conclusion that all our personality may be divided into three fairly distinct phases or stages. We may name these different stages of personal development the foundation stage, the basic stage, and the social stage, respectively.

Foundation Stage of Personality

The foundation level of personality development we may dispose of very summarily, since there is very little equipment here to discuss. This is the period in which the infant is absolutely dependent upon some other person for actual animal maintenance. The individual is fitted with some reflexes and random movements the former of which constitute all of the organized equipment he has for effective reactions and orientational sensitivities to his surroundings. By orientational sensitivity we refer to all the knowledge behavior systems that the organism has in his development, such as the action observed in the young infant when it follows a

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light or moving object, or in displaying sensitivity to differences in the qualities of objects and persons.

Basic Stage of Development

Very early in the life time of the individual the contacts with surrounding objects and conditions, and especially the influence on the infant of the parents' or nurses' actions, induce the development of more complicated behavior systems. These become basic adaptational equipments of the person, both in the sense of remaining as typical activities and as becoming modified into still more complex behavior. Among these basic reactions we must consider elementary forms of expression, linguistic and other sorts, acquisition of likes and dislikes, elementary abilities, mannerisms, defense reactions etc. Here the stimuli conditions may be summed up under the heading of family and playmate environment. Is it not obvious that the objects and conditions found in the earliest family group poignantly influence the particular kind of personality the child will build up?

Social and Cultural Levels of Personality Development

At the social and cultural stages of development the individual acquires all sorts of equipment which are reactions to the social institutions with which the child next comes into contact. These institutions are the objects, situations, and conditions serving as common stimuli to groups of individuals as well as customs, manners, and other ways of acting of people. At this stage we have many school and larger playmate contacts aside from more complicated family contacts. Many of the person's more complicated forms of reaction are built up through meeting other people and other situations outside the home. Later in development the person, aside from the family institutions, comes into contact with church, business, political, professional, and other kinds of stimuli. At this stage, of course, the infant has developed from childhood and adolescence into an adult stage.

The three stages of development enumerated cannot, of course, be said to be the only ones by which the development of personality can be described, nor need there be only three stages of development. Furthermore, whatever number and type of stages one describes they cannot be considered as mutually exclusive chronological periods but rather as referable to developmental contacts which for practical purposes may be considered as successive in time.

Catalogue of Personality Equipment

Every normal individual must have in his personality equipment millions of different specific reaction systems. And since in each case the different reactions must be unique for that individual every personality consists of a catalogue of traits or behavior systems. These catalogues contain more behavior items for some individuals than for others, especially if the individuals differ in chronological age and opportunity for development. Again, some catalogues contain more items of a particular sort than the catalogue of another individual. One person may have

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more knowledge and information, while the other may have more skill. Further the organization of these specific traits may differ. In each case they are connected up with some specific kind of object or situation constituting the stimuli conditions for the particular trait.

In attempting to indicate some classificatory arrangement of these numerous traits of behavior equipments we are suggesting some of the divisions into which behavior catalogues may be arranged.

Abilities

Here may be mentioned the reaction systems the person possesses for performing specific kinds of actions and for bringing about certain conditions, the abilities to speak, to skate, draw, or paint, etc.

Skills

By skill we understand certain excellencies or proficiencies in performing various kinds of action. A skill stresses, then, the particular ways of doing things, rather than merely the performance of the action. One may have skill in typewriting instead of merely being able to use a machine, skill in painting besides being able to paint, and so on.

Capacities

By capacities we mean process reactions, reactions which involve variables in the stimuli. To illustrate, we may have the capacity to multiply or to add, and this capacity we may possess although the particular numbers we have to add have never been present before in that combination. Every trade involves numerous situations in the form of new combinations of old elements which require capacity of various sorts in order to work at them.

Habits

Every personality involves in its equipment a great series of overt forms of reactions of various sorts. We might take this term in its everyday connotation. The individual has a habit of smoking, drinking, playing certain games, etc.

Dispositions

It is common knowledge that every individual performs certain activities in a peculiar way which represent his feeling attitude toward the objects and persons around him. What is ordinarily called temperament is constituted in part of these dispositional modes of responding.

Tastes

When we speak of tastes we mean preferences for certain kinds of objects, foods, types of people and æsthetic objects. These tastes may be negative, as well as positive. In the former case the individual does not prefer a particular type of stimulus objects. Frequently when our tastes do not conform to the popular notion of what should be liked they may be called perversions.

Talents

Many individuals possess in their behavior equipment talents of various types, certain forms of ability representing excellencies in various fields. Talents may be considered as skills on a much higher level of action. They involve more rearrangements of the objects dealt with, especially on the basis of large ranges of experiences brought to bear upon the present situation. In other

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words, talents do not signify specific practices as skills do; they are more inventive and involve more reconstruction.

Ambitions Various strivings or ambitions are part of almost every personality equipment. As such we might speak of the desires of persons to modify their conditions and to achieve levels of action and living conditions not at present possessed.

Attitudes Intellectual attitudes constitute usually a large feature of any well-developed personality. These attitudes represent tolerances and intolerances of all sorts, opinions, agreements, and disagreements with various movements, etc.

Knowledge The kinds of behavior involved under this heading scarcely require any detailed description. Every personality involves such knowledge traits of different kinds and degrees.

Manners When we speak of a person's manners we mean not only what is referred to in every day language by the term, namely etiquette, but also the individual forms of expressing oneself, and otherwise reacting to surroundings, such as being quiet, rough, suave, aggressive, withdrawn, loud, bold, etc.

Mannerisms Under mannerisms we include certain forms of response peculiar to one individual. Many of such traits are ordinarily called affectation. Strictly speaking, these types of behavior systems do not merely mean the deliberately performed actions but various sorts of idiosyncrasies of speech, or other activities which individuals sometime unwittingly adopt.

Achievements and Accomplishments Many individuals there are who possess behavior equipment representing unique acquisitions not possessed by all persons. These accomplishments and achievements may constitute activities in every field of human behavior and are not necessarily limited to the art or science fields.

Ideals Not the least important or significant are the ideals of the person. And what are ideals? Briefly, they are various types of impersonal attitudes and beliefs which may or may not govern other actions. That is, such ideals sometimes are not practical. They present, however, types of action which an individual may have in common with others, but which on the other hand, he may have developed out of his own experience.

Fears Most persons have personality traits which may be called fears and trepidations of various sorts. Some, like the phobias of the psychiatric literature, constitute intense responses to particular stimuli and may have serious influences upon the individual's life. Others are mere timidities in the presence of particular persons or assemblies. Between these we may place various fearful shrinkings from objects and conditions which are not noticeable traits of individual differences.

Expertness Numerous are the reactional equipments which we may refer to as expertness in various fields. Since we have already referred

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to skills and expertness in manual forms of behavior we may emphasize here expertness of judgment in specific fields of action or expertness of insight with respect to practical situations such as economic trends. In the more theoretical fields this expertness may consist of superior appreciation of scientific methods or superior information with respect to scientific accomplishments.

Obviously it is impossible to present a complete list of personality traits or even a complete list of their classes. Certain possible criteria, however, may be specified.

To begin with, these traits may be organized on the basis of the kind of human situation in which they function. Thus the catalogue divisions of traits may comprehend responses to moral, religious, social, intellectual, economic, æsthetic and domestic situations, etc. Other criteria might be based upon (1) whether the personality equipments are developed by the individual in his own experience or are due to social or group influence; (2) again, do the classes of equipment refer to general or specific traits? (that is to say, is the emphasis on the process reaction or on a specific adaptation?) (3) Are these equipments very firmly established features of the individual's make-up or are they only superficial and capable of easy obliteration? (4) Another criterion for classification is the question of whether the classes of traits represent a general distribution over the whole personality or whether they are striking features applying only to a small segment of the person's behavior. (5) Other elements of personality equipment or traits may be established on the basis of whether the traits are the unique possessions of particular personalities or whether they belong to groups of individuals.

Pseudo-Personality Traits

In the discussion of personality traits we must not neglect to consider the distinction between those reactional equipments constituting fairly permanent and bonafide parts of the personality organization, and those which do not represent such actual behavior equipment of the individual. When the reactions are not fundamental equipment of the personality but more or less artificial[1] features of a person's behavior make-up, we may refer to them as pseudo-personality traits.

Pseudo-personality traits are of various sorts. Some may be developed as contrivances of the individual or are built up because of certain peculiar conditions in the person's behavior surroundings. Again some of these reactions may be acquired for some particular purpose, and to operate at some particular time, either because the individual wants to create a particular sort of impression upon other people or because he wishes to disguise his more fundamental and permanent personality. When the pseudo-

[1] Artificial of course only in the sense of fitting in with the rest of the person's equipment from some arbitrary standpoint.

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personality is wittingly built up through commercial, social, or domestic motives the process is ordinarily considered as an entirely legitimate one.

In more abnormal situations the individual may build up a pseudo-personality of an elaborate sort. For instance, because of certain conditions, he may take on a complex equipment entirely unwarranted and unrequired by the behavior conditions in which he actually finds himself. In this case the personality equipment and its developmental procedure may be very little amenable to the person's control.

Types of Personality

From our study of personality, its characteristics and development, it is manifest that a fundamental truth concerning human personality is that each one is very different from every other one. As we have remarked before, the fact of individual differences is a fundamental and far-reaching factor that must be taken cognizance of in every branch of psychological work. Individual differences, of course, are found in every phase of personality equipment. Let us observe that all of these differences constitute variations in type and number of reaction systems, differences which must be considered as psychological phenomena; that is to say, they constitute developmental differences because of different stimulational opportunities and stimulational effects. Also such individual differences depend upon previous behavior acquisitions by the person or upon prior levels of the same person's development.

Because of the extreme variability of individuals the need is sometimes keenly felt for some method of classifying and arranging them into types. Now what superficially appears as a paradox is actually the basis for such a classification. That is to say, the very diversity of individuals turns out to be a basis for their organization into types. More specifically put, the various extreme differences between individuals may be made the basis for type differences.

All those who represent exaggeration of personality equipment in a particular direction can be considered as belonging to one type, while those constituting exaggeration of behavior in another direction are placed in another type and so on.

To illustrate these psychological types, we might point out that from the earliest historical periods of psychology, writers have divided individuals into types, usually four, called by them temperaments. These they named sanguine, choleric, phlegmatic, and melancholic. This classification, although sometimes based upon peculiar ideas, namely that different individuals have different humors or fluids in their bodies which account for these different temperaments, may, when the terms are properly used, possess some sort of classificatory value. For example, this series

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of four classes may be taken to refer to the different rates of rapidity and different degrees of vigor with which individuals react to their surrounding objects and conditions.

Naturally individuals do not have entirely uniform modes of response. Hence these classifications refer only to the predominance of certain types of action in the person's behavior equipment. It follows, then, that such classifications can never be absolute either in the sense of representing universal traits of the person at any particular time, or at all times. Also our illustration indicates clearly enough that these classifications into types may be made upon many reactional bases, such as predominance of rapid or slow action, predominance of intellectual or æsthetic traits, the possession of many or few elaborate names or mannerisms, etc.

Our types then really are organizations of traits which are found in the behavior equipment of different individuals and not definite classifications of personalities. Moreover, these organizations of traits or behavior equipment are relative to those found in the equipment of other persons. Furthermore, any particular individual may belong to an indefinite number of personality types. Two persons may both belong to a certain type and at the same time each, to the exclusion of the other, may belong to other types with other persons.

And finally we might point out that probably no person need be entirely excluded from membership in any personality group but of course his membership in most or many groups is not emphasized unless he performs exaggerated behavior of some kind.

For illustrative purposes we might review some typical personality traits, which when possessed in sufficient quantity, give character and a name to individuals.

The reflective type of individual may be distinguished from the pragmatic or active type. The former is decidedly analytic and cognitional; he wants to be intellectually oriented in any situation before he acts, while the latter plunges into action with very little if any prior orientation.

Similarly the artistic and æsthetic individual shows an extremely marked bent toward expression and construction, and contrasts with those who act upon direct environmental suggestion and necessity.

Free and unrestrained persons typify the vagabond individual who is not subject, or desires not to be subject, to the limitations and prescriptions of civil society, but rather wants to govern his own life and freedom.

Another striking comparison of types is that between the individual bent upon a definite direction and aim of action, the person who has set up a permanent goal which dominates his intellect

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and conduct, and the person who drifts along from one thing to another, never having any definite point of guidance in his life, no motive, or at least no master motive.

Very commonly observed is the differentiation between those individuals who seem solidly constructed and well able to meet their stimulation situations, and those who seem unstable and undetermined. Possibly another pair of types may be called the dependable and undependable, those who can and cannot be relied upon to meet either their natural or social stimulational situations.

A great many other personality types may be mentioned, but we must be content to name only a few more which can be understood without comment. Thus there are the conservative-radical types, the domineering-submissive types, the articulate-inarticulate types, etc., etc. As a final comment upon the entire discussion we might say that the complete value of such a type distinction lies in its possible use for practical purposes. Unless it can be so employed it has no fundamental psychological significance.

Abnormalities of Personality

Such facts as we have observed concerning the development and organization of reaction systems and behavior traits (through contact with particular stimuli and behavior situations) enables us to understand the peculiarities and abnormalities which otherwise are shrouded and hidden from us.

In the first place, we observe that the ordinary oddities and peculiarities of individuals merely mean that these particular persons have built up series of reaction systems which do not coincide exactly with the reaction systems constituting the equipment of other individuals. Hence the individuals with different behavior equipment are considered queer or peculiar. These peculiarities or abnormalities, then, merely represent wide variations in individual differences. Two forms of such wide differences may be isolated, one of which may be considered as positive and the other as negative. The individual who is peculiar because he does not have certain behavior equipments that others have, may be called negatively peculiar. This type may be considered as an unconforming personality. Positively peculiar are those individuals whose personality equipment includes reaction systems not possessed by others in the same community. A foreigner settled in any strange community illustrates both sorts of personality divergences.

The illustration just indicated suggests to us immediately that queerness of personality is relative to individuals. This follows from our study of personality which indicates clearly that the conditions surrounding the building up of different types of behavior equipment are mainly the person's behavior history and various cultural and social environmental situations, such as economic, intellectual and æsthetic opportunities.

Turning now to the differences between individuals which are

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more than mere peculiarities, we find that what are ordinarily considered defective personalities are individuals who have been unable to build up necessary behavior equipments while being under the same general social and economic conditions as other members of the same community. Here the abnormalities may in certain cases reach down to the person's biological foundation, the loss of some anatomic element or organ, or the failure of the person properly to function physiologically in whole or in part. But whether the biological organism is fundamentally involved or not, at any rate the individual is so profoundly affected as to be deprived of the capacity to build up desirable behavior equipment.

Other very fundamental defects, but not directly due to biological conditions, are those in which the person builds up behavior equipment unfitting him to meet the behavior situations in which he finds himself. Here we may quote the neurasthenic, the multiple personalities, the delinquents, and other types of abnormal individuals.

The conception of personality outlined in this chapter throws considerable light also upon other sorts of abnormalities. For example, an important form of personality disturbance is the repressed individual, the person who having acquired certain specific behavior equipments, is not able, on account of some conditions, to operate. As a consequence, the person takes on pathological symptoms which may unfit him in whole or part to adapt himself to his ordinary surroundings. He may become shut-in, exclusive, and unresponsive to the persons and circumstances around him, a condition which may end in melancholia, suspiciousness and stuporism.

In similar manner a person may develop without sufficient restraining circumstances operating upon him, with the result that he may acquire an exaggerated expressive personality. Such individuals have the frankness of children, and possess no private personalities. Optimism of a sentimental and factually unfounded sort appears as a marked interference with the person's capacity and actual endeavor to function properly in his social surroundings.

The examples offered are sufficient to indicate the value of the personality conception here presented. Possibly it is a primary criterion of the validity of a personality conception that it must be able to handle successfully the problems of individual differences and of abnormalities.

Some Misconceptions of Personality

How important a personality conception is for psychology must be very plain, for such a conception is manifestly the central fact of all psychological study. In every case, we must remember the actual datum of psychology is the way some particular individual reacts to a given stimulus. In other words, reaction systems and behavior segments are abstractions derived from the behavior of

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persons. Now if a personality conception is as important as all this, then it is certainly essential not only that it be valid but also that it be adequate to the facts at hand. Accordingly we may examine a few of the faulty ideas that have been proposed as personality conceptions.

Metaphysical conception

Under this heading we may include a large series of conceptions which have been current at some period or other in psychological history, and which indeed still maintain themselves in the psychological field. The fundamental principle of these conceptions is that there exists in some connection within the individual a perduring if not permanent insubstantial stuff or principle. This stuff is variously denominated self, soul, ego, or personality and is supposed to control the actions of the person on the one hand, and on the other, to constitute a store house for forgotten memories and ideas, or merely for mental states, memories, or ideas which are not at the time functioning. Immediately we must observe that the whole conception is at variance with the notion that psychology studies the responses of a person who cannot be disjointed into two parts or phases, one a body and the other a mind, soul, or ego. Again we may notice that this conception is never derived from actual psychological facts. Rather, as an explanation, it has insinuated itself into psychology from some other type of human interest, such as religion or philosophy (metaphysics), or from the unreflective sources of human thought to the whole of which we can refer as folklore.

In more recent times the conception has been renewed and revivified under the heading of the unconscious. In this garb, supplied by psychopathologists, the conception appears again to compete with the strictly observational, scientific attitude toward human life and action.

Another form of metaphysical personality conception is that frequently employed by psychiatrists. This conception makes of personality a series of perduring ideas which ordinarily operate together as a unit but which may become split apart to form rival and opposing personalities. It is the dissociated ideas and the personalities they form which are presumed to constitute the facts of many "mental disturbances."

Popular Conception of Personality

Another conception of personality very prevalent in every-day thinking, and one which exerts a certain influence upon psychology, especially through the fact that the psychopathologists have assimilated it, makes of personality an intangible something manifesting itself in various forms of marked activity. In general, this viewpoint differs from the others in not connecting itself with the traditional soul conception, although the mysterious intangible stuff which is supposed to constitute personality cannot be any more successfully handled. On the other hand, this conception may be translated to refer to some specific striking forms of per-

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sonality equipment, so that the term personality in this sense refers to actual behavior of some extraordinary form. In this light the viewpoint has a factual basis but must be very incomplete, for, as we have indicated, it only comprehends exceptionally striking forms of human action, such as so-called magnetism, convincing salesmanship etc.

Organic Conception of Personality

According to the organic conception, personality consists of some sort of neural or biological character which is responsible for the building up of the person's complete final series of behavior traits and of his action. The point is that the individual is presumed to be fitted with a particular kind of determining organism and that these organic features of the individual determine his personality. In many ways this view is exactly like the first one in principle, only the determining forces or powers are located in the nervous system or some other anatomical part of the body, instead of in some intangible soul or self. So far as actually representing the facts this conception is no better than the first. Since it does imply an actual existing fact, however, namely the nervous apparatus, we may make a more specific criticism of it, and that is that it makes the whole series of psychological facts depend exclusively upon the organism in general and the anatomical features in particular. A particular type of the organic view is that which stands for the notion that all the personality equipment is a complication of and development from reflexes.

Organismic Conception

Our fundamental departure from all three of the personality conceptions discussed is found in our emphasis upon the totality of reaction systems of the person and upon the object and events constituting his stimuli. To be explicit, the study of personality is not merely the enumeration of a catalogue of traits no matter how complex or inclusive, nor the statement of how the catalogue unfolds from some few determining principles. Rather, the study of personality is the observation of how some specific psychological personality is built up and operates when stimulated by its specific stimuli, that is to say, by the objects and events to which the person has previously developed reactions. Briefly put, a personality conception must be predominantly functional and must place great emphasis upon the stimuli conditions and the interaction of the person with them.

Further, our conception assumes that at any particular time the personality does not involve anything but an actual individual having previously acquired behavior equipments who now is modifying his previous activities, or on the basis of such activities, is developing new additions to his personality equipment.

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CHAPTER IV

THE PSYCHOLOGICAL ORGANISM OR PERSONALITY IN ACTION

In the preceding chapter we have delineated the character of the psychological personality as a sum of reaction systems functioning in contact with their appropriate stimuli. Also we have made an exhaustive analysis of the character of these reaction systems considered as descriptive factors in the psychological life of the individual, and as components of behavior segments, or actual particular acts of the person.

In the present chapter we shall consider the organized developed personality as he adapts himself to his various human situations during the course of his actual contact with his psychological environment. In brief, such a study as we now must make consists of the observation of the individual as he interacts with all of the various types of situations which constitute his behavior circumstances. This series of behavior circumstances will naturally comprise many diverse kinds, each involving different kinds of conduct.

At this point it is very important to distinguish between the biological and psychological environments. Otherwise we may not be able to avoid certain illegitimate analogies which persist in creeping into psychological descriptions. Unless we make this distinction we will almost certainly fail to give proper attention to, and to make correct evaluation of, the actual details of stimulational conditions. And the latter we must always stress as essential phases of behavior segments.

Biological environment constitutes the more or less static surroundings of the organism, such as the topography of the geographical region, temperature and other telluric phenomena, and the general ecological conditions including the prevalence of number and variety of plants and animals. Now all these surrounding conditions may have indirect effects upon the organisms which live among them. For instance, they may influence the modification of the organism's biological character; or the biological environment in its details may become a stimulus or stimuli for psychological reactions. Until it does become such it is biological and not psychological environment. Unlike psychological environment, however, the biological environment may bring about the preservation or modification of the biological characteristics of the

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organism, which characteristics may influence its psychological conduct.

In contrast to the biological surroundings the psychological environment includes only those objects, things, and conditions which have taken on stimulational functions, and which have correlated with them specific responses, whether elementary reaction systems or complicated behavior patterns. Psychological stimuli are essentially environing things which arouse the organism to specific activities. This is a more dynamic and functional relationship than that between the organism and the biological environment. A still more important differentiation is the fact that the psychological environment is not limited to what is popularly called natural. Psychological environment consists also of social phenomena, intellectual phenomena, æsthetic, religious and other cultural things and situations. Briefly put, the psychological environment includes conditions and objects which constitute the products of human development and human activities. Clearly such products have only a very tenuous connection with the natural phenomena we have described as the direct components of the biological environment. All of the stimuli of the person must be considered of course as parts of his environment, although most of such stimuli functions have little or no effect upon the biological functions and changes of the individual.

In attempting to systematize the facts concerning the psychological personality in action we find that some of the behavior situations may be placed in an hierarchical series ranging from very simple stimulating conditions and acts to very complicated stimulational situations and activities. This arrangement of activities is based upon the criterion of what knowing-and-doing capacities the individual exhibits in adjusting himself to his psychological surroundings. Other types of behavior which we will describe must be arranged on the basis of different criteria, and thus must be put into a different behavior series paralleling the first.

At what is probably the lowest point on the hierarchical scale we place such activities as merely maintain the individual, that is, keep him alive, in what is practically his natural surroundings. However complex the surroundings of human individuals are, such large and inclusive fields of conduct must and do comprise some situations that approach very closely in their character the natural biological conditions. Such activities we place in a class of non-intelligent behavior, typified by simple reflexes.

Under the heading of intelligent behavior we put into our hierarchical series the actions of the person which are necessary for adaptation to more complicated situations. Such behavior may be considered as functioning as maintenance responses, but to more complicated natural surroundings than is the case with the non-intelligent behavior. In addition, such conduct adapts the person

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to the more elementary cultural conditions such as economic, industrial, social, technological and other human circumstances. Again, we might say that intelligent responses operate in situations involving the carrying out of purposes of various sorts, whether necessitated by the individual's natural or social situations. In general, such conduct involves the accumulation of behavior patterns by the individual in his various contacts with his surroundings, as well as the capacity to appreciate likenesses or unlikenesses of later situations to former ones. In this way the accumulation of behavior patterns can be utilized and transformed to become suitable responses to those conditions.

Still more complicated behavior situations, to which the individual must adapt himself with correspondingly more complicated behavior, comprise the circumstances in which the person develops and uses deliberative, reflective, and creative responses of all sorts. These reflective and creative responses imply various manipulations and transformations of the natural and cultural surroundings. As typical forms of such activity we may consider the various inventions of a mechanical sort, and intellectual and scientific constructions of all types. Still other varieties of these reconstructive or creative activities may be illustrated by the various acts of the artist in the diverse æsthetic fields, such as architecture, sculpture, painting, etc.

Among the types of adaptive behavior which we place parallel to the hierarchical series just described are the different ways in which the person is in contact with his stimuli objects and conditions. In other words, not only must we study the reactions of the person to his different types of behavior situation but also the different ways in which he can react to the same type of situation. Not only can the person perform intelligent responses to stimuli but he can be more or less aware of things to which he reacts. Intelligence acts may be performed in a fairly mechanical way or in a very deliberate manner. Our whole problem here is to describe the intimacy with which the person is in contact or connection with his stimuli objects or situations. Thus, an absent-minded person may do the same thing under the same circumstances as another person but with a detachedness which is as definite as it is familiar. Here we have all of the behavior phenomena which are popularly known as subconscious, unconscious, etc. It is clear that the description of ways of acting and types of action must overlap at various points.

Another feature of the person in action is his development of and domination by particular conditions and situations, which, even though developed in some particular circumstance, operate to influence and condition the person in other situations, sometimes in all other situations and in every contact of the person with things, persons, and circumstances. Among such condition-

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ing and influencing objects and circumstances we may name ideals, motives, and ambitions of all sorts.

It is hardly necessary to point out that our non-intelligent, intelligent, creative, and other types of activities are not the only kinds that the person performs. Indeed it is very difficult if not impossible to enumerate all of the different forms of psychological adaptation. What we can do is to discuss a variety of types which will suggest what are the actual behavior conditions of persons. Also it must not be assumed that these types of personality adjustment always function in mutually exclusive situations. On the contrary, all of them might conceivably find a place in the same particular behavior situation.

Furthermore, it should be clear that each behavior situation that attains to even a slight degree of complexity comprises the operation of numerous specific reaction systems; that is to say, multiplex behavior patterns are involved. And in the more complex behavior situations a large number and variety of behavior segments may function as phases of the single total behavior situation. It is these component patterns and segments which comprise the details of the large behavior situations. With these suggestions concerning our survey of the psychological personality's activities we may now proceed to discuss the following six ways in which the organism performs its action.

(1) Unintelligent Behavior.
(2) Intelligent Behavior.
(3) Behavior indicating different Modes of Intimacy between Persons and their Stimulating Objects.
(4) Inventive and Creative Behavior.
(5) Deliberative and Discretional Behavior.
(6) Purposive Behavior.

1. UNINTELLIGENT BEHAVIOR

A great deal of our psychological action is unintelligent in the sense that it does not represent effective operation of the individual through conditions which he has himself brought about. Naturally the characteristics of such behavior may be considered from the standpoint of both the response or equipment side of the personality, and from the side of the stimulus or surrounding conditions. By unintelligent behavior we mean, in general, action which does not represent on the part of the personality any very elaborate appreciation of the situation to which he is adapting himself. He is not intellectually oriented to his adaptational situations. On the side of the stimulus the conditions are such that there is not much opportunity for intelligent action or else the person has not become attuned to the possibilities for intelligent behavior in the situation. Unintelligent behavior then really con-

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sists of two sub-types, namely, pre-intelligent and non-intelligent behavior. The actual differentiation between these we will now attempt to point out in detail.

Pre-intelligent Behavior

Here we have a situation characterized by the fact that no intelligent behavior is necessary, or else is impossible because the situation does not rise much above comparatively simple biological circumstances. Pre-intelligent situations involve activities of the person in the form of fairly simple adjustments to changes in natural surrounding objects and conditions, and to changes and conditions of the person himself. Illustrative of such changes in the organism itself which stimulate pre-intelligent conduct are the various metabolic and excretory functions and processes. The kinds of acts performed in pre-intelligent situations are symbolized by reflexes of all sorts. Such behavior consists for the most part of reaction systems accruing to the individual because of his biological organization. In other words, the individual can adapt himself to pre-intelligent situations by virtue of the fact that he has developed in his biological evolution certain structures and functions which provide him with various forms of adaptation to his natural surroundings. The especially significant psychological feature of these reflexes or pre-intelligent activities is that through contact with various objects and conditions, specific differentiations and coördinations of reaction systems and stimuli are developed.

Non-Intelligent Behavior

In general, this type of behavior comprises more complicated situations. In fact the circumstances surrounding non-intelligent activity may involve much of the individual's economic and social milieu. And yet the individual does not have sufficient behavior equipment or the proper kind of equipment, whether informational or performative, to react intelligently or effectively to his situation. As a convincing exemplification of this point we might cite the fact that every one at some time is hopelessly inefficient and unintelligent in the face of some specific situations. Naturally those specific situations differ in their kind and complexity for different individuals. Some persons are hopelessly ineffective in the purchase or sale of an object, whereas others have similar difficulties in the choice of a profession, or an employee, etc.

Furthermore, persons differ in their general and more or less permanent ways of reacting to types of situations. Some meet their business conditions with a high degree of intelligence, whereas intellectual situations find them hopelessly morassed. Again, others may be genuinely unintelligent in political situations or business conditions or perhaps in some professional field.

It would be a false impression to assume that unintelligent conduct operates only in complicated human or social situations. Probably no better illustration of such non-intelligent behavior in simpler activities can be given than the case of the person thrown

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into deep water without behavior equipment enabling him to reach safety. All of the floundering and misapplication of effort is correspondingly found in such circumstances as the political situation, although there the individual apparently walks, talks, and breathes calmly. Nevertheless the same ineffectual hits and misses are discoverable.

Let us suggest again that in unintelligent behavior the principal feature on the personality side is lack of knowledge concerning situations, or appreciation of how to remedy them, or to remove oneself from their harrowing midst. On the stimulus side we find conditions that overwhelm an individual, that are unfamiliar and unamenable to his behavior techniques.

Another type of situation in which non-intelligent behavior features is that involving personal conditions to which a person needs to adapt himself, such as handling some mechanism or accomplishing some mechanical task without the necessary behavior equipment to bring about the required result.

A different form of non-intelligent behavior situation is that in which the individual may possess the requisite knowledge and performative behavior equipment to carry out the necessary adaptations but for some reason is unable to employ such behavior equipment. Either he cannot use it or does not use it to carry out his necessary task. It may be that he does not have confidence in himself or that he does not know that he actually can accomplish the particular result he wishes to; or there may be still another condition that prevents him from employing the particular equipment he does possess and which under some other circumstances he could use.

II. INTELLIGENT BEHAVIOR

The intelligent behavior of the personality constitutes reaction conditions in which the individual adapts himself to his surroundings with a facility and expertness of action that appear necessary and suitable for the particular situation. Important factors are the person's insight or appreciation of the character of the situation to which he is reacting and the means whereby suitable action can be carried out. On the stimulus side, intelligent reactions imply frequently, but not always, complicated situations, namely, those which make necessary considerable information and skill in the manipulation of the objects and conditions to which one must react. In other situations we find the stimuli objects fairly simple and uncomplicated but having undergone some change, some modification in their properties or transposition in settings. Or in still other situations the stimulus object, whether simple or complex, is new. Accordingly, in so far as one can appreciate it, it indicates that a particular kind of reaction is

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required, but one which is not at present available in the behavior equipment of the individual, as when one comes across a new plant or animal, a new disease, or other thing or circumstance.

Intelligent behavior implies, then, that the individual possesses a considerable equipment of skill and informational types of reaction systems. It is the possession of such behavior traits which makes for the person's expertness and efficiency in the intelligent behavior situation. Such a series of behavior systems must have been previously acquired in similar or identical situations during the course of the individual's past contact with similar objects and conditions. These accumulated reaction systems in the second place must be capable of functioning as processes; that is to say, they must be capable of fitting and combining in order to serve in situations which are not exactly like those in which they were originally required. With the word intelligence we may then sum up the situation in which the person has built up a considerable number of reaction systems which can be made to bear upon present situations and modified to constitute immediate and appropriate adaptational activities with respect to such situations.

In detail, the behavior called intelligence partakes of a series of descriptive characteristics which serve to identify it and to mark it off from other kinds of action. A number of these different characteristics we may discuss in order. (1) Intelligent behavior is organized activity. The actions which the individual performs in the way of movements and manipulations are organized and systematized in a manner which is under the control of the acting individual. (2) Such activities are directed toward the present specific situation; in other words, intelligent behavior is appropriate to the specific behavior situations at hand. (3) Again, these characteristics of intelligence activity imply that such behavior involves a foresight into the character of the stimuli situations and relationship between the stimuli and the behavior capacity of the individual. Here we see how the person fits means to ends on the basis of his past experiences and his acquisitions of reactions in past situations.

Another characteristic is (4) rapidity of action. While rapidity is not a universal characteristic of all intelligent behavior it is nevertheless a sign or mark of intelligence when the reaction is rapidly performed, provided the situation demands such activity. This characteristic is closely connected with another one which we call agility of response. The individual is able to manipulate himself, his tools, or the stimuli objects in order to bring about a desired result. (5) Closely connected with the characteristics just enumerated is the one we call variability of activity. Here we have a higher plane of variation than that we have described as the general characteristic of all psychological behavior. The variability of intelligent behavior refers essentially to the reinterpre-

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tation of stimuli conditions, making them serve as different signs for things which aid in the carrying on of the particular behavior. (6) Next we may mention that intelligent behavior is localized, in the sense that the individual sets up boundaries and as a result makes his activity specific and fitting for the particular situation. Thus are removed the randomness and misactivity which accompany unintelligent behavior.

(7) The carefulness so characteristic of intelligent behavior makes for accuracy and definiteness of reaction and its appropriateness with respect to particular stimuli situations. (8) Owing to the independence and deliberateness of the individual concerning the stimuli, he stands to a certain extent calmly over against the situation. In this manner he is enabled to provide the most appropriate means for carrying out the particular end or result. This independence makes for steadiness and coolness in surveying the situation, so that the adjustment to these ends may proceed in an orderly and systematic manner. (9) Even if intelligent action can go on without the individual being alert and alive to the situation, still the more effective forms of intelligent action require considerable alertness on the part of the acting individual. (10) A last and exceedingly prominent characteristic which we have already mentioned is that such responses consist to a great extent of process reactions having their stimuli in signs and symbols of various sorts. This process consists mainly of the ability of the person to make use of his previously acquired equipment. It is chiefly through these process reactions that the individual is able to bring about desired reconstructions of the stimuli situations which call out the intelligent behavior.

Corresponding to the detailed response characteristics of intelligent behavior we find a series of detailed stimuli characteristics which typify the situation in which intelligent behavior operates. For instance, (1) suddenly presented situations are frequent stimuli for intelligent behavior as well as (2) complicated situations, and (3) critical circumstances or those involving important and decisive conditions; (4) also strange objects and conditions serve to elicit intelligent behavior of all sorts. In the same way (5) new objects are inevitable occasions for the operation of intelligent activities. (6) Very characteristic of intelligence stimuli are developing situations, conditions which are changing, (7) also, such stimuli as may be considered as offering a challenge and putting the individual on his mettle.

Some Misconceptions concerning Intelligence

An unfortunate situation exists with respect to intelligence in a considerable amount of psychological literature. For we find there a continuation of a popular misconception concerning the nature and functioning of intelligence. Succinctly, the whole matter may be summed up by pointing out that intelligence, instead of being considered a particular organization of reaction

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systems operating in particular ways, is looked upon as some sort of force or potency operating in the individual and bringing about the results we call intelligent conduct and intelligent adaptation to surrounding conditions. This unfortunate misconception maintains itself in psychological literature and in popular opinion because it is apparently difficult to give up the notion that intelligence is not an innate potentiality which itself determines the kinds of activities the persons should develop and perform. Such a notion conflicts very strikingly with the conception that intelligence is a name for actual ways in which persons adjust themselves to particular conditions.

Intelligence considered as a force or potency consists mainly of a reification of a type of action through the instrumentality of a name. Sometimes at least, the potency of intelligence is made, whether intentionally or unintentionally, to inhere in some substance. Or else intelligence is made entirely into an invisible and intangible force independent of the action which it is presumed to influence and to determine. Strangely enough one of the strongest conditions favoring the retention of this faulty conception in psychological thinking is the commendable interest psychologists have in the exact measurement and determination of psychological facts.[1] This interest in measurement influences psychologists to conceive of intelligence as a fixed, unchanging, or very little changing, quantity. How incompatible such conceptions are with actual behavior phenomena must be obvious to the alert psychologist.

III. BEHAVIOR INDICATING DIFFERENT MODES OF CONTACT BETWEEN PERSONS AND THEIR STIMULI

So intricate a phenomenon as a psychological personality operating in its coördinately complicated surroundings necessarily displays to us varieties of specific modes of action. That is to say, the person in his various performances operates in different ways depending upon his intimacy with and awareness of stimuli objects and conditions. To take speech reactions as an example, the person may be on the *qui vive,* on the highest plane of anticipation and eagerness to have conversation with another person, to understand him and to be understood. In contrast to such an alert mode of reaction to the stimulus the individual may proceed downward in his behavior to the point at which he will barely appreciate what is being said to him or hardly be certain whether the other person is speaking to him. This variable mode of contact with the stimulus may operate in any other kind of behavior situation or involve any other specific type of action. As a mat-

[1] Cf. Kantor, "Intelligence and Mental Tests," *Journal of Philosophy, Psychology and Scientific Methods,* 1920, XVII, 260–268.

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ter of fact, the person can perform many complicated and important activities in a semi-automatic fashion.

Our point here is, then, that the person may perform the ordinary behavior reaction systems in his equipment, responding to the same objects to which he normally reacts, but the modes in which those reaction systems are performed may vary immensely. Not only does the individual react to his stimuli surroundings in variable modes of action with previously acquired reaction systems but he may also in the same set of variable ways acquire new and different reaction systems. These variable modes of action in some cases involve some one or a few specific actions, in other instances a great number of closely related acts, while in still other cases and at other times, the entire person in all of his complicated action is implicated. Of these modes of intimacy or contact of a person with his surroundings there are obviously a great number. For illustrative purposes we may select and describe five forms or modes of action which we may classify as follows.

(1) Automatistic.
(2) Subreactionalistic.
(3) Reactionalistic.
(4) Subpersonalistic.
(5) Personalistic.

The Automatistic Mode of Action

Automatistic modes of behavior are comparatively simple forms of psychological action. Their primary characteristic is that the individual is in contact with only a limited range of objects. This means in effect that the connection between the individual and his surroundings is not very close. In fact the number of stimuli functioning to call out automatistic reactions is very small. Thus the person appears to be rather passive. Only very striking objects or conditions which bring about decided and sudden changes in the functioning of the individual become stimuli for his behavior. For the most part, such objects must be mediated by definite mechanical contacts in order to elicit action from the person at all. Accordingly the predominant types of automatistic action are either general reflexes which have their stimuli within the organism, or implicit activity which is stimulated by other overt or implicit action of the person.

Characteristic of automatistic conduct is the fact that whatever automatistic activities a person performs will not later on be recalled. A notable and important exception, however, is the case of dreaming. Such activities are but slightly conditioned and guided by external surroundings. Dreaming activities constitute the best illustration of this point. Thus, when dreaming, a great amount of action (implicit) is performed and in a variety of ways. In fact there is little or no check upon the kind and amount of dream behavior.

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When we survey the field of specific human conduct to illustrate automatistic reactions we discover that within the limits of any particular mode of behavior there appear to be many degrees of actions or types of relationship between the person and his surroundings. Such degrees of action depend naturally upon the specific kind of behavior conditions under which they occur. The following behavior circumstances of persons all illustrate automatistic modes of conduct.

Anæsthesias The passive and uncoördinated functioning of the person with respect to his surroundings is admirably illustrated by general and local anæsthesias. The individual in a state of general anæsthesia undergoes a maximal limitation in activity, performing only such reactions as are determined by his biological organization. From this deepest stage of dissociation and uncoördination there are gradual upward grades of contact with stimuli objects depending upon the depth of anæsthesia. Much the same conditions prevail in the case of local anæsthesia, but in this case the entire mode of behavior is restricted to particular segments of the organism and specific features of the general surroundings.

Catalepsies and Stereotypies Certain abnormal conditions of the person indicate decided automatistic actions. Thus the cataleptic fixation of the limbs, head, or other parts of the organism, or of the whole individual, all indicate his dissociated and passive character. Again, various forms of stereotyped repetitions of actions, shaking the head or other part of the organism, waving the arms, the repetition of words, syllables or single sounds, whether originated by some internal stimulus or external suggestion (command), all represent dissociations from the ordinary human surroundings.

Stupors and Comas Other abnormal activities of the individual giving us typical automatistic behavior pictures are the negativistic actions symptomatizing the withdrawal of the person from his normal surroundings. Some stupors display a gradual and progressive elimination of voluntary, thinking, and other active forms of response to the complicated series of normal human conditions. In place of such behavior we find a coördinate increase of automatistic action to the point at which the individual is mainly a biological mechanism, and only in the smallest degree a psychological personality. Frequently, even the simplest implicit actions are dispensed with, although other stuporous individuals indulge in elaborate inquiry and other forms of implicit activities. Endogenous intoxications and other conditions may bring about rapid and more complete automatistic modes of behavior, such as exemplified by the various comatose forms of abnormality.

Sleep The various forms of behavior during normal sleep, ranging from the light dissociation of dozing to the fairly complete withdrawal from the surroundings in the sleep of total relaxation, likewise exhibit the picture of automatistic activity. Here again the

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person is dissociated from his stimuli objects and conditions, is passive and does not perform knowledge or performance activities. In the case of sleep as well as in the lighter anæsthesias the individual may perform many activities of an implicit sort.

Intense Momentary Emotional Excitement

Violent emotional excitement constitutes a type of psychological functioning in which the person is oblivious to his surroundings, and so far as any extended range of objects is concerned is very passive. For the time being practically all his activity consists of violent trembling, panting or other forms of excitatory response. There is also much stereotopy of action in certain particular situations, screaming, rapid repetition of words or phrases etc., but no composed, discriminative responses to particular stimuli objects.

The Subreactionalistic Mode of Behavior

In this mode of behavior the individual is not cut off from his surroundings. Rather he is decidedly in touch with objects and conditions constituting his immediate environment. Here we have a much more vital and effective connection between the activities of the person and the stimuli objects inciting those responses. As compared with the automatistic mode of action this type is characterized by the large number of objects and conditions which may and do become stimuli for actions of various sorts. On the whole, then, the individual is decidedly active and spontaneous because he is in contact with so many simple and complicated behavior situations. From this fact proceeds a number of conditions.

In the first place, a great many different types of behavior are possible, since the individual is not limited to the performance of simple reflexes as in the automatistic mode of behavior. Again, in the subreactionalistic mode of conduct the individual is not restricted to any specific kind of surrounding objects. There is practically no limit then to the kinds of actions that the person can perform in this mode of activity.

Probably the main characteristic of this type of action from the standpoint of the person's behavior as a whole, is that when performing subreactionalistic behavior the individual is very definitely concentrated on the stimuli objects and conditions rather than upon his own reactions or his own personal interests and problems. As a consequence he is fairly definitely guided and controlled in his action by stimuli objects and circumstances. The point is that upon the basis of the individual's behavior equipment he can perform all sorts of activities upon the appearance of the appropriate conditions and occasions and moreover he can do this without any decided projection of his own desires and interests into the situation. In other words, it is not the individual's reactions or interests that are of importance or prominence in the situation but rather the surrounding circumstances with their compulsory and modifying condition. Accordingly, in sub-

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reactionalistic behavior the individual is not operating upon a very high cognitive level; he is not very definitely aware of his actions or of the stimulating conditions, although he may be performing very complicated operations and accomplishing very elaborate results. His action is not sharply pointed and directed. Objects and conditions do not challenge and arouse him. Previously, however, he may have been so challenged and aroused by a condition or problem that now his actions are still guided and controlled or at least influenced by that problem, despite the fact that it may not now be a prominent feature of his intimate surroundings. Subreactionalistic conduct is consequently very excellently illustrated by the rather indifferent forms of action in which a feature or a part of a thing or situation stimulates one to perform a half-hearted or half-witting response.

A decided characteristic of at least many of the subreactionalistic forms of conduct is that, while at the time the action makes very little difference to the person and involves very little awareness or appreciation of what is going on, at a later time when some one speaks of the occurrence or otherwise suggests it, the acting individual may recall the circumstance and his part in it. In this characteristic we find a marked contrast between the subreactionalistic and automatistic modes of conduct.

The subreactionalistic mode comprises an exceedingly large range of specific types of action. But these different forms do not fall into any hierarchical system. Rather, they may be considered as definitely coördinated types of activity which may be arranged in a convenient series.

Habits

Many of our habit reactions come under the classification of this mode of behavior. Here we have a large series of activities in which because of the very close coördination between the responses and stimuli, the response practically operates automatically when the stimulus appears. In this case the person is not necessarily keenly aware of what it is that he is doing at the particular time, although the activity is performed in an orderly and effective manner. The point to be noticed is that the individual has in some previous situations developed habitual forms of reaction systems which are intimately integrated with certain stimuli, so thoroughly integrated in fact that the person finds himself performing reactions which he discovers he had not known he was doing. Such habitual activities cover of course a wide range of behavior, both simple and complicated types. Among the complicated acts may be cited the carrying out of elaborate manipulations with machinery, driving a car for example, going some place, etc. Among the habits which constitute subreactionalistic modes of behavior are mannerisms of various sorts, such activities as tapping one's foot while hearing music, chewing one's pencil or scratching one's head while attempting to solve a problem.

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Absent-mindedness

Under this heading we place behavior modes in which the slight contact the individual has with a particular stimulus object or situation is the result of a serious preoccupation with other objects or situations. This means to say that, although the person is definitely reacting to things and perhaps effectively also, still his contact with those objects is more or less uncertain, indifferent, and mechanical. In other situations such absent-minded behavior may be very ineffective and can only operate at all when the objects and situations are comparatively simple. Otherwise disastrous consequences might ensue. Possibly the main point about this mode of behavior is that the person is so occupied with some problem or interest that he concentrates all his energies of action upon one situation or object, allowing very little of his intensive conduct for other objects and situations around.

Non-Attentional Situations

By non-attentional we refer to a type of behavior in which, because of the competition of two or more surrounding objects or situations, one object may be the recipient of practically all of one's attention to the practical exclusion of the other. As a consequence the reaction to the other object will not involve much awareness or effective intimacy. Illustrative of this situation is the activity of the person attending a ball game or a theatrical performance in the company of so interesting or so important a friend that upon the latter is concentrated the main activities of the individual. In consequence, the performance or game is witnessed only vaguely and with no exercise of vigorous activity. In other situations the competing stimuli objects or situations tend to distract the individual, so that his reactions to both are confused and ineffective, leaving little to be recalled. Illustrative of such subreactionalistic conduct is the activity of the person who has been more or less overwhelmed by good or bad information from different sources. The result is that he performs only ineffective, impersonalistic, dreamlike behavior.

Indifference Behavior

Indifference behavior is a type of subreactionalistic conduct indicating that the surrounding circumstances are more or less unimportant to the person. His responses, therefore, are apathetic and negative. A typical instance is the way one attends to and performs work when in a state of strong feeling. Such activity will not be performed with alertness nor with any profound degree of appreciation of the character or implications of the work. To a great extent such a person will be reacting primarily to his own state or circumstance and only secondarily to the object.

Fatigue Conditions

Similar to the situation just discussed is the case of the person who because of general organic conditions bringing about a state of fatigue, is to a great extent out of vigorous contact with surrounding objects and circumstances. For the most part such conditions are indicated by a noticeable insufficiency of conduct. A

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common example is the behavior of the individual who is reading a page in a book, but even as he reads on he hardly appreciates the nature of the material treated by the writer. This mode of activity simulates somewhat the reaction of the individual during sleep.

Reactional Momentum

The activities which may be called reactional momentum provide a unique set of types of behavior of the subreactionalistic mode. These types of action show us both simple and complex behavior results achieved without any apparent behavior process immediately going on to bring them about. Of the simpler processes the most familiar are the subtle inapparent activities producing the recall and utterance of names and numbers, which the greatest effort had previously failed to bring into function. In these situations the individual doubtless is very powerfully operated on and influenced by surrounding objects and conditions, yet we can observe few if any visible signs of the person's acting. As we have indicated, the great importance of the stimulus which at one time is unable to produce in the person an immediate response of a satisfactory sort (in the sense that the name is not produced or the problem solved) starts the individual off, however, with the result frequently observed that the name soon appears or the problem is soon solved. As a matter of fact in such cases we frequently find that when the person stays with the problem stimulus the solution is more hindered than helped. Clearly then, the type of process we are now describing usually if not always involves cases in which the action is implicit in character. Here we find the remarkable and striking illustrations of solving complicated problems and making scientific and other discoveries. As other examples of such behavior we may refer to literary workers of all sorts, who report that the work of composition goes on by itself or is done by some one else.

Possibly the most striking action illustrative of reactional momentum is the "flash of inspiration" or "genius." In such an instance, because of the inapparent character of the responses, the stimuli are not in evidence. Also the responses can operate subtly and without detection. As a consequence, the entire procedure, namely, the production of some important work without any apparent action, appears mysterious and surprising. As an illustration of such a flash of genius we may quote from the chapter on Mathematical Creation in the volume called Science and Method written by the celebrated mathematician Henri Poincaré.[1]

"For fifteen days I strove to prove that there could not be any functions like those I have since called Fuchsian functions. I was then very ignorant; every day I seated myself at my work table, stayed an hour or two, tried a great number of combinations

[1] Published in "The Foundations of Science," 1913.

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and reached no results. One evening, contrary to my custom, I drank black coffee and could not sleep. Ideas rose in crowds; I felt them collide until pairs interlocked, so to speak, making a stable combination. By the next morning I had established the existence of a class of Fuchsian functions, those which come from the hypergeometric series; I had only to write out the results, which took but a few hours."[1] In essence this experience of Poincaré's is precisely like the surprising experience of finding that we have made improvements in our typewriting, swimming, or skating since our last trials.

Typical of the activities operating upon reactional momentum is the absence of any apparent checking by the person. Behavior results work themselves out on the basis of the person's previous effort and attention. This all means in effect that the person is not reacting to himself or projecting himself into the behavior situation. The fact of the person not responding to himself and the advantage this procedure has for the accomplishment of one's purposes is very familiar in the action of the inexperienced public performer. We all know how much such an individual lacks in the successful performance of his particular activity when he allows himself to function in the situation, that is to say, when he is stimulated by his own presence and thoughts concerning the situation. On the other hand, the public performer who loses himself in his action and is aware only of the stimuli which constitute the actuality of the situation for the moment (as in the case of the actor actually playing the part he is representing) accomplishes a much more satisfactory activity. In such an instance we find that the person's ability to put himself into the situation he is acting out depends to a considerable extent upon this principle of reactional momentum. The individual gets himself into the situation and then whatever task he has to perform is carried out on the basis of the stimuli conditions of the total behavior circumstance.

Other striking and familiar facts due to the effect upon the person of inapparent stimuli are those including what is popularly called intuition, first impression, and telepathy. In intuition persons learn to make use of certain criteria for knowledge and judgments, the specific elements of which they are themselves either unaware of, or even of ever having previously observed them. First impressions are likewise reactions to stimuli objects and conditions observed but which are not appreciated at first because of their uniqueness or because they are constant accompaniments of particular situations. The result is that such stimuli objects do not challenge attention and analysis. Telepathic phenomena in the sense of the common ideation of two or more persons distantly

[1] P. 387.

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removed in place, whenever genuine, may also be traced back to the influence upon persons of inapparent stimuli objects and conditions.

The Reactionalistic Mode of Conduct

The distinctive feature of this mode of action is that the person is reacting to such complicated situations, involving so many stimuli or sets of stimuli together with their settings, that his own reactions of necessity become a central feature of the entire behavior situation. In these cases because of the variety and complexity of stimuli objects and conditions the individual must be exceedingly alert in order to respond in an adequate and systematic way to the multiplex group of stimuli. Especially must he be sure that he is doing the necessary acts in the proper way and at the proper time. On the whole we may say that the reactionalistic mode of conduct operates in behavior situations in which the process reactions are required, actions in which the person must either successively or simultaneously attend to and take care of a series of conditions and objects.

Now although, as we have pointed out, in such process reactions the many stimuli objects and conditions are somewhat superseded in stimuli importance by the greater and greater prominence of the person's reactions as stimuli, still it is of cardinal importance to observe that this does not mean that the act itself centers about the person. It does not consist of such a contact of the individual with the surroundings as to be a working out of his personal interests and desires with respect to certain objects. On the contrary, the reactionalistic mode of behavior is definitely an attempt to bring about manipulative changes of some phase or feature of the surroundings. But as we have already indicated, there is a distinct need in the situation for the person to attend to and watch his own manipulative responses. Such behavior we may illustrate by a few typical examples.

Process Responses

Reactionalistic behavior as it operates in process responses may be illustrated by a chemist working out some experimental problem. In the first place, he must attend to his problem; then he must have about him and work with a large series of chemicals, the use of each of which has its specific place in the total experimental process. Also, such experiments may require specific temperature and pressure conditions, either constant or variable at different points in the procedure. Again, many details of mixing, boiling, evaporating, and filtering come in for exact and accurate attention, besides watching and using measuring instruments of all sorts. These exceedingly numerous and complicated manipulative reactions appear in the general behavior situations as among the most important features of the stimuli conditions. Thus the acting person becomes peculiarly intimate with and sensitive to the specific stimuli conditions in which he finds himself.

The same sensitivity to stimuli details necessitated by the im-

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Precautionary and Apprehensive Situations

portance of the person's own reactions is found in all behavior situations in which precaution is necessary or in which one apprehends danger or difficulty. When one is doing work requiring extreme accuracy or expertness of some sort, as in testing materials or performing calculations of various kinds, the reactionalistic mode of conduct is decidedly in evidence. Puzzle reactions of various sorts also admirably illustrate such precautionary sensitivity of the person to his surroundings.

The Subpersonalistic Mode of Conduct

Some of our behavior situations are so complicated that the person himself becomes and operates as a definite feature of the stimulational surroundings. This means of course that something more than the reactions of the individual must be reacted to by him. It means that the person as represented by his likes, tastes, abilities and interests must be definitely considered when the response takes place. Thus when one is asked to do something the answer, if it belongs to this mode of conduct, will depend upon an appreciation of the ability or inability of the reactor to perform such a response. In such situations the question arises, "Could I do that?" "Would I fail in such an undertaking?", etc.

Similarly, the kind of reactional contact which one sustains to surrounding objects and conditions may involve the person's tastes, desires, and interests whether or not overtly appreciated by him. The fact that certain actions one might perform would provoke a disturbance of or conflict with one's personality equipment implies a rigid scrutiny of stimulating situations and a decidedly interested and concerned attitude toward them and toward one's responses to them.

Other actions included within the subpersonalistic class may involve the person not directly as a stimulus but rather as a setting for some other stimulus object or condition. Thus in situations in which one is merely an onlooker upon some other person's manipulation of a dangerous object, say, a loaded weapon, one must be alive to one's total surroundings because of some probable result that might happen to oneself. Insofar as the reacting individual is responding to himself as a setting to the main stimulus his action is not so alertly directed nor so vivid as when he constitutes all or part of the main stimulus itself.

Past Responsibility

Besides the illustrations already offered of subpersonalistic behavior such conditions can be illustrated by situations in which the person is concerned with some past event. The question whether he is implicated in some past action is more or less vigorously pursued if he and his possible participation in that event are parts of the general stimuli circumstances of the situation under discussion.

The Personalistic Mode of Action

Probably the most complicated of all our behavior modes are those conduct complexes in which the person is not only a part of the stimulus situation but the main stimulus. Such a circum-

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stance is obviously the case in which a person's action is a problem to him. Typical in this connection is the case in which the person must discuss with himself the value and consequence of some act still to be performed. Since obviously whatever action the individual is performing or will perform will involve other persons, things, and conditions, such activity may be set down as consisting of the most vivid and intimate contacts which the person has with respect to his surroundings. In such behavior situations the person must not only be aware of his environing circumstances but he must contemplate changes of all sorts and consider his present and projected relations to his surroundings. Still further, he must be alive to the consequences of his contacts. This, of course, makes for the person's further and deeper intensity of awareness, attentiveness, and alertness while in contact with his surroundings. We may illustrate this mode of conduct with the following types of action.

Scientific Investigation

Every complex scientific investigation implies a rigid scrutiny of the processes one employs. This scrutiny involves consideration of the adaptability of methods to the situation at hand, adaptability in the sense of being relevant to the hypothesis employed and capable of inclining the balances toward the acceptance or rejection of the hypothesis, as well as supplying verifying evidence of its validity. In such situations the hypothesis is of course an intimate factor in the life and experience of the scientist. Thus, on the whole, the person is constantly in the center of the entire situation and eternally alert toward every occurrence finding a place in the investigation.

Thinking and Problem Solving

Not only complicated scientific investigation but any form of important thinking or problem-solving activity illustrates the same alertness in watching over every detail of a behavior situation. In general, the person is decidedly eager to be in control of the stimuli conditions, the response actions, and the results of the whole situation.

Voluntary Action

Voluntary actions of any serious importance exhibit instances of the most complicated and vivid interactions of the person with his behavior situations. Whenever there is some problem of advantage or disadvantage to the reacting person or when the consequences of an act have special significance for him or for some situation in which he is interested, then we may observe the typical characteristics of the personalistic mode of contact with stimuli objects and situations.

In addition to the suggestion already made, to the effect that the types mentioned do not constitute all of the modes of interaction of the person with his surroundings, we offer another, namely that these different modes of conduct are not necessarily found in distinctly different behavior activities. On the contrary, in any one

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complicated behavior complex we may find the individual performing activities of every mode. In various familiar anecdotes concerning the intensive pursuit of particular problems by individuals we find that at the same time that the person is in a decidedly personalistic form of intensive contact with a particular problem he is also functioning in a very subreactionalistic manner with respect to his own comforts and welfare. For instance, let us recall the case of Newton who, while working intensively on his problems, overlooked completely the stimuli of hunger and other indications of his human needs. So we might indicate that to a certain extent any particular mode may itself be a phase of a larger form of activity of which one or several other modes may constitute an accompanying phase or phases. Probably in order to determine with fairly rigid accuracy the kind of mode that a person is performing at any particular time we would have to consider segments of behavior rather than behavior situations.

Another point of importance in considering the problem of modes of conduct is that when the individual is engaged in some particular occupation he may very readily change one mode of behavior into some other. Thus it is well known that activities that originally require very intensive intercourse with surrounding objects may later on become automatized and pass from an intimate personalistic mode of conduct to a reactionalistic or even automatistic mode of behavior.

IV. INVENTIVE AND CREATIVE BEHAVIOR

From the observation of the psychological individual in action we discover that while in a general sense his activities may be looked upon as adaptations or adjustments to his surroundings as they are, a considerable number of his actions constitute transformations and modifications of his environing conditions and circumstances. In the latter type of action to which we give the names inventive and creative the individual rearranges, develops, and recreates his surroundings in such a way that we might well say that he makes for himself a new environment.

In the final analysis all such creative activity must be individual and idiosyncratic in character but we can probably best illustrate this form of action by considering different human groups. How varied are the surroundings of individuals who live in diverse types of human society. Compare the environment of the more primitive tribes, say the black groups of Africa and Australia, the Indians of the plains and the Eskimos of the north, with the white civilizations. In the first place, we observe that as we move from group to group the presence of different objects and activi-

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ties bears convincing evidence of the different ways in which the persons of the different groups have performed their inventive and transforming work. In the second place, the more complicated civilizations in comparison with the simpler groups show us how great has been and is the amount of transforming and creating conduct. In all groups, of course, such inventive and creative activities cover every phase of human activity; they comprise technological processes, methods of social organization, art production, scientific and mechanical invention, and all of the improvements in practical arts and ways of living and thinking. Furthermore, while the differences in inventive behavior are very great between the members of the different ethnological groups, minor differences of the same general sort are found within the same groups. Also since only comparatively few individuals of any particular group of the civilized communities are proficient as compared with the rest of the group, the differences between the inventive ability of the members of the same groups are enormous.

For a better understanding of the nature of inventive and creative behavior it is well to point out that it differs only in degree and not in kind from what we have called adjustment and adaptive conduct. Let us observe that the primary distinctive feature of the latter types of behavior is that the person reacts to things and conditions that are immediately present without altering their character or condition. By contrast, inventive and creative actions are those which alter present surroundings. In every case, of course, the individual is adapting himself to some present situation, albeit the result of inventive or creative conduct is that he surrounds himself with new objects and situations.

What we have then in all inventive and creative situations is a constant cumulative effect. The product of some action becomes a stimulus for another action resulting in a more complicated product, and so on, until the person surrounds himself with objects, customs, and actions which are exceedingly different from the type of conditions with which he started. For this reason we must observe that to a great extent it is true that inventional and creative activities are in their simpler forms almost as wide-spread and common as bare adjustment behavior. For instance, we may consider the creational factors of conduct as almost a universal characteristic of the human type of psychological organism. Because of such a transformative mode of adaptation it is a normal and almost inevitable result that the surroundings to which the individual has to adjust himself become more and more complicated, especially as the changes initiated by human individuals of different generations increase.

For expository purposes we may distinguish between these two types of behavior, making the inventive distinct from the creational form.

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Inventive Action

Typical of such activities of the person are the development of new objects, new processes, and activities by a more or less closely dictated need or problem set by immediately present circumstances. In plainer words, each specific inventive or constructive problem has its basis or stimulus in some specific set of circumstances which the individual finds himself facing. Thus some circumstance, constituting either an uncomfortable situation for the individual or symbolizing a more satisfactory condition or circumstance, brings about a great series of actions which tend toward some transforming conduct and in many cases the development of some new product, in the popular sense of inventing something. But in all instances the transforming actions and the resultant product bear very close relations to the problem and need. For example, a problem in bridge building must be definitely conditioned by the site, the character of the traffic, the funds available for the project, etc. The construction and equipment of a hospital must be conditioned by the precise type of cases to be handled, the character to be served by the institution, the available funds, besides the architectural needs dictated by the specific building problem. Similarly, many technological actions and even the development of scientific processes, conceptions, and interests are directly determined by manufacturing, economic, and other everyday problems.

Among the outstanding features of inventive reactions is the importance of the person's capacities and experiences. Every inventive adaptation involves deliberate utilization of a person's qualifications, such as definite techniques, information, and other capacities developed in past contacts with similar situations. Almost wholly does inventive activity demand genuinely personal features of behavior. Only individuals with particular specialized behavior equipments are able to bring about necessary changes and transformations in the surroundings or in general are capable of employing the proper means of attaining particular ends in view. Here we find the basis for choice and individuality of performance. Although the stimulating conditions influencing the work are exacting and determining, still the inventor, architect or engineer has a fairly wide range of choice of action with respect not only to the details but to the total development of the entire project; so that in the final analysis different particular individuals will perform the work in their own particular ways and the products will bear their own unique stamps.

Our study of inventional conduct sufficiently suggests that such activities cover an exceedingly wide range of particular behavior segments. Not only do they comprise mechanical and technological processes and objects but also practical changes of one's conditions, arrangements of furniture, preparation of food and other household problems. Also inventive behavior characterizes moral,

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religious, and social practices, besides the development and organization of various idea-systems, covering every phase of human life. Clearly then, it appears unnecessary to add that the psychological fact of inventive behavior is an exceedingly broad phenomenon and is not confined to the popular conception of invention which hardly reaches beyond mere mechanical manipulations.

Creative Activity

From inventive activity creational work may be differentiated by the criterion of spontaneity and freedom in the production of things and processes, and in the actual modes of working during the course of creative production. The artist, unlike the inventor, is not definitely restricted by canons, or conventional ways of doing things. We might point out then that the stimulating conditions for creative activity are not so definite, so limiting, and determining. Even in cases in which the stimulus to creative work is definitely given, the work itself must represent the unique performance of the person. Whereas in inventive activity the performances or adaptations depend upon the individual's previous development of definite techniques and modes of operation in similar situations, in the case of creative activity, the processes being spontaneous and free, represent more the personal expressions of the individual's tastes, abilities, desires, etc. The creative worker then does not need to fit particular means to particular ends. As a consequence the product of the creative activity may be very unique and very decidedly different from anything of similar character which has previously existed. Such principles as we have been pointing out as operative in creational behavior may be excellently exemplified in the artistic production of a picture or a piece of sculpture and in the development by a scientist of a new hypothesis or theory.

Creative activity then is indefinitely more individual still than the action of an inventor. Here we have always the behavior of a virtuoso to the precise degree to which his activities are unique and original; that is to say, creative. In fact, the activities of the creative person in performing original conduct are baffling in their description. It is not surprising therefore that we have great difficulty in attempting to describe how creative activity is executed and what to do in order to be a creative worker. At best we may say that such activity involves the development of individual capacities of a unique sort, the development of judgments and intuitions, which in their ontological development, of course, represent the absorption and assimilation of current information and artistic and scientific trends. Certainly a creator must be in extremely intimate contact with the general types of situations in which creative conduct is possible and actually develops. Such development of individual capacities demands a close and long acquaintance with materials used and traditions found in any par-

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ticular field of activity. In order to develop a scientific hypothesis one must be exceedingly alert to happenings in the particular field under investigation; one must develop and accumulate a system of judgments and other reactions representing adaptations to particular situations. Similarly, in the case of artistic creation, the development of original objects implies a familiarity with techniques, and with previous methods and productions in order to be able to surpass them, although in many types of activities it is precisely the lack of acquaintance with previous creative activities which enables one to be original and to do original work. In the latter case, however, this does not mean that one can dispense with a thorough acquaintance and contact with the situations that offer scope for original and creative conduct.

The individual and spontaneous character of creative work is illustrated by the fact that the creative individual and creative processes seem always to be removed from the conventional knowledge, interests, and activities of the general mass of individuals. For this reason, we find that the creative worker is in many cases subject to persecution by those who do not understand what he is doing or the things he has produced, or who may have an affective reaction of disgust or hate to things new and unlike those to which they are accustomed. As a matter of fact, in many cases the original or creative work of individuals may be the result of their own protest against the standard social surroundings, and represent their attempts to modify these in order to make them more congenial to themselves.

Again, in many cases creative conduct results from the person's attempt to obtain human satisfactions of various sorts to compensate for some personal weakness or to achieve some superiority. In many instances of course, the creation of a new process in a particular social surrounding may mean that one introduces in a modified form some new social or cultural situation with which one has been in contact in some other group or civilizational surroundings.

Let us recall that we may look upon both the creative and inventive behavior as adaptations to surroundings. At this point we wish to add the statement that as adjustments these two types of conduct can be differentiated by investigating whether the stimulus or response phase of the adaptation is particularly emphasized, namely, whether the adaptational surroundings calling for transformation are more prominent in the behavior segment or whether the adaptational expressive activities of the person form the dominant note of the behavior situation. In each type of action the individual rearranges and transforms his surroundings but with a different guiding motive. Whereas in the inventive actions the work is carried on primarily in order to bring about some needed or desired modification in the surroundings, in the creative

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activities the guiding motive is carrying out some private purpose and conception of the individual.

To a certain extent because creative activity is more personal and constitutes more intimate activities of the person it results in the operation of more implicit action than in inventive behavior. This condition ensues from the more original development of the precurrent features of the specific behavior systems which operate.

Creative and inventive conduct may be compared by pointing out that although both partake to a certain extent of free expressive activities of a person, the former much more definitely involves forms of play. In this sense creative action represents behavior which expresses in a fairly unhampered way the accumulation of the person's tastes, likes, and dislikes as a result of his past experience together with his present desire to exercise his creative powers, and to attain to some sort of concrete symbol or product of his expressive impulse.[1]

From the intimate personal character of creative conduct it follows that this operates in an enormous range of situations, for the free play of human conduct may operate with a wide variety of materials. Thus creative activity may function in the serious domain of art, in the development of improvements of human circumstances, in the conduct of a business, in the arrangement of collections, in the entertainment of friends, in short in almost every human situation, either as the distinctive conduct of that situation or as an associated or allied form or phase.

V. DELIBERATIVE AND DISCRETIONAL BEHAVIOR

Prominent among the contrasting activities of human beings we place the responses which may be called deliberative and discretional actions. These may be contrasted with the non-deliberative and non-discretional activities. In most of the person's behavior he comes up against a stimulus object or situation and responds with whatever suitable reaction systems he possesses in his behavior equipment, or if possessing none, he does not respond at all.[2] In contrast to such contacts with objects there is another type of action, namely, one in which the person has an option as to whether or not he shall respond to a thing at all, or if he does

[1] The term impulse refers of course only to an immediate response to a stimulus and not to any force or power.

[2] In view of the fundamental functional character of stimuli it is well to point out that reactions are considered suitable entirely upon one's arbitrary evaluation of the situation. Thus when I hand my friend who has little or no experience with guns, my new automatic rifle, the fact that he cannot even locate the safety lock is sufficient sign that he is poorly equipped to respond adequately to that object, handling it, putting it down, etc., not being looked upon as such responses.

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respond the option extends to what kind of action it should be. Of course, in such a behavior situation we must assume that the person possesses in his behavior equipment reaction systems which make possible appropriate or adequate responses. Or at least it is entirely possible and probable that the person can and may acquire such behavior.

In general in the deliberative type of conduct we might look upon the organism as detached from the immediate surroundings, that is to say from immediate natural conditions and circumstances. The organism stands more or less free and autonomous with respect to the objects and conditions constituting its surroundings. The latter therefore do not comprise imperative conditions; that is, they do not force the individual to act in one specific way, but allow for deliberation and discrimination of response. The present situation is a distinctly humanistic one, a situation in which natural surroundings are modified and brought under the reactional control of the responding person. This does not mean, however, that the individual is able to control his responses, in the sense that stimuli do not have their ordinary functional capacity for him. Rather it means that the objects having such capacity have their particular functions because of previous modifications in a person's behavior through the building up of reaction systems either in the individual life of the person or in the collective life of the group in which he lives.

Accordingly, the deliberative and discretional types of activity may be looked upon as essentially selective types of actions. In the first place, possessing such behavior means that the individual will perform all sorts of preferential reactions; he will react to those things which appeal to him rather than to any and all things which appear in his behavior surroundings. On the other hand, it means that the kind of action he will perform with respect to the things which are included in his preferential stimuli objects will be peculiar to him either as an individual or as member of a class or a group. Within the behavior under discussion we may differentiate between the deliberative and discretional types.

Discretional Behavior

When we characterize behavior as discretional we imply that the individual is responding not in a highly reflective or deliberative manner, but merely on the basis of his individual action traits. Possibly his reactions are bolder or more hesitant than others around him. These selective idiosyncratic modes of adapting himself are selective, then, merely on the basis of his previous individual development and training, that is to say, on the basis of his own peculiar personality traits, likes, dislikes, interests, capacities, and ability habits of various sorts.

Correlated with the personal idiosyncratic mode of action is a second type of selectional and discretional form of conduct. This we have previously referred to as the conventional type, namely,

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that type which an individual performs because of the traditions and other institutional developments of the group among which he lives. Because of the individual's development and residence among other individuals who have developed certain modes of actions, any person of the group performs selectional and discretional conduct. In this sense he is constantly surrounded by a series of barriers and taboos marking him off in his behavior as performing a very distinctive selective activity. To illustrate, an individual of one group does not react to the same types of people, the same types of nature, the same types of religion, art, and ethical objects in the way that individuals of other groups do.

Reflective and Deliberative Behavior

Of a much more complicated nature than the discretional type of activity is the deliberative or reflective way of responding. Characteristic of these selective reactions is a critical attitude found lacking in the other form of action. An individual who responds deliberately reflects upon the character and knows the value of the objects and situations to which he is responding. Under such circumstances a person chooses and selects in a very definite way the things to which he shall react and the way this reaction shall take place. This type of discretional activity is based upon an elaborate development of an intellectual sort. For instance, an individual cannot perform such behavior before he has developed ways of thinking, information, and methods of analysis with respect to the various things and situations constituting his behavior surroundings. In general, this means that he must be intellectually oriented with respect to surrounding objects; he must develop intellectual freedom and insight concerning the situation before him.

In accordance with the development of such insight into and power of analysis of situations, the individual performs very complicated voluntary activities. These constitute definite manipulations of the surroundings on the basis of certain accepted principles and analyses of the conditions. It is in this sense that the individual appears to be free and to achieve a definite and intimate control over the objects and conditions with which he comes into contact.

Probably the most elaborate development of deliberative and discretional conduct is the sort of behavior in which the person is not only selecting in his ordinary surroundings, but is also seeking on his own initiative new forms of stimulation, new types of contact with his objects. Illustrative in this connection is the behavior in which the individual constantly appears to have exhausted the possibilities of action in his immediate situation and is forever seeking means of transcending and getting into new conditions, new situations. In such instances we have discretional conduct resulting in the most original and unique forms of activity, and leading to all types of creative conduct.

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VI. PURPOSING BEHAVIOR

Ordinarily the person is in contact with situations in which the stimuli objects and conditions call out responses immediately initiated and directly terminated. But this is not always true. There are many behavior situations in which the responses are lengthily prolonged and require a long time for their consummation. To a certain extent this is the case with the deliberative and reflective conduct that we have just been discussing.

Contrasting considerably, however, with discretional and reflective conduct are the purposing actions. These are delayed because influenced and determined by stimuli or general behavior conditions and circumstances. An individual comes into relation with certain types of stimulational conditions which control his conduct by exerting a more or less prolonged influence upon his behavior, so that he cannot respond to and dispose of the stimulating object at once. When I become stimulated to write a play or to earn a million dollars I enter into a definite relationship with that stimulus.

Or, still more, the stimulus may continue to operate so that it will constitute an auxiliary to other stimuli and consequently modify what would ordinarily have been the responses to those stimuli. Thus having been stimulated to make a fortune I may not be susceptible to the stimuli offered by intellectual achievements. In still other instances, the continued operation of a particular stimulus object may interfere with and prevent the operation of other stimuli. Not only will intellectual stimuli and responses be conditioned by the fortune stimulus but they may be entirely prevented from operating.

Very definitely must we consider purposive action as constituting a specific form of stimulus and response connection. In other words, the entire behavior must be judged from the standpoint of the acting individual and his stimuli conditions rather than from that of the onlooker. The responding person is not acting out an ultimate purpose beyond his own behavior situation, but is responding purposively in the sense of being conditioned by stimuli situations.

On the side of the response, purposing actions constitute unique forms of conduct, especially in the more complex situations. In the latter case the person's action is such that whatever immediate behavior the person performs is not done in order to bring about some immediate achievement. Whatever immediate action is performed is only preliminary to or a part of a larger behavior situation. That is, particular acts refer to a condition or situation beyond the immediate surroundings. To continue the fortune illustration, the carrying out of a particular business transaction in its details is for the purpose of (stimulated by) the for-

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tune situation. In such purposive activities we find the conduct of the person consisting of numerous activities, specific behavior segments distributed in time but all held together by the influence upon the individual of the stimulus object or situation.

Somewhat different is the behavior situation in the simpler cases of purposive action, or those consisting of the operation of a single behavior segment. A typical instance would be that of accomplishing something that we intend or propose to do immediately. Thus when I propose to place my golf ball at a certain spot the purposive action may be considered as a precurrent phase of the final-stroke action. Upon the importance of the proposal phase of the behavior segments depends the question whether the action is purposive or not. In other words, whether the character of the stimulus situation is such that it makes necessary a proposal or intention phase in a behavior segment, may be considered the criterion for the simpler purposing activities. For it is precisely this character of the stimulus which provides it with its controlling power over the action of the person.

Because the source of the controlling power of the stimulus situation lies in the reactional biography of the person it may be justifiably insisted that no purposive behavior may involve so small a number as only one behavior segment. Indeed, it may be said that unless one was stimulated to be a golfer or at least to play this particular game, which means of course to play it well, the control function of the present stimulus would be lacking. While the justice of this contention cannot be denied we still believe that it merely reiterates the practical difficulty of isolating our specific stimuli. But such isolation of stimuli is of course practically possible and not to the exclusion of purposive conduct situations, we believe. Perhaps a clearer example than that already given might be found in the situation in which the person walking along the seashore and seeing an interesting object floating some distance from land, immediately proposes to secure it and does. Perhaps here it would not be so plausible to say that it is not merely the present stimulus object which exerts the controlling power, but some more remote situation.

The insistence upon the occurrence of both simple and complex purposive action lies in the necessity to avoid the danger of allowing the more striking purposive conditions, which dominate the complete or almost complete life of the person, to overshadow all the other simpler forms of purposive situations. The larger types are no more important from a psychological standpoint. But whether we agree that there is unisegmental purposive conduct or not we may still be convinced that, in general, purposive conduct consists of simple and complex actions, which on the behavior side exhibit the descriptive features illustrating the controlling powers of stimuli situations.

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The influence of stimuli conditions upon the individual performing purposive action may be considered as negative or positive. The negative influence consists of the continuation of the stimulational function which for some reason cannot be responded to at the time. In other words the final action in a behavior pattern cannot occur. This is the case in which the mechanic has mislaid a tool or dropped a piece of mechanism upon which he is working. Or, it may be that the behavior activity involves the performance of much preliminary action before a final action can occur. This is the situation when the person is attempting to solve a puzzle or problem.

The more positive influence of purpose stimuli upon a person may be illustrated by the case in which he is actually performing a response to a stimulus, but because the response requires a comparatively long time the individual is under the prolonged influence of the stimulus. To illustrate this type of situation we may merely consider the person who is working upon a plan requiring an enormous amount of detail; so that a single stimulus operates continuously. A more elaborate positive operation of purpose stimuli (which, however, may appear as not continuously operating) is demonstrated by the person who in his daily activities is working out a life purpose. The most striking illustration of such a situation is that in which an individual's life is dedicated to the bringing about of some end or result through the collective performance of all his daily actions. Between these two forms, namely that in which the stimulus conditions some specific action, or in a general way governs the activities of the person, are the cases in which the person is so controlled by a purpose stimulus that he does many things in direct response to that stimulus. But he makes such actions a unit, and further does not permit other stimuli to affect him. This situation may be exemplified by the individual carrying out some definite plan of revenge, or by the spy who is bent upon the discovery of some state secret or by the inventor or explorer. In each one of these instances the positive and fairly exclusive operation of the purpose stimulus is emphasized by its relatively great importance as over against the comparative unimportance of other stimuli.

Naturally we should not overlook the fact that as a matter of course a person at any particular time may be under the influence of two or more equally important stimuli. Also it is possible that whenever a purposive stimulus operates upon a person, another and probably complementary one must simultaneously perform such a function. Thus, when one is carrying out a revenge action stimulated by a particular stimulus, one must be at the same time under the influence of another stimulus, for instance not to be apprehended in some action which will result in danger to the person or to the carrying out of his project.

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Further study of purposive action must suggest that the stimuli for such conduct are for the most part much more complicated and ample in stimulational proportions than are the stimuli for other types of activities. Also, it appears that purpose stimuli are not simple objects but rather complex conditions of objects, conditions demanding change and modification. To a considerable extent these stimuli call for actions to be performed or accomplishments of various sorts. In other words, the person may have as his stimulus the condition or necessity of making a certain amount of money, overcoming obstacles in one's way, rearing children according to some improved system, and a great variety of other stimuli conditions of similar type.

Whenever the purpose stimulus is a complex or intangible object or situation it must of course be substituted for in each specific case by an immediately present and tangible object or condition. Although such more tangible stimuli objects and conditions guide the individual in the performance of his reactions, in the final analysis his responses are made to the adjustment or intangible purpose stimuli. To illustrate, the person under the influence of a moral purpose stimulus finds in some specific situation a substitute stimulus for the performance of a moral action. The act thus incited by some specific situation may be considered both as conditioned and influenced by the larger stimulus object (moral purpose) and its coördinate action, the working out of a moral purpose.

Numerous of course are purpose stimuli. Also they operate in different ways upon the person. We may then point out some of the most prominent of these ways which influence the person to act. First, some stimuli operate very directly on the individual, while others have more indirect function. By direct operation we mean that some definite act to be accomplished may, because of the difficulty and length of time necessary to carry it out, keep the person acting purposely until such behavior can be completed. On the other hand, the stimulus may not be some condition which produces an immediate effect, but one which operates indirectly through the arousal of some activity already a part of the behavior equipment of the individual. Such indirect operation is made possible, therefore, by the person's previous acquisition of desires and information having a bearing upon the particular present situation. For instance one is indirectly stimulated to persist in carrying on some activity because of previously having acquired the ideal of never giving up a task that one has set out to accomplish. Or one is directly stimulated to continue such activity because of some momentary interest or occupation. In a direct purpose action, then, the purposing conduct is owing primarily to the stimulus situation, whereas in the indirect situation the pur-

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posive activity is a function not only of the stimulus situation but also of the person's behavior equipment.

Similar to this situation is the distinction between the operation of purpose stimuli upon the person on the basis of whether he wants to carry out such a purpose or not. To illustrate, when an individual finds himself in some danger situation he must, regardless of his own inclinations, carry out certain activities tending toward his safety or escape. Again, in more definitely social circumstances persons find themselves under the necessity of carrying out purposes of freeing themselves from debt or economizing their expenditures in some way. On the other hand, a person may carry out a purposive activity because the stimulus or the situation governing his action appeals to him. Obviously the driving force in the latter instance comes from his own reactional equipment and history.

Still another way in which purpose stimuli influence the action of an individual is by conditioning his conduct either with or without his knowledge. A person may react in typical purposive subsurviency to some stimulus which sustains a long effect upon him, and yet have little or no knowledge concerning the stimulus. Probably the best examples of this type of situation are those in which the individual carries on permanent forms of action under the influence of some sort of social or conventional institutions. Thus an individual may perform much and prolonged activity in his effort to maintain a particular form of government or moral ideal, with very slight appreciation that his actions are really influenced by some sort of purposive stimulus such as self-aggrandizement.

In many cases the individual's lack of knowledge that he is under the influence of a purpose stimulus is owing to misinformation. For example, he may be told that he is helping to carry on combatant or non-combatant activities in the war for some ideal purpose, whereas the actual stimulus purpose may be a purely meretricious one.

Our last differentiation of ways in which individuals are influenced by stimuli suggests an important distinction between different types, namely, the institutional type as over against the individual purpose stimuli. Social or institutional purposes are conditions or circumstances which have an influence upon numbers of individuals in common and consequently result in their carrying out activities of a conventional and prescribed sort. Activities pursued in order to maintain and forward moral and political ideas of all varieties fall into this class of social purpose stimuli.

Under the heading of individual purpose stimuli we place all those conditions and situations operating more particularly upon specific individuals and which do not necessarily have any effect

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upon other persons. Here we may classify an individual's personal ideals, as well as directly operating conditions influencing his conduct, such as danger situations. All these different characteristics of purposive conduct are reflected in the complex purposive activity illustrated in the following examples.

Motivation and Compulsion Behavior

Throughout the details of daily life every human individual is influenced and determined in some or most of his reactions by various motives and compulsions. Among such motives and compulsions are fears, hopes, ideals, loves, and revenges of every type and description. How much activity of a domestic and business type is conditioned by fears of economic pitfalls and the superiorities of competitors! The hope of better times and conditions may influence the person to suffer all sorts of present inconveniences and hardships. Love of some person or interest in some thing may similarly control the behavior of an individual so as to make all his acts the carrying out of a definite purpose. In like manner the desire to live up to the expectations of respected persons or those upon whom we are dependent, as well as the urge to be revenged upon someone, control some or all of our conduct.

These purpose behavior situations may be considered as being of the indirect type and as forced upon the person by surrounding conditions and circumstances. Also these purpose actions may operate as partially or totally unknown to the acting person, though of course, they are not necessarily of this description.

Consecration and Devotion Behavior Situations

Many stimuli conditions have their hold upon persons because the latter are committed to certain ideals or general modes of conduct. As a consequence such persons are ruled in their detailed behavior as though they were constantly carrying out some purpose. Among the most striking illustrations are the historical characters, saints, and other religious devotees, who were consecrated to lives of holiness and restraint. In more current periods may be cited the patriot devoted to the freeing of his country, to the avenging of some wrong, or the saving of himself and others from evils of some kind or from subjection to unworthy institutions. Still others devote their lives to an æsthetic or rational ideal or consecrate themselves to the achievement of success in business or politics. Their entire lives are thus molded in conformity to this dominating ideal or motive.

Not infrequently such dominating motives control the details of some particular line of the person's activity rather than all of his behavior. For example, we find in literature certain prevailing ideas taking a prominent place in every book of a particular author or in the books of authors belonging to a particular school. A recent example of this situation is the sex motive which dominates certain writers. Others may have a dominating principle of an ethical sort, for instance that of improving or attempting to improve society by their writings.

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In the devotional and consecrational types of purposive behavior we find a more direct operation upon the person of a determining stimulus than in the former case. With this more direct control of the person by the stimulus situation is correlated a more or less definite acceptance of, or acquiescence in, the domination of the purpose stimulus. Most commonly, too, in this type of purpose situation the individual is very definitely aware of the presence and activity of the stimulus object or condition.

Inspiration and Domination Stimuli

Another common type of purposive behavior is that in which the person is under the extreme influence of some condition or circumstance. Here we may instance the familiar case of the artist. He is not only controlled but driven by some conception or inspiration, so that he must be furiously carrying out some creative purpose. Other instances of this type of situation are the traditional prophet and modern evangel who have irresistible and burning purposes to fulfil. Still more striking, however, than these normal situations are the abnormal cases. The controlling stimulus here takes the form of voices heard or a general personification of what may be an imagined stimulus, God or a devil. Just as striking is the abnormal purposive stimulus, usually referred to as a fixed idea. In this case the person is dominated by a particular stimulus condition,—one which may not only dominate but disrupt his entire behavior. The fact that the stimuli in these abnormal cases are the person's own implicit behavior dominating and influencing his conduct adds much to our insight into the way in which purpose stimuli control our conduct.

Inspirations illustrate cases in which the purposes are partially accepted but do not, in the normal cases, amount to a complete control of the person. In these are exhibited a keen knowledge and intimacy with the stimulus situation if not with its driving function. This fact doubtless follows from the specialized character of the stimulus situation.

Challenge and Incentive Purpose Stimuli

As a final example of purposive behavior we may take the cases in which circumstances clearly external to the individual exert a definite dominating influence upon him. This means to say that now the important control power lies in the stimuli conditions. It is the qualities, values, and desirability of the stimuli rather than the person's hopes, wants or traditions which are primarily responsible for the controlling effect the stimuli have upon the person. To be sure in many cases, unless the individual were profoundly interested in such stimuli, they could not be stimuli at all, but there is a difference here between merely being stimuli (for desire, want and other responses) and being purpose stimuli. The latter function as we have said may be ascribed primarily to the character of the stimuli objects.

On the whole, challenge and incentive stimuli consist of very particularized stimuli conditions and incline the person's actions

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in given directions. Here some difficulty or delicate situation draws him on to perform many particular actions in carrying out a fairly general purpose. One's distressing economic situation, the failure to win a prize or to keep pace with another in a game or contest provides challenges which control and guide one's increased exertions in a particular direction. In such fashion is an individual prompted to numerous modifications of his previous conduct and to the undertaking of new activities following the lead of the challenge. Controlling incentives, such as wage bonuses, the good will and impression of other persons, all guide and influence the individual's action to carry out some purpose.

Although in these cases the primary force of the purposive situation lies in the qualities of the stimuli, still such purpose stimuli usually are not only accepted but may even be chosen through elaborate choice actions. Once accepted or chosen the challenging and incentive stimuli are not mild in their controlling effect. On the contrary, they exert a tremendously dominating influence upon the person. Such acceptance and choice as we find in these purpose behavior situations do not, however, interfere with the primacy and directness of their operation. In other words, the stimuli here operate not by virtue of being accepted, but rather because they happen to be acceptable stimuli do they dominate the behavior of the person.

These forms of purpose situations chosen from the great mass of such activity may serve to illustrate the whole series. And so with this type of behavior we complete the catalogue of illustrations depicting some of the most prominent and important ways in which the psychological individual operates in his various contacts with his surroundings.

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An interesting variant in the influence which metaphysical ideas have had upon psychological development is found in the study of personality. Whereas in many cases the psychologist's witting or unwitting adherence to some metaphysical notion has influenced him to give a description and interpretation of his facts not precisely in accordance with their natural character, in the case of personality study it has influenced him to handle the subject hardly at all. But this circumstance, however, has turned out to be a very positive advantage. It has made possible the development of a more objective conception of personality than would otherwise have been the case. In recent years, we notice that the subject of personality has been developed in a more definite objective fashion than most of the more specialized psychological topics.

To a considerable extent this development has been fostered by the psychopathologists who were influenced in their work by the need to compare individuals varying from each other and from the normal taken as a standard. Typical of such a personality development is the discussion of psychological types by the members of the psychoanalytic school. A typical specimen of this conception is that of Jung (Psychological Types, 1923). Unfortunately, however, psychoanalysts carry the conception of personality beyond the empirical observations to a metaphysical conclusion, since they base their empirical studies upon a metaphysics of the unconscious.

More empirical studies resulting from the observation of abnormal conduct are represented by such cases as are cited in Myerson (*The Nervous Housewife,* 1920). Furthermore a number of methods have been devised, with the study of the abnormal as a motive, for the rating and measuring of particular traits of intelligence and character constituting the personality of abnormal individuals. Very complete bibliographies of this work are given by Allport (*Social Psychology,* 1924).

So far, then, as the general subject of personality is concerned the material in our treatise may be considered as fairly well connected with quite a few studies which stress the objective approach in a fairly satisfactory way. In the text of the last chapter we have indicated a number of differences between what we called the organismic view and some others which may likewise be termed objective in character.

When it comes to the specific operations of the personality or

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psychological individual, however, a wide gulf divides the present work from most of the traditional material. This is true, for two reasons, in the first place because the latter handles the specific activities of the individual in a faulty way, and in the second place entirely neglects some important facts. Among the specific activities of the personality that are not usually treated adequately we may mention the problem of intelligence and intelligent action, the problem of subconscious, unconscious, and other activities in this general series.

Let us consider the intelligence problem first. So far as we are concerned, intelligence is never anything but a name for the particular way the individual adapts himself to his surroundings. Exactly what we mean here is that each personality comprises a unique series of reaction systems which operate when their appropriate stimuli are present. Now because in every complicated organism complications of stimuli situations are ever present, differentiations arise in the number of these equipments that are employed, depending upon the reactional biography of the individual, that is to say, his contacts with similar stimulating situations, and also the agility, the ease, and accuracy with which he performs these reaction systems.

In contrast with this objective consideration of personality behavior we find that traditionally intelligence is considered to be some form of power or enduring process; so that it can be spoken of as inherent in an individual and as determining for all time what his capacities and ways of acting shall be. Further it is assumed that this inherent substance or power matures at a given period in the individual's life, after which it no longer develops. In this type of attitude toward intelligence we discover a peculiar paradox of science. These non-observational viewpoints concerning intelligence appear to have been developed concomitantly with a distinct desire to measure accurately and to probe deeply into the actual individual differences of performance in different particular persons.

Another misinterpretation of the specific activities of the personality concerns the description of the kind of behavior ordinarily referred to as subconscious, unconscious, etc. Here various ideas of an exceedingly faulty character have found a place in the treatises on psychology, for instance, the subconscious and unconscious are described as a mental storehouse for perduring "ideas" and "memories" or they have been thought of as being activities of the nervous system without the paralleling consciousness, etc. In fact, every kind of doctrine of subconscious has been proposed, excepting that which looks upon these terms as names for very definite modes of intimacy of the individual with his surrounding stimuli conditions.

Turning now to problems that have not been handled at all we

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find that especially since the rise of the experimental method in psychology there has been little if any room in the field for the study of the personality or of the human individual when he performs what may be very definitely and accurately called purposive conduct. This subject has enjoyed very little attention and treatment by the psychologist, although the purposive activity of the person, as well as the complex creative responses, may be studied just as objectively and scientifically as any subject in the entire psychological province.

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CHAPTER V

THE SIMPLER OR FOUNDATION BEHAVIOR SEGMENTS

In undertaking the description of the specific forms of behavior segments we face the problem of whether to use an analytic or a genetic method. Both of these methods are possible. The genetic method may be used with good results, since as a matter of fact the entire study of psychological activities must be genetic in character. All of the behavior segments which the individual is able to take part in can be traced out from simpler prior activities. Furthermore, such reactions as the individual performs are very definitely acquired modes of operation upon or with respect to, stimuli objects and conditions of various sorts.

Equally so does the analytic method suggest itself as a possible way of undertaking the description of behavior segments. Clearly some of the reactions of an individual constitute parts or phases of larger reaction patterns. Thus, one might develop the descriptions of psychological phenomena on the basis of the analysis of the simplest responses and then indicate their development into more complicated forms of behavior.

In both of these methods of studying psychological phenomena, however, we find complexities. So far as the genetic method is concerned we meet with the difficulty that there is no single progressive development of activities. Rather, all through the life of the person new and unique forms of action are acquired and performed. Moreover, we are not able to trace out, except in a general way, any very elaborate system of chronologically progressive modes of action. To believe that thinking begins at a particular time in the life of the individual is not objectionable if we remember that in this case we are not dealing with specific psychological phenomena. In order to deal with the latter we must consider that the person is constantly developing such reactions and as long as new problems present themselves it is not meaningful to say that new thinking has not been learned.

From the standpoint of the analytic method, difficulty arises from the fact that in our complicated reactions what in one case we find to be larger and component reactions may in some other cases shift their relative positions, the larger act becoming a component of what in another situation is the smaller and component action. As a matter of fact, in most cases we are thrown back

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upon the alternative of merely describing behavior segments without regard to the two guiding principles we have just indicated.

There is, however, a series of actions which may be considered both as analytically elementary and genetically prior in development. We may therefore undertake our study of specific behavior segments by considering a series of segments which we may call the simpler foundation behavior segments. Simpler, because the reactions do not comprise elaborate patterns of action; and foundation because to a certain extent we may consider these as chronologically prior in operation during the infancy of the person. Of these simpler foundation reactions we may describe fairly definitely three types, reflex behavior segments, random movements, and momentarily occurring behavior segments.

REFLEX BEHAVIOR SEGMENTS

The Nature of Reflex Action

Reflex behavior segments are characterized by the fact that their responses consist of single reaction systems. To be more specific, the reflex activity, although the adjustment of a complex animal or person, is a simple and immediate final response to a directly presented stimulus. Obvious it is, then, that there are no precurrent or anticipatory reactions in reflex segments of behavior such as we find in our complex behavior segments, in which the final act is preceded not only by a definite attention set but also by another reaction which we may call a free perceptual, ideational, or other precurrent response. The statement is justified therefore that reflexes involve no foresight of the end, or knowledge of the organism with respect to what is to take place before the response occurs or what is in fact transpiring at the moment of action. But what of the complicated reflex behavior in which several adaptations are taking place? Upon investigation we find as a matter of fact that such behavior can be analyzed into a series of behavior segments, that is to say, into a series of stimulus and response coördinations. Here, as is not the case elsewhere, we have a chain effect. One final response serves as the stimulus for the next reaction and so on throughout the series no matter what its length.

From the unitary character of the response in the reflex segment of behavior follows the fact that reflex action is absolutely unintelligent conduct. And this statement holds true no matter how complexly conditioned is the response act. For the character of intelligence is an essential contribution of the precurrent reaction systems. The latter are means of conditioning actions so that they can serve to adapt the organism in a very precise way to a particular total stimulating circumstance. Needless is it to contrast this prescient type of conditioning of one part of a response by another phase of the reaction, with the simple condition-

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ing of a total reaction by the stimulus, as is the case in reflex behavior. The most complex conditioning of the latter sort, while demonstrating an awareness on the part of the reacting organism, does not merit the use of the term intelligence.

As a consequence of the unitary character of the reflex response it appears to possess the following specific characteristics, namely (1) relative automaticity, (2) constancy, (3) permanency, and (4) localizability.

(1) Relative Automaticity

Since there is but one immediate movement or one essential secretory act, then the reflex response must perforce appear as practically automatic. An evidence of the automaticity of the reflex is the fact that it occurs and recurs in practically the same way no matter what the person is doing at the time or where he is when the stimulus is presented. It is obvious, of course, that when the reflex behavior segment is connected with other segments the total behavior situation of the person may appear different, although the individual reflex act remains the same. Generally speaking we might consider that the mere presence of an adequate stimulus, whether primary or secondary, will throw the reflex reaction system into automatic operation.

It is needless to add that the automaticity of reflex action is relative in the sense that no psychological reaction can be wholly without spontaneity. What is meant, of course, is that relative to other responses the reflexes are immediate and direct consequences of stimulation. There is, in fact, a very close relationship between the stimulus and the response, and no variation through interpolated responses is possible between the appearance of the stimulus object or situation and the final adjustment.

(2) Constancy

The constancy of reflex actions is a fact which follows from the function which they perform in the various adaptation situations of the organism. Reflex behavior of the simpler sort adapts the person to the simple maintenance situations in which he is found, such as shielding himself from immediate noxious stimuli and nourishing himself in order to grow. Note that in the trophic reflexes, for example, the mere presence of food objects at certain strategic points of contact with the organism (at pillar of fauces, for deglutition) brings about the action; also in the shelter reactions, the pin prick, the hot or cold object must be in immediate contact with the organism. Now all of these food and shelter conditions are constant factors in the surroundings of the individual and consequently the reflex adaptations remain constant in their functional and morphological character, although as we have intimated, in the human being, reflexes may become organized with other behavior segments. It is possible also that the reaction system as a whole in reflex behavior segments may become slightly modified because of changes in the size and tonicity of the organic

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apparatus, although the general character of the reaction remains constant.

(3) Permanency

Since reflexes are elementary forms of responses adapting the organism to permanent specific conditions they are permanent factors in the reactional equipment of the organism. Moreover, reflex action systems do not become integrated and modified to become phases of larger and more complex reaction systems. They remain simple reflexes. We have already indicated that complex reflex adjustments consist of numerous repetitions of a particular reaction system of which the preceding members of the series serve as stimuli to the following ones. In short, a serial reflex is merely a series of behavior segments and not an integration of reflexes into more complex behavior.

(4) Localization

The comparative simplicity of reflex action systems and the definiteness of their operation permit us to look upon them as partial acts. As a result, it appears as though the organism operates in limited segments when functioning reflexly. Thus we speak of an eye or hand reflex. This partial functioning is not an actual fact, however, for it is a biological and psychological impossibility for the organism to act unless it acts as a whole. When we withdraw our hand from a hot object with which it accidentally comes into contact we obviously react as a complete organism. However, every reflex, no matter how great a change it produces in the person's relations to his surroundings, may be for practical purposes circumscribed and localized in a comparatively limited area.

The Analysis of a Reflex Reaction System

Since a reflex reaction system in common with all reactions constitutes merely a specific type of movement or other action of the person in a localized way; that is to say, since the reaction system is merely a particular way in which the person reacts to a stimulus object, the analysis of a reflex response system must consist primarily of a description of specific muscle, gland, and neural mechanisms, among other factors of the system which are most prominently in evidence in any particular action. Special importance, however, attaches to the phases of the reaction system which have more direct reference to the stimuli objects, for the latter determine what the particular form of the localized reflex action will be. To these phases we attach more importance than we do to those phases of the localized action which depend upon the original structures and development of the biological person. Accordingly, we need only stop to discuss the cognitive, conative, and affective factors[1] of the reflex reaction system.

[1] It is probably a cultural and traditional influence which makes such features consist only of three components, but for such elementary activities as we are now considering we may assume that there are only these three. This does not, however, commit us to the conception that all of our behavior is classifiable into thinking, willing, and feeling, for observe that conative here means attending in the ordinary sense rather than willing in any sense.

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(1) First let us consider the *cognitive* factor. Every reflex action involves a definite discrimination of stimuli although the discriminative factor is more pronounced in some reflexes than in others, a condition, however, which reflexes share with all types of psychological behavior. This prominence of discrimination depends, of course, upon the character of the stimuli objects. As we have already indicated it is the discrimination of the object's qualities which determines the character of the total action. A hot object will call out a reflex action while a merely warm object may not do so. The cognitive component means then that different objects elicit differential responses from the reacting person or organism. Clearly, in the case of such comparatively simple responses as reflexes the differential reactions will be aroused not so much by complex objects as by simpler qualities of such objects, or in many cases the differential response may be elicited by a condition rather than by any specific quality.

Obviously, we must all agree with those who assert that when we perform a reflex reaction we do not know just what is taking place, for in such a reaction there are lacking the verbal response systems which among other factors strikingly represent the knowing element.

(2) In a similar fashion the *affective* factor in the reflex behavior system consists of a change produced in the organism similar to that which we find in ordinary feeling behavior. Glandular and visceral activities are aroused, indicating that not only has the stimulus object been acted upon by the organism, but also that the action has extended to the organism itself. Here again it is entirely superfluous to suppose that in any sense the person overtly reports to himself that he feels thus and so; the feeling situation or affective response is merely a sort of internal response involving relatively more the visceral organs than the external skeletal muscles. Naturally the diffusion and intensity of the visceral disturbances will correlate with the violence of the response to the urgency and pressure of the stimulus.

(3) In much the same manner can we analyze in reflexes the *conative* factor, by which is meant the attention change from one stimulus to another. In no reflex action, of course, is there present the deliberate precurrent change of position or attitude by which the individual prepares himself for adaptation to a new stimulus. Hence, the attention factors in all the various reflex action systems are what is ordinarily called involuntary; that is to say, the person exhibits more or less violent jerky movements in shifting his adjustments to new stimuli.

The Origin of Reflex Behavior Segments

From the standpoint of genesis, reflex responses are unique among the permanent behavior equipment of a human being, in that they may be considered as the earliest and most intrinsic of all the types of responses. The simplest of them are organized and

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operate considerably before the completion of gestation. Reflex behavior is essentially life-maintaining activity and therefore is most intimately related to and dependent upon the biological structures of organisms. Hence reflexes necessarily begin to operate from the very inception of the organism's life; in fact the reflex reaction system may be said to be inherited (if this can be said of any response system) along with the specific organs which have a part in their operation. So elementary and primary are some of the simple reflex responses that as a general rule the impression is prevalent that all reflex reactions are congenital and that none of them are acquired in the life of the person. Such an assumption is not strictly correct. To account for the essentially adaptive character of such basic and undeveloped reactions which are not inappropriately named protective, defensive, avoiding, and seeking responses, we must fall back upon some sort of natural selection hypothesis.

Types of Reflex Action

For practical purposes we might classify reflex action systems into at least five types, partially upon the basis of their organization and especially upon the kind of contact which they effect with their ordinary stimuli. In general, reflexes may be adjustments to conditions (1) within the organism, or (2) to changes surrounding the individual or (3) to both of these at once. The first type we may name the interoceptive reflexes, and as illustrations of such responses we may mention the stomach and intestinal reflexes, etc., or expressed differently, responses in which these phases of the organism play a prominent part.

On the other hand, reflexes which are primarily adjustors of the person to outside stimuli we may call exteroceptive actions. Here we may analyze two types which we will term localized and general exteroceptive reflexes respectively. In the former type the response appears to be localized in a definite way and involves primarily external skeletal mechanisms. Examples of these reflex actions are the hand, foot or body withdrawal responses to heat or pain objects, the knee jerk, turning the head toward a flash or sound, etc. The latter type, *i. e.*, general reflexes contrasts with the local responses in that a larger phase of the organism is saliently involved, and also in the fact that the visceral and glandular factors may dominate the segment of behavior. As examples of the general exteroceptive reflexes we may mention writhing, trembling, shivering, etc.

The third class of reflex which adapts the individual to both external and internal stimuli we will call combination reflexes; these we may likewise analyze into two types, local and general. The former type comprises adjustments of a more or less restricted sort, although on the whole the reactions are more complex than those in our second class. Among the localized combination reflexes we may enumerate the sexual and salivary responses. In

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this class both the local and general responses involve much glandular activity, although the latter comprises so much more of the visceral and glandular factors that we may refer to some of them at least as feeling reflexes. Illustrative of the general combination reflexes are the "startle" and "start" responses which are frequently confused with feeling and emotion reactions, and which in some cases constitute the simplest form of attention acts.

It is plain, of course, as we have indeed suggested, that the specific reaction systems in these different types of reflexes are integrated from specific factors. For example, the principal interoceptive reflexes as a rule include mainly muscle and glandular factors, while exteroceptive reflexes involve primarily the skeletal muscles. Again, practically all the interoceptive and some of the exteroceptive reactions involve the sympathetic nervous apparatus in a prominent way, while the exteroceptive reactions involve mainly the central nervous system. A prominent exception to this rule is the iris reflex in which the muscles involved are in part innervated by the sympathetic system. In such comparatively simple reactions as reflexes the discriminating factors would naturally be, as we have already seen, the simplest found in any reaction. In all of these cases, to be sure, the discriminating factor strictly speaking is nothing more than the occurrence of a simple differential response to its specific stimulus-object. As in all cases of classifying reactions the divisions and subdivisions that we have made represent only attempts to order behavior and not the separation of unequivocally different responses. For this reason no classification can avoid many overlappings. Emphatically the value of any classification may be judged most adequately by the criterion of whether it suggests the likeness and overlappings of behavior types or whether it serves to obscure such similarities and transcursions of the classes.

The Stimulation and Conditioning of Reflex Action

A radical change in the view concerning what constitutes the stimulus for reflexes is implied in the acceptance of the organismic hypothesis. For if we assent to the view that reflexes are adjustments of the individual some of which are very complex, then we can no longer entertain the notion that they are aroused to action by merely simple thermal, light, or sound radiation. Aside from the general confusion which this notion implies between the media of stimulations and stimuli objects or situations, such a view in the domain of reflexes excludes all but the simplest situations as stimuli.

Let us notice then that reflex action is stimulated as are all other kinds of responses by objects of various sorts, and by circumstances and situations. To be plainer, human reflex actions are rapid and localized responses to things, persons, and conditions. Now this way of describing the reflex situation allows for the fact that the whole person is acting and not a single part of him,

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which is of course an impossibility. Moreover, this mode of analysis forestalls the tendency to overlook any type of reflex response, since we may be certain that the class of reflex action is large enough to include much more than the simplest avoidance responses. How complex and varied the stimuli for reflex actions actually are appears clearly in the consideration that objects in particular settings will elicit the salivary reflexes, while the same objects in different settings or different objects in the same settings will not bring out the reflex adjustment. What more complex stimulus can there be than the actions which operate while we are reflecting upon or reading of some person or event which excites us to sex or hunger functioning? Extremely informing also are the observations concerning the reflex changes in the person while under the subtle social and sex stimulation of other persons. Especially important here are the complex social objects and situations which constitute the stimuli for intricate human reflexes of all sorts. As among such social situations we may refer to games and gatherings of persons of the same or opposite sex which arouse sex and hunger responses of various degrees of diffusion. Again, we are familiar with the revulsion responses which dead or live animals produce in us when touched or seen. These are all complex reflex responses representing functions of the person's total reaction equipment to customary stimuli which are therefore social in nature.

In the last mentioned reflex adjustment as well as in many others we meet with the very important conditioning activities influencing the adaptation of the person to his surroundings. Thus, for example, the nauseous visceral responses to dead animals may have become definitely attached to a new or accessory stimulus at some specific time and under particular circumstances. The early stages in training an infant to perform proper excretory behavior is in great part a process of attaching to a new eliciting stimulus reflexes already present and functioning.[1] Especially subject to the conditioning process are the combination reflexes, since the internally stimulated act can be variously transferred to and from the coördinately stimulating external object. So involved are the conditioning processes that in many cases it truly appears that the reflexes have become integrated into more complex forms of behavior, although as a matter of fact this type of response remains practically in its original condition throughout all of its complication by attachment to various new forms of stimuli.

Reflex Actions as Stimuli and as Behavior Settings

So intimately related are the reflexes with the total behavior of the organism that they constitute the stimuli to many of our reactions. Because of this intimate relation, however, the reflexes are frequently overlooked and their importance unsuspected. As

[1] This conditioning process may antedate the development of the necessary inhibitions.

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a consequence psychologists are commonly guilty of the assumption that mysterious powers bring about various reactions, whereas a careful study reveals that the reactions in question have definite stimuli in the reflex responses. There can be little doubt that reflex stimulation is responsible for much of our action which we call diffuse feeling-responses and moods and that they compose elements in our complex social acts. Acts of love, pity, revenge, etc., may be due in large measure to reflex stimulation.

To state the matter otherwise, reflex stimulations comprise some of the facts referred to as mixed motives in complex responses. Can we deny that it is through the accessory stimulation of reflexes, in addition to thoughts and memories aroused by tales of cruelty and violence, that we are induced to add our contribution to alleviate the suffering of which the stories inform us? In further illustration of reflex stimulation we may cite the ways in which our reflex responses color our reactions to æsthetic objects. Thus through the operation of these by-play reflex reactions we are stimulated to read human and personal qualities into physical objects stimulating us. In many instances the additional stimulation by reflexes may also supply energy and alacrity to the behavior. This latter fact has been celebrated in the statement that artistic production is the sublimation of sex impulses. While the term sublimation hardly represents a psychological process, still it does serve to emphasize the prevalence and power of reflex stimulation. In all these cases, reflexes serve as adjunct or additional stimuli and as a result of their operation the individual may act in an entirely different way than if he were stimulated only by the original object. Suggestive it is to note that the way we respond reflexly to things and persons in turn stimulates our first impressions (reactions) to those things and persons. In other words, if reflexes of a complex sort are called out in us by things and people, then when we attempt to formulate a judgment of these things and people (or if we merely are prepared for some future response) the delayed action is based and dependent upon reflex responses.

Furthermore, reflexes may function as combination stimuli-responses in delayed reactions. This function in general is made possible by the fact that series of reflex responses intervene between the presentation of the stimulus and the final adjustment, and thus function in many cases to keep alive the effect of the stimulation until the final response occurs. The combination reflex-act-stimulus is undoubtedly a primary basis of the wants and desires as psychological facts. One is forcibly led to this view by the consideration of the place of sexual and hunger-digestive reflexes in food, and sex wants and desires. So potent are the reflex actions as stimuli, that we can elicit from a careful study of the differential frequency and intensity of such reactions much

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valuable information concerning the type differences between individuals which are usually considered as temperament, disposition, etc., such characteristics being marked by actions which in a large measure are stimulated by reflex responses.

And finally, the visceral and glandular reflex behavior of persons may serve not as direct stimuli to actions but rather as the setting of responses. That is to say, these reflex responses operate as influences of behavior affecting the general condition of the person. As the setting of stimuli, visceral reflexes determine whether or not certain stimuli shall be potent and call out a reaction. Thus for example, during the operation of hunger reflexes it is more difficult than otherwise to attend to one's work; in other words, the sensitivity to exacting stimuli is decreased. In other cases the functioning of reflexes may serve to increase one's sensitivity to particular stimuli and in consequence the person will respond more readily to surrounding objects.

Distinction Between Human and Animal Reflexes

Because of the comparative simplicity of reflex action it is doubtless true that the slightest variation exists between human and infrahuman behavior at this point. And yet if we were to overlook the enormous differences that after all exist between human and animal reflexes we should do irreparable damage to our observations as well as to our interpretations. For there are great differences even between the various reflex actions of the human individual, depending upon size, weight, health, and maturity, which cannot be neglected in any analysis of behavior, especially if we are to attain exactitude in our descriptions. From the existence of the different reflexes in the human species it follows that there must be extreme variations in the behavior of the individuals of the human and infrahuman developments.

In support of the proposition of the wide variation between human and infrahuman reflexes two sorts of considerations suggest themselves. First, not only the general biological difference between the two species of animals but also the specific neural disparity argue conclusively for great diversities between the two types of reflexes. The second and more striking consideration is the general fact of behavior equipment. If our hypothesis is valid that a reflex act is a specific type of organismic adaptation, then clearly the behavior must be colored by the total reactional condition of the individual. In other words, the reflex action in the human being must be a function of the entire behavior equipment of the person,[1] and the specific surrounding circumstances.

[1] How potent is the behavior equipment of the organism in influencing its actions may be well observed in the illustration which Whitman quotes of the pigeon reared by a wholly different species which will reject a mate from its own species in favor of the species under which it was reared. Cf. *Orthogenic Evolution in Pigeons*, vol 3. *The Behavior of Pigeons*, 1919, 28 edited by Harvey Carr.

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Now obviously the person's behavior equipment is so different from that of any infrahuman animal that the reflex behavior as well as any other class of action are very different in the two cases.

Whatever argument is offered for the continuity of the two series of reflexes must perforce be based upon continuity in biological development. Now such continuity, it must be observed, does not imply any similarity in specific acts of psychological conduct; rather the argument for continuity overlooks all actual facts of concrete behavior in favor of a general developmental or descent hypothesis. Such a neglect of the specific adjustment inevitably results in error. To illustrate, it was only because of a lack of interest in actual adjustments that the believers in continuity attempted to make of spinal reflexes the typical reflex action to the exclusion of cerebral reflexes. Moreover, they believed this in disregard of the fact that even when reflexes are considered as neural mechanisms they are cortically controlled and modified.[1] In view of the cortical control of reflex action who can deny the distinction between reflexes which we are attempting to make? In concluding this section of our discussion we might suggest that our distinction between human and infrahuman reflexes in no wise interferes with the biological continuity doctrine. For the logical implication of our hypothesis is that only a degree of difference exists between any two levels of psychological action. In consequence, it is our argument that animals are not different from human beings in lacking memory, thought, and language, as the text-books would have it, but only in the capacity to respond with simpler memory, thought, and language reactions. But note, that in all cases of behavior the needs of psychology dictate a careful and accurate differentiation and description of responses.

Distinction between the Psychological and Physiological Attitudes towards Reflex Action

Clearly the same term reflex or reflex action is used for a variety of phenomena. For example, the action of a decapitated frog in moving its legs toward a spot on its body where acid has been placed has long been studied by physiologists under this heading. It would appear necessary then to distinguish between what might be called a psychological and a physiological reflex. Fortunately for the study of this distinction we have the situation that the physiologist studies the exact crude or basic fact in which the psychologist is also interested, but in a different way. We consider it expedient then to differentiate between the different kinds of phenomena by distinguishing between the different attitudes of the physiologist and psychologist toward the same activity.

What is then the difference in the two attitudes? Merely this: that while according to the psychologist a reflex must be looked upon as a special adjustment of the organism as a whole, for the physiologist a reflex action is the operation of an autonomous system of particular parts of an organism. Now if this distinction is

[1] Cf. Herrick, *Introduction to Neurology*, 1920, 68, 120, 312.

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valid it is obvious that in order to reach an accurate description of reflex behavior this differentiation must be kept in mind.

Because the physiologist, while studying reflexes, is primarily interested in the functioning of neural structures, and secondarily in the activity of glands and muscles, he is disposed to look upon such behavior, as well as other types of responses which he studies, as constant mechanisms entirely independent of surrounding stimuli. From this fact arises the distinction long current in psychological literature between the so-called physiological and sensation reflexes, the former being presumably completely autonomous and without the controlling influence of awareness. Accordingly, the psychologist assumes that typical reflexes are exemplified by the visceral activities. Since on the whole, therefore, a reflex action for the physiologist consists of the innervating activity of a segmental neural apparatus, a limited extension and flexion of muscles, and the localized action of glands and nothing more, we must look upon the physiological description of a reflex action as an abstraction, wholly unsuitable for use by psychologists.

From the psychological standpoint, as we have suggested, a reflex action is a definite adaptation act and upon such a basis is just as much a psychological datum as is thinking and knowing. Strictly speaking, the psychological organism under ordinary circumstances cannot act otherwise than as a psychological organism, and this refers to all activities, although for some purposes we might consider the individual performing isolated reactions such as merely digestion, etc. But these situations are exactly analogous to those accidental circumstances such as being struck by an automobile, in which instance the individual may function as a mere physical object. To be entirely precise at this point we mean to point out that as a general principle our exogenous reflex activities are stimulated to action by objects and events about us and operate as adaptational mechanisms in exactly the same sense as any psychological act.

In general, then, we may take as our standard for the differentiation between psychological and physiological reactions, a criterion which we believe to be in the main reliable, the question whether an act is or is not an organismic response to stimulating circumstances. Now in order that an act should be considered a genuine organismic response we must be able to trace its arousal to some effect produced upon the person by some external object or some need for adaptation existing in the organism itself. Accordingly, as we might expect, no sharp lines of division mark off the internal from the external reflex stimuli. A food object operates precisely as does the hunger reflex (gastric contractions) in the arousal of salivary reflexes. Similarly, from the standpoint of effecting an action in the person there is no functional difference (as stimuli) between another person (opposite sex) and genital re-

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flexes in the acting person, when each serves as a type of stimulus to elicit (other) sexual reflexes. Whether the stimulus be endogenous or exogenous the reaction which it calls forth is an adaptation of the individual in just the same way that a habit or thought reaction is. On the whole, we find the reflex to be (and this is why it is a psychological act) an interconnection between organisms and specific things; or in better words, reflexes are the operation of reciprocally interacting stimuli and responses. Thus when I see a dish of apples my salivary reflexes may begin to operate, while a dish of peaches may not have the same effect at all. Now here the physiological attitude, according to which the problem of the reflex begins and ends entirely within the organism, contrasts with the psychological study in that the latter is concerned with (1) the means whereby the end-effect, which is the secretion or muscular contraction, is initiated, and (2) how the act is dependent upon the reactional characteristics of the specific individual performing the act. The psychologist cannot afford to overlook the fact that reflexes are very strictly conditioned and that upon the type of stimulus object which elicits the reaction depend the intensity and range of the behavior.

As a matter of fact there is no actual conflict between the physiologist and the psychologist, since each worker is merely interested in a different phase of the same series of events. While the psychologist is interested in the total action of the person to some definite stimulus, the physiologist is interested in the workings of the reflex mechanism as they operate within the organism itself. What we are desirous of showing is that when the psychologist is satisfied to duplicate the work of the physiologist then he cannot hope to do justice to the psychological facts in the case.

If our distinction between psychological and physiological behavior is valid, we find in it a compelling warning not to confuse reflex behavior with the truncated activities of injured and partially destroyed organisms. All experimental animals such as the decerebrate pigeons of Flourens and Schrader, Goltz's dogs and other laboratory animals exhibit atypical forms of behavior which cannot be fairly taken as examples of reflex responses. How valid this point is we have already had occasion to see in our discussion of the differences between normal responses of animals and human beings.

Reflexes not Neural Mechanisms

If our description and analysis of reflex behavior segments agree with the facts in the case then it is manifest that our interpretation of reflex action is in conflict with and must replace the practically universal belief that these forms of behavior are merely specific forms of neural arcs or circuits. In clearer words, the essential thing about a reflex action is supposed to be a particular concatenation of neurons, usually described as preformed patterns

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in the nervous system. Probably the most fundamental error in the neural theory of reflexes is that the neural apparatus is in some sense presumed to be the cause of the muscular movement and glandular action which constitute the observable results of the reflex action. In the neuronic theory apparently the neural circuit replaces the soul or consciousness as cause of a given adaptation. Credence is lent this view when we consider that as a matter of historical fact the so-called spinal reflex was sometimes considered to be the exclusive reflex type of action, while at other periods the spinal reflexes were presumed to be the typical if not the exclusive reflex responses.

In addition to the general difficulty involved here, namely, neglecting most of our reflex reactions, (for we probably have as many cerebral as spinal reflexes) another question arises equally fundamental for the whole of physiological psychology. Does the neural apparatus control the muscles any more than the muscles and glands control the neural apparatus? Is it not a fact that the specific pathways involved in any reaction are involved because certain muscles or glands need to function? The writer is firm in his disbelief in the functional priority of any system to any other. In fact, to our way of thinking no such priority exists or can exist in the ordinary circumstances of behavior.[1] Especially clear becomes the problem of the supremacy of the neural apparatus when we consider the activities in which the muscle spindles are the primary receptors, for in such activity we have a circular process which it is extremely difficult to analyze into prior or posterior phases of the reaction. This action in our opinion minimizes the general view of the primacy of the neural apparatus in any type of reflex action.

Is it not closer to fact to affirm that the neural, muscular, glandular as well as all other action phases of any behavior are simultaneous in their functioning and that no system is prior to or more important than any other? What actually happens in all psychological behavior is that the organism performs an act of which all the component systems are phases, in the sense that they constitute factors of a total response. In their aggregate these phases constitute an adaptation to some object or situation. But apparently we have dissipated the cause of the adjustment. What, it is asked, if not the neural apparatus, determines how the muscles, glands, and other phases of the reflex should act?

To this we answer: what in fact could be the cause of which the total neural, muscular, glandular and adjustment is the effect, but the stimulus object or situation, for what other observable causes of our actions are possible? Again let us stress that a reflex action

[1] In various experimental procedures we may of course consider either the neural or muscular acts as prior.

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represents a differential mode of behavior, neural, muscular, glandular, etc., which the organism has acquired in the course of its development and which now operates when its adequate stimulus is presented. The failure of reflex descriptions is largely owing to the fact that psychologists do not recognize the dependence of reflex action upon actual stimulation, exactly as is the case in any other psychological action. When, however, we do appreciate the relationship between the stimulus and the total unitary response then we can cheerfully dispense with the causative character of the neural apparatus.

Now here another objection may be anticipated. How can we argue that the neural factor is neither primary in importance nor prior in time when we know that as a matter of fact the essentially conductive function of the neural apparatus requires some time to operate, no matter how brief? Such an argument we reply, rests upon a misconception which can be avoided by a closer observation of facts. Of a surety when we experiment upon a neuromuscular coördination we may with perfect propriety disengage locally the conducting from the contracting mechanism. However, when we do perform such a local analysis we must not forget that such an experiment implies the falsism that the mechanisms are both inactive at the inception of the experiment, when in fact both nervous and muscular mechanisms are functioning before the experiment is started. Actually the organism is never at rest. Further, this objection implies that a single neural impulse can be in fact isolated and that it can be traced from a receptor to a muscle or gland. Now it is incontrovertible that a psychological organism is constantly in action and therefore neural impulses are discharging uninterruptedly over all the tracts in synchronous harmony with muscular, glandular, and other types of processes. What in actuality happens when we present the organism with a stimulus is a redistribution of action, an emphasis of other features of the person than were prominent when the new stimulus appeared; in short, there is a refocussing of the individual upon a new stimulus.

By way of emphasizing our hypothesis that if reflex actions are psychological data they must be considered as segments of behavior, *i. e.*, stimuli and responses, we mean to deny entirely that a reflex is a partial reaction in any sense. We mean especially to controvert the three typical forms of the decurtation theory concerning reflexes which are found in psychological and physiological literature: (1) Reflexes are not primarily neural circuits in the sense of concatenated neurons or the operation of such circuits; (2) Neither are they exclusively activities of the complete nervous system; (3) Nor are they merely neuro-muscular or neuro-glandular responses. Again we return to the charge: reflexes are

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complete or organismic adaptations to specific or adequate stimulating objects and circumstances.

Reflexes and Tropismic Action

Considerable light is thrown upon reflex action when we place it in comparison with tropismic or purely biological action. Since there is no strict convention governing the use of the term tropism, let it be understood to exclude the criterion, that such action does not involve systematized nervous tissue. For our hypothesis concerning the adjustments of organisms does not permit us to seek in their mechanisms for the exclusive conditions of behavior. Now observe that the comparatively simple mechanism of the tropismic action is prominently correlated with the sensitivity of the organism to its surroundings. As a matter of fact it is possible to differentiate between reflex actions as typical psychological responses, and as tropisms, on the basis of the relationship of the organisms to the surroundings when they are performing either one or the other type of action.

Although it is entirely probable that the difference between tropisms and reflexes is merely a variation in developmental complexity, still we can specify particular adjustment differences. For example, tropisms as responses, while entirely disproportional to the exciting condition in the expenditure of energy, in form and type of movement are still constant. This constancy of movement is a function of definite organic structures operating as a whole in the manner which is referred to as irritability, and correlates exactly with some (non-psychological) stimulating condition in the surroundings. This external condition is practically an undifferentiated one and never an object with its specific qualities. Moreover, the reactions are such as maintain the present status and condition of the individual's organization exclusively by means of metabolic functioning. From this standpoint it is easy to see why we must look upon tropismic action as relatively simple responses to surrounding conditions.

Reflexes as psychological activities, on the other hand, are specific responses to particular objects and conditions. Such behavior, as we have seen, constitutes differential responses and exhibits a subtle interdependence of stimuli and responses. By virtue of the person's possession of numerous characteristically different reflex action systems to which many different specific objects and conditions are coördinate, the individual is selectively sensitive to many features of the milieu. That this essential psychological character of reflex actions has been overlooked may be accounted for by the fact that many of the specific differences between reflexes and tropisms seem to fall away when we compare them both with the higher developed and more complex adaptations which we call volitional responses. Such an overlooking of the definite psychological character of reflex action is exceedingly unfortunate

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of course, since as a matter of fact reflex responses can be shown to partake in some fashion of practically all the typical characteristics of the complex psychological reactions.

RANDOM MOVEMENT BEHAVIOR SEGMENTS

The Nature of Random Movements

The responses of these behavior segments consist of spontaneous and fairly unorganized movements, gestures, vocalisms, etc., which the organism performs under the influence of very slight and fairly indifferent stimuli. Naturally such activities are entirely lacking in direction and specific adjustment value.

To a certain extent we may look upon these random movements as multiple chance responses to stimuli which apparently serve only as energy outlets for the individual. Excellent illustrations of such actions are the shiftings and squirmings of infants when stimulated by a blanket or other piece of bed clothing, and their various cryings and smilings in the presence of objects and conditions which may hardly be said to have taken on for the infant the functions corresponding to his movements and actions. For we observe that the infant barely touched upon some part of its anatomy will move about with much undirected expenditure of energy and with no apparent facility in connecting itself with its stimuli, in the sense of locating or knowing how to locate and remove or otherwise manipulate stimuli objects.

From the descriptions given of random movements it appears that we may hardly call them reaction systems; that is to say, they are not definitely localized and directed actions with respect to the objects and conditions initiating their operation. Nor can we isolate them very well as factors in particular behavior segments. In other words, we cannot discover what specific distinct object or circumstance has connected with it a single response, either a single unit or a pattern of several units.

On the other hand, however, random movements are undoubtedly the raw materials of reaction systems which have not yet become integrated but which under the guiding influence of the stimuli surroundings will eventually become organized and integrated with those surroundings. The very spontaneity and random character of these responses indicate the enormous possibilities which they contain for development into more complex and orderly reactions. The fact is that the slightest contact with surrounding objects and conditions serves to integrate them into more stable and complex reactions. The constant and rapid development of orientation actions means a modification and organization of the random movements, a transformation which is equal to their suppression and loss. Thus even young children after a certain time no longer act in a random way. The various types of random movements may be referred to as pre-walking, pre-talking, pre-

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writing actions, since the walking, talking and writing actions, etc., undoubtedly develop out of the less organized actions just as the latter have developed out of what existed previously as still less organized acts.

From the random movements we may observe developing gradually very complicated habit and volitional actions such as enable the individual to adjust himself psychologically to his surroundings and to achieve a measure of behavior control over them. In this fact of being lost and dropped out or integrated into larger and more complex actions, random movements contrast most markedly with reflex actions.

Distinction of Unorganized from Organized Random Acts

Essential for the understanding of random movements is the distinction of the unorganized reactions of the infant from the hit and miss acts which invariably constitute prominent features of all learning activities both in children and adults. The two types of activities are entirely different morphologically and even their functional resemblance is slight. In every attempt to acquire a new complex type of action, and in the development of manual skill, random movements serve at first to confuse the learning and then are either incorporated into the new response or are suppressed. In learning to use the typewriter the beginner is frequently discouraged by the meaningless and superfluous actions that are made. Later when some progress has been achieved the person is very much mystified by the sudden disappearance of the random movements which have become components of the acquired skill. But in the case of acquiring skill one is responding always with organized reaction systems which, however, are termed random merely because they are not the reactions we are interested in for the time being or which we think of as being useful for the immediate purpose or desirable in general.

MOMENTARILY OCCURRING AND ACQUIRED BEHAVIOR SEGMENTS [1]

The Nature of Momentarily Occurring Behavior Segments

Among the simple foundation behavior segments we may place another type, although in the human being it is very vague and mainly known through analogy with the older and more mature reactions, and through further analogy with the activities of the infrahuman types of animal. In spite of the vagueness of our knowledge of these activities, however, we may be fairly certain

[1] The phenomena to be described under this heading constitute in part whatever of genuine fact exists in what has been traditionally called "instincts" and "general capacities" as well as the relevant points in the behavior which has been miscalled the primary or first sensations. However, because it seems impossible to use terms without involving oneself with various metaphysical powers and potencies the writer deems it advisable to give them up entirely. Such terms in common with the terms "soul" "psychic faculty", etc., must for scientific psychology be relegated to the limbo of obsolete words.

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that they occur and fairly confident of our description of them.

These behavior segments may be looked upon as original actions of the person; that is to say, here we have situations in which the organism is surrounded by various objects which very frequently make it necessary for it to do something with respect to them. But the organism has never yet had the same exact experience as the present one, and therefore whatever it does must be done in an original and unique way, namely without the aid and support which comes from having had similar experiences before. Now clearly such activities consist of responses which are very simple and ineffective in their operation. Also, such momentary occurring reactions are fleeting and later lose their original form, although in their modified condition, as the result of further contacts with the same or similar objects, they may become permanent phases of the individual's behavior equipment. But of course the new types of actions must be looked upon as elaborate acquired responses and not momentarily occurring reactions.

Necessarily then, such fleeting and comparatively simple behavior segments cannot be named nor connected up in any way with any definite type of behavior segment which the maturer person performs in his various contacts with his surroundings. As we have indicated, the closest relationship between these momentarily occurring behavior segments and the more complicated actions of the maturer individual are those of predecessor and successor in the behavior-life history of a person. This point must be insisted upon, since in the study of these particular behavior segments, even more than in any other case of human action, the absolute singularity and specific identity of facts must be pointed out.

We may further describe the momentarily occurring reaction systems by indicating that they are occasional; they are absolutely dependent upon the individual's specific behavior circumstances for their occurrence and the actual form they take. Emphatically, they are not activities which may be expected because of any behavior equipment acquired in previous circumstances. Possibly the point now under discussion, as well as the general character of these behavior segments, may be illustrated by various movements of actions observed in infants. For example, a very young infant may be observed to put a finger into its mouth. Now in watching the action one can readily convince himself that this is not a reflex nor yet a mere random action. We may assume that the infant has been stimulated by some condition of the mouth and because of its structural organization a possible response is that of moving the arm and hand toward the mouth. The occasional and singular character of these momentarily occurring reactions suggests that because of the complicated character of the human organism an indefinite number of such activities would be possible of occurrence. And yet on the other hand, because of the absolute

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helplessness of the human infant and the constant and almost complete assistance which he receives in making his early adaptations it is possible that there are very few such activities in the lifetime of the individual. That is to say, the human individual is not left free to perform as many of the momentarily occurring reactions as he could; so that practically all of his behavior has a history which to a considerable extent is supplied by acts which are not originally of a momentarily occurring variety.

In view of the conventional comparison of native, and acquired or learned reactions we might specify that our momentarily occurring responses are such as can be learned immediately at one stroke and at the first presentation of an appropriate stimulus. The point here is that because of the particular organization of the individual and of the character of the surroundings, learning may take place at the first trial. This circumstance, we might add, however, does not differentiate momentarily acquired reactions from reflex behavior since possibly the same point might also be made with respect to reflex types of action.

The Analysis of a Momentarily Occurring Response

Probably the most characteristic feature about the responses of this type is that they are usually if not always patterns.[1] Accordingly, they are more complicated as responses than is true of the reflex type of action. The response consists of series or chains of reaction systems, all of course of the same general sort. Especially must we notice that these reaction systems are all final actions. Stated otherwise, the patterns do not consist of precurrent as distinct from final reaction systems, but they must all be considered as final. In essence this means that such activities consist of very simple actions so far as cognitive processes are concerned, although of course they are differential in their functioning. In other words, the surrounding objects do not possess for the individual complicated stimulation functions. Indeed it is just such contacts with objects that serve as the bases for the development by the person of complicated acts to correspondingly developed complicated functions of the surrounding objects.

So far as the affective factors are concerned, however, they need not be considered as different in these acts from similar factors in other more complicated forms of responses. In fact, very early in the life of the infant many of his reactions are primarily affective in character, based of course, in these situations, upon endogenous stimuli.

Much the same point may be made with respect to the conative factors in these types of reaction systems. They may be just as definitely conative, namely requiring as much new direction of action on the part of the person from one stimulus object to another as in the case of any kind of complicated action. With re-

[1] This proposition is made upon the basis of the infrahuman behavior analogy.

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spect to all the other components of the reaction systems we cannot specify any fundamental difference.

Because of the simple and inexperienced character of the responses subsumed under the present heading we might notice that whenever a response consists of a pattern the earlier reaction systems in the series may function as stimuli for the later ones. The whole series is called a pattern because we can trace out one fairly dominant stimulus, while the others cannot be considered as more than auxiliary stimuli functioning as partial incitements to action. Illustrative of this kind of chain action would be the case of the activity of an animal which, being first stimulated by an interoceptive stimulus proceeds to move about, thus coming into contact from time to time with new and different objects, and so proceeds to perform a series or chain of activities. The latter may belong as a series to a general behavior condition initiated by the original endogenous stimulus.

The Behavior Conditions of Momentarily Occurring Behavior Segments

As general favoring conditions for the operation of such behavior we can point out two most important ones, namely, the stimulational surroundings and the biological make-up of the organism.

Much more than in other types of behavior are the stimuli conditions of prime importance in the operation of momentarily occurring behavior segments. This point we have already suggested when we referred to these activities as occasional behavior. In other kinds of behavior the stimulus object serves to a certain extent as a cue for the operation of the person but here it is primarily in the nature of a cause of the person's acting and his way of acting. This means to say that the character of the surroundings forces the individual to do various things in order to adjust himself, avoid objects, seize attractive things, etc.

Stimulational Surroundings

Further we might point out that the stimuli for this type of activity are comparatively simple. They are constituted of actual needs in the form of conditions and changes in the natural surroundings, such as temperature, pressure, etc., also the imperious influence of various qualities of objects, such as colors and hardnesses. Naturally then the individual will be in very intimate and direct contact with the stimuli objects and conditions functioning as phases of the momentarily occurring behavior segment.

Biological Conditions of Momentarily Occurring Behavior Segments

We have already indicated most of the salient influences upon the type of behavior we are discussing which are due to the character of the acting organism. We need only consider now that every psychological organism is a very complicated machine in the sense of having very intricate anatomical and physiological organizations which perform elaborate and constant biological functions, (metabolic, secretory, etc.). It follows that this biological character of the organism makes the individual not only capable of performing all sorts of adjustments dictated by stimuli

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surroundings but also provides the occasion, or helps to do so, for such conduct. At any rate, the organism's biological character makes it entirely probable that the surroundings will produce in such individuals specified forms of occasional action.

At this point we must suggest that the organism's biological characteristics influencing momentarily occurring behavior are different from those of the biological properties of the organism operating in reflex action. In the latter case, the individual's biological organization constitutes an integral feature of the actual responses made, in the sense that the organism has particular organs which function in particular ways, lungs for breathing, wings for flying, etc. In the present case, however, we merely refer to the structural character of the organism in general, the functioning of which does not constitute a particular and specific form of action.

In this section we might also point out that a potent biological influence upon the person's development and performance of momentarily occurring activities is the fact or situation known as biological adaptation. As is well understood, organisms living under particular environmental conditions develop various relationships of fitness in and suitability for particular sorts of ecological conditions. This fitness provides the occasions for action in the sense of emphasizing the mutual relationship of the organism with his particular surroundings. In our further discussion of the momentarily occurring behavior of animals we shall see that it is this biological adaptation that in great measure supplies the facts which are misinterpreted as mysterious, peculiar, and unlearned abilities of animals.

Differentiation of the Foundational Momentarily Occurring Behavior Segments from Similar Adult Action

As we have previously indicated the behavior treated in this division of the chapter is analogous to the momentarily occurring reactions so familiar in the behavior life of any psychological organism. Every individual is all the time performing reactions of occasion which are initiated by specific surrounding circumstances. But in no case in the adult individual are these reactions entirely novel and occasional, because it is impossible to divide off these specific momentary actions from activities which the individual has previously performed and which in a genuine sense constitute the foundation for these actions. Furthermore, the momentarily occurring reactions in the adult are performed on the basis of definite reaction systems previously acquired which are now merely somewhat modified and organized as a new form of action to the immediately presented stimulus. Thus, while the foundational momentarily occurring behavior we are studying is not in principle different from the behavior of the adult which may be given the same name, still the details differ so widely that in the latter case we are really dealing with an entirely different sort of behavior phenomena.

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Momentarily Occurring Behavior Segments in Infra-human Animals

Many unfortunate misinterpretations of psychological phenomena have resulted from the fact that the types of action we are discussing are to a certain extent describable only by analogy with similar activities in animals, and also that among animals the momentarily occurring actions possess more definite and more permanent character.[1] It becomes incumbent upon us, therefore, for the time being to set aside our intention to confine our studies entirely to human types of behavior and to study in some detail momentarily occurring action in the lower animals.

Probably by far the greatest amount of an animal's activities consists of behavior segments the reactions of which are momentarily acquired in the presence of particular stimuli situations. So far as the origin of such activity is concerned we must carefully observe that the lower animals are born with a practically mature biological organization. Also they are born into an environment which is especially adapted for their maintenance. Thus the objects and conditions which become stimuli for the animals are the types of things to which the animal organism is equipped to respond. As a result animals can perform momentarily occurring reactions especially well fitted for whatever maintenance functions they have to accomplish as well as what other environmentally accomodative behavior their surroundings necessitate.

Because the animal is both practically mature and lives in a very simple environmental situation, such organisms perpetuate their originally acquired momentary behavior. Probably some of the actions of all animals are modified slightly by variational changes in their surroundings. Such behavior is probably still more altered by relatively complex stimulational conditions of a problematic sort such as constitute the stimuli for human behavior situations. But for the most part what appears in the earliest infancy of these animals remains as part of their permanent behavior equipment. In this situation the human organism contrasts markedly with the lower animals in the matter of random actions. The lower animals probably perform very few if any random movements, all of their behavior, as we have been indicating, being practically organized definite activity. On the other hand, the human organism, aside from the simple reflexes, performs no originally organized and definite activities but many random movements. It is then easy to see how the idea has arisen that animals are born with capacities to perform whatever actions they can do. This erroneous idea is made even more objectionable by the additional notion that in human beings we find the individual born to perform all sorts of complicated conduct. In either case, whether this view is held concerning animals or human beings all of the important and essential facts concerning the interaction of the

[1] Since they are more on the reflex, or biological structure type of action.

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organism with its surroundings are overlooked or set aside and the descriptions of behavior are made replete with potencies and magical powers of all types.

The modifiable character of these momentarily acquired reactions in animals must not be overlooked. In fact it is this characteristic of modifiability which distinguishes in the animal these occasionally acquired reactions from the reflexes which are not subject to modification, but only to conditioning. Depending upon the complexity of the animal we find that the momentary occurring reaction systems can be so modified as to be completely integrated into larger parts of behavior. We have already seen this to be the case in the human organism. The process of integration proceeds on a smaller scale as we consider the animals in their lesser degrees of biological development.

Such modifiability as these types of actions possess may be traced back to the point that we have already made, namely, that they consist of more than one reaction system. They partake therefore, of certain particular characteristics which make possible their transformation among other changes. These characteristics we may enumerate as follows: (1) spontaneity and variability, (2) modifiability, and (3) integration.

(1) By spontaneity and variability we refer to the greater adaptability exhibited by momentarily occurring behavior than by reflexes. The latter may be conditioned in various ways; that is to say, the simpler reaction system can be differently attached to a stimulus, but the response factor itself does not vary. In the case of the momentarily occurring reactions, on the contrary, the members of the pattern may rearrange themselves in modification of the pattern.

This arrangement is made possible by the fact that while the total pattern may be stimulated by a definite appropriate stimulus, say by some interoceptive reflex or by some exteroceptive stimulus such as the visual presence of food or an animal of opposite sex, the individual reaction systems in the pattern are aroused to action by other surrounding stimuli, namely, objects and conditions which have to be rolled around, carried away, etc., so that each has some autonomy and the whole pattern is spontaneous. Accordingly, this type of action is the more adaptable response when the adjustment conditions are more variable. This type of action in which the member reaction systems are subject to rearrangement is the most spontaneous that we can observe. The reactions which are less spontaneous are so because the member reaction systems of the segment are only very little stimulated by the surroundings and more by the preceding members of the pattern series. It was this kind of act no doubt which gave rise to the notion that these adjustments were chains of reflexes. When there is only one stimulus, or at most only a few surround-

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ing stimuli, conditioning the behavior in question, then the reaction as a whole is more rigid and conforms to a type.

(2) Since the individual reaction systems in a momentarily acquired behavior segment are correlated with specific external stimuli it is entirely probable that the auxiliary stimuli may become more and more effective as factors in the total response, thus modifying in a specific way the total act and making it more serviceable to the organism in its particular surroundings. This modifiability contrasts with the permanence of the reflex behavior segments which cannot of course be modified in any essential degree.

(3) Another intrinsic characteristic of such acts is the fact that when conditions allow and make necessary they become integrated into more complex reactions. It is this fact of integration above all which marks off the human from the infrahuman momentarily occurring actions and also distinctly differentiates them from reflexes. While the reflex activities remain practically as they originally appear this type of behavior becomes developed into more complex forms of responses. And so it happens that in the animal domain they become integrated to only a slight degree because the conditions are not conducive to any considerable development. In the human individual on the other hand, the behavior conditions are so complex that there are very few momentarily occurring responses to begin with and these few become integrated into larger reactions and disappear. By the same token the reflexes originally comprising elements in the behavior equipment of the individual remain with him in practically their original number and condition.

As we have seen, although the momentarily occurring behavior in the lower animals constitutes very complicated forms of activity, still we must be extremely careful not to misinterpret these actions and after the analogy of complicated human behavior conclude that animals perform action which requires a great amount of human experience, knowledge, and information. In this sense, then, we must avoid the idea that such activities may be called loving, hating, revenging, appreciating, etc. As we have already suggested, probably it has been owing to the fact that first these animal reactions have been misnamed and misconceived through analogy with complicated human actions that the idea has developed that individuals are also born with "capacities" to love, hate, appreciate, know, etc.

Some Misceptions concerning Momentarily Occurring Reactions

Clearly the type of actions we are now discussing must be considered as definite natural phenomena, as must all other facts of psychology. Yet it is these particular psychological phenomena which have constituted the basis for numerous misconceptions as erroneous as they are widespread. These misconceptions arose long ago when psychology was considered to be a study of some

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sort of substance or power which was presumed to have some sort of connection with psychological acts or with the activities of human beings and animals. What was no doubt momentarily occurring behavior was considered to be "instincts." These were presumed to be mental or psychic powers and forces guiding the individual through his activities in the form of knowledge or purposes which were assumed to operate when individuals acted.

Possibly the main tradition of "instincts" has its basis in the observation of animal life. In the animal realm we find organisms acting in very definite ways without going through what in man and higher animals must be considered as learning. Thus, for example, we observe the Yucca moth depositing its eggs in the seed pods of the Yucca plant, which seems an extremely appropriate sort of food for the larvæ. Because of the extremely brief life history of the moth, which dies immediately upon laying its eggs, it is assumed that there is a mysterious form of knowledge guiding the activities of the animal. Again, when the worker bee flies to a flower upon its first exit from the hive and attacks the flower, definitely collecting pollen and nectar, this act is presumed to illustrate a peculiar form of unlearned knowing. Such a misinterpretation of this kind of action obviously was influenced by the fact that students overlooked the intimate details concerning the structures of these animals and their biological adaptation with respect to their specific surroundings. Possibly the worst result of such misinterpretations of psychological phenomena is the fact that animals are endowed with all kinds of forces and teleological powers to do all sorts of things. In direct line with such a fallacy, there are ascribed to the human animal forces which make him live in cities, acquire and build up large estates, indulge in religious practice, take on traits of leadership, salesmanship, etc. Because of the obvious misinterpretation of psychological phenomena which such conceptions foster it is probably well to consider some of the more popular misconceptions concerning momentarily acquired reactions. Since the traditional name for these activities is "instinct" we shall discuss them under that name.

Instincts as Unlearned Knowledge

One of the oldest conceptions concerning this type of action held that instincts are unlearned knowledge, that an animal is somehow endowed with information as to how to conduct itself with respect to its surroundings without any previous learning activity. When we study critically the actual facts of infrahuman psychological behavior we notice that such activities lose most of the characteristics that are presumed to distinguish knowing. In the first place, there are a great many miscarriages of acts. To illustrate, when the Sphex wasp finds some prey it brings it close to its nest and deposits it there, while the wasp enters the nest, seem-

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ingly to inspect the latter. Ordinarily the animal emerges from the nest and pulls the prey (grasshopper) inside. If, however, one draws the prey away some little distance from the nest the animal will repeat the entrance and emergence action as long as the prey animal is taken away, even though the time required for the whole procedure is too short for anything to happen to the nest. Here we may refer to the Sphex's apparent lack of appreciation of its activities in entering and reëntering its nest when the prey is brought back to where it was first. The whole activity of the "instinctive" sort seems to be nothing but a highly refined integration of responses and stimuli. For frequently the Sphex will, when the grasshopper is placed out of sight, close and seal up the nest leaving its larvæ without any food. More striking than this case is the situation of the Bembex which has its young covered with sand. The parent animal brings food to the young and finds it, although the human eye does not seem to be able to distinguish the spot. When the sand is removed and the cell and larvæ exposed, the parent animal seems bewildered and unable to recognize the young. In the words of Fabre who observed this activity, "It seems as if she knew the doors, the nursery and the passage, but not the child." Another instance of the same sort is the case of the white fox-tailed pigeon observed to make love to a brown stone ginger-bottle. Strong criticism against such a conception is the fact that ants permit the Lomechusa beetle to inhabit their nests, although the larvæ of this beetle feed upon the young ants. Not only will the ants tolerate this beetle, but will actually tend the larvæ as they would their own. The ants will not stop even here, but will change their method of feeding to suit these larvæ, although it is not suitable for their own young.[1] Such facts as these concerning animal conduct, although superficially lending themselves to the appearance of knowing things without learning them, provides indeed a fallacious basis for ascribing such unlearned knowledge to human beings in their various activities.

Instincts as Springs of Action

According to this view instincts are supposed to be forces or powers of some sort which bring about the kind of behavior we find in animal and human adjustments. Using other terminology such instincts are considered as teleological processes existing quite aside from the animal organism. In short they take the form of mental forces operating upon a mechanical body and determining its action. Besides introducing occult substances and forces the "springs-of-action" doctrine prevents us from understanding actual psychological phenomena since it entirely overlooks the innumerable facts of actual stimulation and response making up psychological behavior.

[1] For an excellent summary of animal conduct bearing upon our discussion, cf., L. T. Hobhouse, *Mind in Evolution*, 1901.

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Instincts as Preformed Pathways in the Nervous System

Naturally psychologists rebel against the idea that we have in us in some form mystic potencies which determine our behavior. As a consequence such psychologists attempt to interpret the springs of action in neural terms. They aim to establish the hypothesis that the constant determiners of our action are ontologically preformed pathways in the nervous system. The hypothesis is that the organism is fitted with specific nervous patterns which condition all its complex behavior.

Two outstanding objections may be recorded against the neural hypothesis. First, this view arbitrarily assumes that the neural factors of response systems are in some sense primary and can control and condition the rest of the action. In studying reflexes we have already indicated the inadequacy of such a conception in the case of those comparatively simple actions. Certainly then this view carries little weight when applied to more complex behavior.

Another objection to the preformed pathway conception is that for any sort of action it presupposes a fixity and lack of development which is directly antithetical to the actual facts of animal behavior and much more so of human conduct.

Instincts as Driving Adjustments or Mechanisms

A doctrine similar to that of the springs of action is the view that individuals possess innate forces in the form of a physiological mechanism which determines behavior. This view is not very different from the springs-of-action doctrine, although it is stated in physiological terms, since it is assumed that organisms possess some kind of action mechanisms not developed or derived from stimuli situations.

No special criticism of this view is necessary, for the physiological mechanism is never established but merely asserted to be there. In what form it exists, or how it operates is not at all stated. Therefore this conception really reduces itself to a springs-of-action doctrine or else to the preformed pathway theory. The only difference between this view and the springs-of-action doctrine is that instincts as driving adjustments represent a springs-of-action doctrine of a more specific sort; that is to say, the springs are presumed to refer to more definite actions than is true in the springs-of-action view.

Instincts as Natural Characteristics or Traits

This doctrine supposes that just as human and animal organisms have certain traits of action and structures because they belong at a certain point on the evolutionary scale, so they also possess specific traits of behavior of a complicated animal and human sort. To illustrate, just as human animals are upright-walking and lung-breathing so they also have traits of mating, living in cities, fighting, etc. The criticism here would be whether there is a fair analogy contained in this doctrine, also whether it does not violate a fundamental scientific principle which is of essential importance in psychology. This principle is, namely, that in every study of

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psychological phenomena we must investigate the details of every part of the occurrence and observe all of the particular happenings. When we do this we find, of course, that whatever traits and capacities any psychological organism has are very definite developments of actions acquired in contact with specific surrounding objects and conditions.

Instincts as Bases of Action

In order to account for complex human action without an elaborate study of its growth and development through the contact of persons with their complicated surroundings, simple actions such as sex and food-getting activities of animals are transformed into permanent bases and determiners of complex conduct, both animal and human. These simple acts are supposed to be permanent behavior factors which become organized and connected with other behavior facts to form mosaics of complicated action.

Besides making specific responses of organisms to specific stimuli into something else of a very vague and diaphanous sort, this doctrine as we have suggested, attempts to avoid an actual detailed study of the concrete facts of human behavior. It oversimplifies complex conduct and falsifies the actual behavior pictures.

Instincts as Inherited Actions

Another misconception of momentarily occurring behavior is that they are inherited activities. Thus the individual is supposed to be born and ready-made with various kinds of action systems which he can perform when occasion demands. Such a view violates every scientific conception of heredity and the character of psychological phenomena. Obviously, we cannot inherit actions. Furthermore, such a viewpoint, in common with the other misconceptions we have examined, immediately cuts the student off from the study of behavior as it actually occurs in connection with the stimuli situations initiating it.

These misconceptions comprise only a few of the great number of faulty doctrines that have been propounded from time to time in the attempt to explain human and animal behavior without an intimate study of the actual stimuli and responses.[1]

With this description of the three types of the simpler forms of human behavior, reflexes, random movements, and momentarily occurring responses, we complete our delineation of the early behavior pictures of the psychological organism. Remembering that the performance of these simpler reactions constitutes the lowest foundation for the behavior biography of human beings, our next step in the study of psychological phenomena leads us to the investigation of the person's acquisition of basic and fundamental reaction systems. In many ways these basic reactions constitute the central features of the developing personality.

[1] For a more extended discussion of the instinct problem, cf. Kantor, "The Problem of Instincts and Its Relation to Social Psychology," *Journal of Abnormal Psychology and Social Psychology*, 1923, XVIII, 50–77.

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CHAPTER VI

THE NATURE OF BASIC CONDUCT AND HOW IT IS DEVELOPED

The Problem and Nature of Basic Reactions

One of the best established of all psychological principles is that the activities of an individual depend upon his reactional biography or behavior history. As far as we have already traced the development of this personality we have been concerned with comparatively simple reactions which for the most part depend upon the organism's biological organization and upon the intimate details of its biological adaptation to natural surroundings. Our problem at present is therefore to investigate a kind of activity which chronologically succeeds the earliest or foundation behavior discussed in the last chapter.

This second general class of activities we call basic reactions. Basic responses constitute fundamental forms of actions, mainly because they are very early developed in the behavior history of the individual and therefore serve in a large measure to influence all of his later conduct. That is to say, many of the reactions which the person acquires early in life become so definite a part of his behavior equipment that they constitute the individual's particular identity. Such early acquisitions determine what is ordinarily called the character of the person and consequently condition what later reactions he will acquire or build up. In a genuine manner, then, the development of the infantile basic reactions marks the beginnings of personality development in any particular individual.

Because basic actions are acquired so early in the life of the person and because they are not very essentially conditioned by the person's biological organization, they depend primarily for their nature and acquisition upon the stimuli situations with which an individual is in contact. That is, they are contingent upon the objects and conditions constituting the person's particular psychological environment. It is these contacts of the individual with his different surrounding objects and conditions that result in the ascription of functional capacity and character to the object; that is, the individual builds up reaction systems corresponding in exact detail to the surrounding stimuli objects and conditions.

So far as the fundamental character of these basic reactions are concerned we might indicate that they constitute very definite

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types of action, identifiable ways of walking, talking, believing, thinking, acting technically and industrially, such as mark the differences between specific individuals within a group or between individuals in different groups. Clearly it is through this interaction with original stimuli surroundings that persons take on their fundamental differences. They take on, in other words, specific personality equipments which mark them off from all other individuals. On the other hand, these basic reactions also constitute group reaction traits, such as specific speech-dialect reactions, or specific technique responses with respect to industrial and artistic behavior. The basic reactions comprising what are ordinarily known as specific individual differences we may call idiosyncratic actions. Here we would put specific tastes, dislikes, etc., differentiating one psychological personality from another. The forms of action which make individuals into members of larger units we will call group or social responses. Both of these are built up as superstructures upon the prior behavior development in the general personality plan.

At this point we want to distinguish between two types of basic reactions on the basis of their relative prominence as factors in the behavior equipment of the individual. Some of our basic behavior becomes integrated from simpler forms of responses apparently only in order to be immediately further integrated into more complex forms of behavior. Such is the condition with respect to a child's language activities. No sooner are the latter acquired than they become factors organized into more complicated language behavior organizations. Other forms of basic behavior, however, remain more or less permanently as phases of the person's behavior equipment. This second condition naturally prevails when the corresponding stimuli objects and conditions remain in their pristine condition in the person's surroundings without change in quality or relation. Typical of such activities are various beliefs and thoughts representing the folkways of the person's cultural group.

Looking somewhat closer at the surrounding stimulational conditions of basic behavior we note that in addition to the natural surroundings in which the individual is found the basic activities are built up also in a distinctly human milieu. We might even say that the human character of the surroundings is of greater primacy than the natural surroundings. For consider the human individual is hardly capable of reacting as a distinct or separate individual to his stimuli situations, since almost every act is shaped and conditioned by some other individual who enters in to supply the lack of reactional capacity to which human individuals are inevitably subject. Basic reactions then begin to be developed in the family surroundings, in the earliest days of the individual. And gradually the development of basic equipment broadens ou'

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until the individual comes into contact with other human situations outside of and beyond the narrowest confines of the family situation.[1]

Regarding complexity, the basic reactions are either very simple definite reactions to specific surrounding objects, or exceedingly complex responses to complicated situations. It must be clearly understood that when we call an action basic we are not referring to its simplicity or complexity, but merely to the fact that it is developed at a time previous to later acquisitions and as such is essentially constitutive of the personality equipment. Because of the infantile and family auspices of basic behavior acquisitions, however, these activities are simple as compared with later and more mature activities of the same person. In general, we might suggest that the basic reactions have more to do with things and their crude manipulation, and less with complex understanding and intelligent transformation of such objects. Again, basic behavior consists relatively less of social conduct in the form of definite religious, artistic, or economic behavior, although the beginnings of such behavior are found at this stage. It is difficult at times to make sharp distinctions between basic activities and the later activities which are built up from them.

Since both the simple and complex forms of basic conduct are definite acts acquired through the individual's contacts with various objects and conditions, and further, since such acts are not in any intrinsic way dependent upon the biological character and development of the person, the actual features of the reaction systems are not important descriptive factors. We cannot therefore specify just what muscles and glands are primarily operating in any particular behavior segment nor is it important to do so. Accordingly, the study of basic reactions departs from our previous method of analyzing specific reactions in order to approach closer to a genetic description of the contacts of the person with his surrounding stimuli objects and conditions.

Psychological Processes or Principles Involved in Basic Behavior Acquisitions

Since basic reactions are acquired primarily on the basis of the stimulational conditions we observe in basic behavior situations the fact that certain of the psychological processes (namely the modes of interrelation of responses and stimuli objects characterizing psychological phenomena) are more emphatically involved than are some of the others. Thus for example, the principle of integration looms very large in the development of basic activities. No less important is the process of modifiability, whereas differentiation and variability are somewhat less emphatically involved in these situations. The discussion then of the various processes involved in basic behavior may be confined to these four types.

[1] In the latter case the reactions are basic not so much in the sense of constituting intimate features of the individual's behavior equipment but as chronologically prior to other actions of the same general type.

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Integration

A positive fact it is, that in the development of the individual all of his behavior at any period of time must be the integration of previous actions. No reaction system can be acquired *de novo*, that is to say, without having had some reactional basis upon which to build. In plainer words, each stage of our development represents the acquisition of response systems by means of the modification of previously acquired reaction systems. This modification comes about through the instrumentality of newer forms of stimulation, that is to say, through contact with new types of objects and conditions. Thus, the walking reactions of an infant can be observed to develop from simpler responses. Very soon after acquiring the primary walking reaction the infant builds up more complex locomotor responses, such as running to the call of the parents, or playmates, or fetching things when asked to bring them. Similarly, the elementary sound reactions through contact with persons become integrated into language behavior.

While there is then a core or basis of previously possessed reaction systems in any new acquisition of behavior, we must not overlook the definite progressively adaptive character of our reactions. Our responses with the exception of reflexes are developed to meet the needs of some present stimulation. The conditioning factors of both the acquisition process and the operation of the responses themselves when acquired are to be found in the specific surrounding conditions of the person. The human organism does not ever have in itself full-blown powers for making complex adjustments to intricate surroundings.

Modifiability

Basic reactions in their development involve the principle that whatever important or striking qualities are exhibited by a stimulating object will result in the modification of the person's second or later reaction to that object. Through such modification of reaction, objects and persons surrounding individuals take on newer stimulational functions. An excellent illustration of this modifiability process is afforded us in the activities of the child with respect to a ball. At first it may be merely an attractive object. Gradually it takes on various stimulational functions and becomes an object to throw, to roll, to bounce, etc. In this case, of course, we have not only various modifications of original responses but in addition the acquisition of entirely new reactions with respect to the ball or other object. This new mode of reaction developed by the process of random variation of conduct may become a fixed mode of reaction to the stimulus in question.

In similar fashion developing reactions may become modified through the influence of cultural or social stimuli. It is in this way that the child takes on fundamental manner and custom reactions. He learns to obey, to speak only when he is spoken to, to conceal his attitudes, and in other ways to modify his behavior

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by checking and inhibiting the reactions aroused by natural objects, and people.

Variability

Many of our basic reactions are acquired because of the fact that the individual who has already developed some form of reaction system to an object is for some reason unable to respond and as a consequence remains in contact with that object. He then proceeds to vary his action by diverse manipulations until he finally does manage to bring about some form of adaptation. This new form of reaction developed by the process of random variation of conduct may become a fixed mode of reaction to the stimulus in question. This may happen either as an additional mode of basic reaction or as a substitute for the original reaction system which could not at the time function. This variational mode of developing basic conduct is well illustrated by the child who cannot manipulate an object by his customary pushing reactions, and thus discovers that the thing can be pulled and henceforth handles it in that fashion.

Differentiation

It is necessary only to point to the process of differentiation as a factor in the development of behavior, since obviously every original reaction with respect to objects must be based upon a differentiating function. Because of the universal presence of this function in psychological phenomena the contacts of the infant with various different objects in its surroundings call out distinctly different reactions. Most likely it is because such reactions are acquired so early in the life of the person that they constitute fixed components of the behavior equipment, in brief, operate as basic responses.

The Subtlety and Rapidity of the Process of Acquiring Reaction Systems

Probably one of the important causes of overlooking the actual process of acquiring reaction systems is the subtlety and rapidity with which the process takes place. The fact is that the infant is constantly developing thousands upon thousands of reaction systems unobserved and uninfluenced by the parents. How frequently are parents embarrassed by having their children bring to the attention of visitors certain information or knowledge of events and situations which the parent believed entirely lacking in the personality equipment of their children. Such a situation forcefully exhibits the casual and subtle way in which children absorb and acquire their early behavior traits. That this developmental process occurs unobserved is to a great extent owing to the parents being off their guard because of the difficulty they experience in deliberately training a child to do various things.

It is of cardinal importance to notice that there are distinct differences between the deliberate training imposed upon an infant and the casual training resulting from a favorable contact with surrounding objects. The difficulties which balk parents in the deliberate training of infants are due to obvious defects in

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the methods employed. All too frequently the parents cannot gauge correctly the proper time to stimulate the child to develop particular modes of behavior, or again, the parents use methods which they themselves would adopt were they learning the activity involved. Anyone carefully studying an infant as he responds in his own way to the countless objects and conditions around him must be impressed at once with the facility and the constancy with which modes of behavior are normally developed. Uninterruptedly the child takes on acts and attitudes which involve postures, facial expressions, modes of manipulating the mouth and vocal apparatus, and numerous other reaction systems. To study a child carefully in its early contacts with its surroundings, to see him establish his likes, dislikes, and other traits of character, to watch him develop avoidance and pursuance responses means to give up permanently any theory of implanted powers. Later in his development the child takes on without any instruction, the social, religious, economic, and other action characteristics of the family.

Strangely enough the tradition of implanted or inherited psychological characteristics has prevailed in the face of an almost universal belief—correctly based in fact,—that the early years of childhood are the formative years of human life. Although it is universally appreciated that the child at this period acquires all sorts of behavior, it is not sufficiently recognized how deep and fundamental in the individual's total life this formative process actually is. The fact is that through the child's early contacts with objects and persons he not only develops the ordinary adjustmental activities and social ideas, prejudices and faiths, but also the talents or interests which constitute the permanent factors of his personality traits. It should not be at all difficult to understand how a child develops talents and fundamental interests and capacities if we only remember that such interests, talents and capacities are intensively integrated reaction systems, which are put into operation by complex stimuli situations. That an interest or a talent seems to be rather a potentiality in the person instead of some definite activity need not interfere at all with our view, since we may well agree that there is no difference in principle between the fact of possessing a talent and having the capacity to solve a problem in calculus or chess. In each case we are concerned with the development and performance of numerous process reaction systems of particular sorts. While it is entirely correct to say that in learning the multiplication table we acquire a capacity to multiply, what we actually are doing is building up reactions of responding with particular verbal or graphic acts upon receiving definite stimuli.

No less subtle and rapid on the whole is the acquisition of reaction systems by the adult person. This is observable every day

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when we change our positions, move to another part of the country, or otherwise place ourselves under the influence of new individuals, new objects and conditions. Of course, whatever changes occur in the person because of the individual acquisition of new reaction systems can be better observed by another than by the person himself. As among the most striking of such new acquisitions we might mention mannerisms and other types of socially unapproved behavior popularly called affectation.

The Rôle of Stimuli Objects in the Acquisition of Reactions

As we have already indicated, the kinds and number of reaction systems which a person develops depend upon the contacts he has with surrounding objects and conditions, in plainer words, upon the opportunities to develop response systems. It follows that the same thing is true of the rapidity with which reaction systems are acquired. Each quality of an object, its color, shape and material, represents a possibility for the development by the person of specific reactions.[1] The same thing is true of the various combinations of settings or backgrounds in which the objects are placed. To observe the elaborate education which an infant receives from contact with the popular contrivance, known as the "Kiddie Kar" leaves one in no doubt concerning the effectiveness of objects to induce the acquisition of reaction systems.

Obviously the varieties of reactions which other persons induce in the individual are indefinitely more numerous than those induced by physical objects, although the latter are responsible for the acquisition of many different kinds of reactions. That the contacts with persons result in the acquisition of a larger variety of and more complex response systems is owing to the constant interstimulation between individuals.

What the person does in play and work depends very directly upon all of his physical and personal stimulation. How a child plays and what are his games, are conditions which vary directly with the opportunities for such action. A person who has had no contact with certain kinds of animals will never fear or like them. We must of course take account here of the similarities between animals, for if a dog has bitten a child no doubt he would fear a wolf if one should appear before him. In the same way the similarity of the settings of two objects will generally cause us to carry our response over from one to the other. How we are influenced by our surroundings is excellently illustrated by the consideration of customs and language. Similarly, whether or not a person builds up bashfulness reactions or coöperative behavior depends entirely, we believe, upon his immediate circumstances.

Because of this great influence of surrounding stimuli objects and conditions it has become widely, though superficially, recognized that a developing child should have a satisfactory home

[1] Clearly what we have here is the person endowing objects with stimulational functions by developing reaction systems to them.

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environment. If parents habitually fume and rage at each other, the child will become irritable, sullen, and rough in manner, while if the parents are overly gentle and too yielding the child will also become so. It is because of this peculiar influence of stimuli upon persons that the belief has prevailed in the inheritance of "disposition." For instance, because a child reacts like one of the parents, for example quick temperedly and impulsively, it is particularly thought that the child directly inherits such a disposition from that parent. As a matter of fact, had circumstances and conditions happened to be different, the child might have been influenced more by the other parent and displayed entirely different tendencies. To be more explicit, it is the particular parent having the closest *rapport* with the child who influences the latter's action to such a degree that the child resembles that parent in all he does and says. In the adult it is the particular social and economic conditions which stimulate the person to build specific reactions. It is also true that in most instances the adult stimuli counteract those of infancy and youth and thus modify the previously acquired reaction systems.

Throughout all this discussion of the influence of stimuli upon the development of reaction systems we must bear in mind that every human individual is in contact with many objects and persons, also that objects and persons appear in various settings. Therefore many interferences in influence are inevitable. Thus, for example, it is not at all determined that a child should take on the reaction systems which the home stimuli promote. We must take into account the great influence of playmates and other people. In fact, the child who at home builds up reactions of respect for property and those who own it, may as a consequence be more influenced by the customs and traditions of the neighbors who happen to be in greater possession of property than his own parents.

Classes of Conditioning Stimuli

Since stimuli and responses are reciprocal phases of behavior segments, and since our behavior segments can be arranged in fairly distinct types, we may therefore distinguish between the various kinds of stimuli conditioning the acquisition of response systems. Thus we may classify stimuli in the following ways.

(1) Physical or Natural Stimuli

By such stimuli we refer to those objects and conditions that induce reactions, but which are practically fixed and admit of relatively no interplay of stimulation because they are not affected by the person. We might assert that, in general, contact with physical stimuli result in the acquisition of all those response systems serving to adjust the person to the innumerable physical conditions of his surroundings, such as the avoidance of noxious objects, the seeking out of favorable or desirable things, and the modification of his relations to atmospheric conditions and changes.

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(2) Personal Stimuli

Persons and their actions naturally constitute an entirely different class of stimuli. In this case, the stimulus itself is a person who in turn is stimulated by the reacting person. As a result there is an intricate interplay of effects of the stimulating and responding individuals. Through such mutual stimulation we develop the most complex and numerous behavior segments and acquire such conduct as is popularly called fear, anger, rivalry, hate, love, desire, ambition, scorn, coöperation, admiration, gratitude, belief, credulity, envy, jealousy, etc. Among such stimuli are to be included the person's own reactions such as ambitions and ideals, built up in previous situations and which now operate to stimulate his later conduct.

(3) Social Stimuli

Under this heading we place social situations, as famines, the volcanic devastations of cities, etc., and social objects or institutions. An institution we take to be any thing or condition which operates as a common stimulus to a definite group or series of individuals. Cultural stimuli may be of two types, those comprising the common reactions of members of a group, such as the institutions we call manners and customs, or the products themselves of social behavior, as buildings, roads, distinct wearing apparel, etc. Through the operation of social stimuli, which obviously must coincide with personal stimulation,[1] we build up all of the myriads of behavior types which are frequently denominated social conduct.

Enumerated among the reactions of basic, social conduct are political, social, æsthetic, moral, religious, and intellectual reactions. Let us be entirely clear concerning our views at this point. It is our theory that through contact with persons and institutions the developing individual acquires a very large series of behavior segments which form the background of his everyday conduct. These social reactions constitute the elementary ways of eating, walking, talking, playing, etc. How many such social responses there are can never be made the subject of statistics. There are as many reactions as there are permutations of individuals, groups, and institutions in social situations. To attempt to make lists of the various social responses would mean to attempt to staticize and limit what from the nature of the case cannot be so handled.

Let us not slight the fact that each name for social behavior, such as awe or shame, must, if it is to mean anything at all, stand for some concrete and specific action which of necessity is abso-

[1] In our personal contacts we acquire what we may call individual human conduct as well as common or conventional reactions. While we cannot draw sharp lines here we can differentiate between the aspects of our intellectual, æsthetic, moral, political, and other reactions, constituting the panoply of our personal behavior and those phases of our social conduct which we share with some or all of the other members of our particular group.

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lutely different for each person, and also varied within the different periods of an individual's life. An act of charity, mercy, faith, hope, shame, or resentment is a specific factual, behavior situation and we must by no means overlook the fact that, because for descriptive purposes we apply a conventional term to such reactions, there is anything but a conventional similarity in such behavior situations. What, we might ask, is common to the "honor" of thieves, nations, and gentlemen? Social conduct we repeat again, consists of behavior segments developed through contact with actual institutions or common stimuli, and the nature of the behavior is a direct derivation of the stimulating circumstances in which the person acquires it.

Stimuli Mechanisms Functioning in the Acquisition of Basic Reactions

On the side of the stimulating circumstances, we might arbitrarily divide the conditions which induce the development of reaction systems into two general types. We do this not because there are in fact only two classes, nor because these are entirely independent modes of inducing reaction development, but rather because in such a maze of complex situations it is well if we can contrive some order no matter how provisional and inadequate. As we proceed in our discussion we shall see that the two types of mechanisms for building up response systems overlap at almost every point. We shall name these types deliberate and casual respectively.

By the deliberate means of inducing reactions we refer to the process in which the human individual is brought to conform to the practices and ideals of the group in which he lives by the authority of the group. On the other hand, the casual type of process is that in which the mere contact with objects and persons results in building up appropriate reaction systems. On the whole it is probably safe to say that the casual process is the most efficacious form, as the doctrine of teaching by precept would imply. Perhaps we might also add that the reaction systems built up by this process are the more fundamental factors in the make-up of the personality.[1]

The Casual Stimulation Processes

Among the earliest of the mechanisms for building up reaction systems is the stimulation of the mother or nurse, the home objects and the parents or other members of the family and household. Through contact with these physical, personal, and social stimuli the individual builds up those fundamental forms of behavior which are primarily responsible for his particular traits and temperament. By coming into contact with various types of stimuli the child takes on those types of reactions which make it easier for him to adapt himself to a certain kind of environment, that is,

[1] Here, it seems to us, lies the factual basis for the Freudian and other theories of "Unconscious," and the scientist's belief in instinctive or intuitive knowledge; cf. Mach, *The Science of Mechanics*," (3), 1907, pp. 1, 26–28, 80–83.

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one fairly common with his own, and in consequence induce him to build up other similar reactions. If the home is provided with objects and conditions reflecting the musical, other artistic, or entirely different kind of interests of the parents, or a single parent, then the child builds up reaction systems functioning as those we ordinarily call talent or interest. The person then seeks stimuli of a musical or other definite sort. Just how deep and lasting these talents and interests become depends to a great extent upon the concord and unity of the home conditions, in addition to how well the child fits into the home situation. It can be readily seen that the development of certain traits in the child depends directly upon the sympathetic interest of one or both parents, an interest which itself depends upon the harmony of the home conditions.

Another very striking source of casual stimulation is contact with persons outside the home. Just how effective and effortless the casual stimulation process may be as compared with the deliberate process is readily appreciated by everybody who has acquired some art, both with and without the intentional stimulation of insistent parents. That one is in contact with various associations of persons does not always mean that he will build up reactions of conformity, nor that the conformity which does occur will be complete. Patently, the person just as definitely, although just as unwittingly, is frequently induced to do entirely the opposite or to accept the stimuli only in part. Just why this situation should exist is clear when we consider that the person receives stimuli from numerous individuals—individuals belonging to different and sometimes opposing groups. Also the infant no matter how young already has other behavior equipment and so the new reactions may conflict with the older ones. How careful we must be to avoid conflicting with older forms of behavior equipment is indicated by the difficulties which parents have with negative suggestion.

The strength of the casual stimulative process depends entirely upon the agreement or harmony of the new stimulation with the old circumstances to which the person's present reaction systems must be attributed. The lack of similarity between old and new stimulating circumstances when they are social institutions paves the way for such complex phenomena as class and race prejudices of all sorts and is moreover the basis for psychological variations between individuals comprising different groups. Clearly different groups are merely aggregations of individuals who have been stimulated by different institutions and who have in consequence developed different reactions.

Incidentally we have been led to the consideration of another powerful casual instrument for the building up of reaction systems, namely institutions. As we have already observed the

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presence of numerous institutions or common stimuli developed and fostered by the individuals of a given group force the person to acquire specific sorts of response systems with which to adapt himself to those institutions. The casual character of these acquisitions is readily understood from the fact that the institutions and the reactions to them appear to the person as natural facts with apparently no beginning or end. Anyone who attempts to change or remove one of these absolute institutions meets with the dire wrath of the individuals who have already built their adaptive behavior around such common stimuli. Only through an acquaintance with other and conflicting institutions can we be freed from the influence upon our behavior of the original stimuli found in our own family, nation, or other group.

Another evidence of the power of casual stimulation is found in the fact that even in the supposedly most critical levels of activity, namely in scientific domains, we also find casual stimulation operating as effectively as in the most elementary situations. Although scientific workers are presumed to be absolutely critical in their attitudes and to base their scientific information and judgment upon what they can determine to be actual occurrences, they are nevertheless greatly influenced by authorities and school affiliations. The stimulating circumstances responsible for this condition are the obvious complexities of facts which make it impossible for single individuals to be in actual contact with all phases of any phenomenon. Again, because our reaction systems are integrations of previously acquired responses, we have always a core of reactional foundation which influences the later development of reaction systems of the same general type.

Fashions in science and other domains of critical thought likewise exemplify the subtle influence of institutions in inducing the development of reaction systems. A study of the intellectual history of nations or of general movements of thought in various centuries indicates very clearly the modifications in ideas paralleling changes of an institutional sort in the economic and social domains of activity. Decidedly, no field of human endeavor is uninfluenced by the changes in institutions. Especially is this fact illustrated by the periodic modification of attitudes and ideals in art.

The Deliberate Process of Stimulation

Much of the stock of the person's reaction systems is developed by direct operation of various deliberate agencies; so that there is a constant process of modification and integration of the person's adjustment mechanisms. Among the earliest of the intentional stimuli for building up reactions are the training efforts of the parents. The latter not only induce the acquisition of all sorts of adaptive responses to physical objects and conditions but inspire conformities to social stimuli as well. Knowingly or unknowingly parents are themselves stimulated by the needs of the

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social surroundings and in consequence attempt to build up in the child all sorts of behavior which will enable the latter to adapt himself to the various objects and conditions that are the inevitable environment of persons.

What the parents in the home cannot accomplish the schools are supposed to bring about. As a general proposition the schools are presumed to induce the child to acquire mainly informational responses as a preparation for work and citizenship, but as the school institutions have developed they stimulate the acquisition of all sorts of social reaction systems. Clearly, it is impossible for the functions of the parental and school training to be very sharply sundered and so they not only supplement one another, but duplicate each other's processes.

For the more mature person a large number of deliberate institutions exist for the stimulation of reactional acquisition. We need name only a few which will bring to mind the entire process of deliberate stimulation to develop all sorts of behavior systems. Military institutions actively reconstruct the individual to the extent that anyone who passes through the course of training usually takes on an entirely new personality. Such a person responds differently and characteristically to all of the surrounding objects and conditions whether physical or social. Less general is the transformation of the person which the church aims to bring about, for the latter is primarily interested in the individual's so-called moral and spiritual behavior. Prominent also among institutions deliberately inducing new and characteristic reactions in the individual, are the various voluntary associations, such as fraternities, lodges, literary, social, and other clubs. Each of these is designed intentionally to modify the person and his behavior in order that he will yield to definite prescriptions of social action.

Basic Reactions and the Inheritance Problem in Psychology

The psychological problem of acquiring responses to stimuli is not without suggestions concerning the problem of inheritance as it applies to psychological activities. In the first place, the problem of acquiring reactions through the process of stimulation must not be confused with the biological problem of inheritance versus environment. Especially we are not to be understood as championing the cause of the environment as over against the efficiency of the hereditary factors influencing the development and operation of psychological phenomena. For in psychology we are not dealing either with the simple biological organism on the one hand, nor with bare environment on the other. At this stage of our study it should be clear that we are concerned with an organization of reaction equipment and not with biological (anatomical) structures or the operation (physiological functioning) of those structures. Again, as we have already pointed out, the objects stimulating the acquisition of reactions are only under special con-

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ditions to be considered biological environment. That is to say, when our stimuli functions are located in fixed objects and conditions the latter may at the same time be considered as part of the biological environment. But when we think of the stimuli functions of those objects then of course no biological process or condition is involved, since the functional process of stimulation is built up in connection with and as a reciprocal factor of its coördinate responses. Furthermore, as we have already had occasion to observe, stimuli objects consist of actions of the person as well as of intangible institutions of all sorts. Plainly such stimuli have no connection whatever with environment in the biological sense.

So far as there is, then, an inheritance problem in psychology that problem must deal with prepsychological factors that go below the development of psychological activities. For it is plain that in no sense may we say that human behavior reactions are inherited. The only inheritance factor which does bear upon the acquisition of behavior must be considered to be the structural (anatomical) organization of the organism. Otherwise, we are in grave danger of believing or at least of asserting that we can inherit all sorts of powers or potencies, a condition exceedingly disastrous to our investigative and descriptive procedure.

That no inheritance problem is actually involved here is apparent when we realize that no specific structural elements exist in the make-up of an individual which can constitute the biological foundation of basic behavior inheritance. What structures we ask correspond to the acquisition of defensive or expressive behavior? What anatomical organization to acquisitive conduct, etc., etc.? Moreover, when we consider that each name used for any person's activities such as acquisitive, protective, etc., is only a class name for hundreds of thousands of specific contacts with particular stimuli objects, the structure inheritance notion explodes into its own infinite expansion.

Although there seems thus to be hardly any room for an inheritance problem here, still some attitude toward the general inheritance issue cannot be dispensed with. For the extreme subtlety of acquisition of the basic reactions may lead to some puzzling question concerning the source of origin of such activities. By paying strict regard, however, to the inheritance factors involved as well as to the actual stimuli conditions we must conclude that our basic conduct has to do with the intimate details of a personal behavior biography, beginning and ending with the individual's actual interactions with his stimuli conditions.

How far a psychological problem of behavior acquisition is from the biological inheritance problem must strikingly appear from the consideration that even much of the structure organization and consequent functions of the organism, are decidedly influenced

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by environmental factors. Aside from the inevitable species characteristics of structure, it is highly problematic how much of such actual structure represents clear-cut inheritance factors. Such biological work and opinion as that of Morgan, Child, and others [1] is most illuminating in the study of this problem. So far as the student of psychology is concerned, clearly he has no option but to interest himself thoroughly in the person's specific stimulating conditions and in the precise details of the responses made to such stimuli.

Types of Basic Behavior Equipment

Because the reaction systems acquired by the individual cover the extremely wide range from elementary maintenance responses to the most elaborate creative acts, and from the most deep seated attitudes to the most critical thought, we might profit by an attempt to inject some order into the various types of behavior comprising our reaction equipment. From among the hundreds, even thousands, of various types of behavior acquired by the person through contact with various objects and situations we may for illustrative purposes isolate the following.[2]

1. Adaptive Reactions.
2. Compensatory Reactions.
3. Protective Reactions.
4. Defensive Reactions.
5. Manipulative Reactions.
6. Expressive Reactions.
7. Exhibitive Reactions.
8. Approbative Reactions.
9. Recessive Reactions.
10. Accommodative Reactions.
11. Acquisitive Reactions.

1. Adaptive Reactions

By adaptive responses we mean to refer to that class of actions which to all appearances seem to orient the person in his surroundings, and put him in a satisfactory relationship to the objects and situations with which he comes into contact. As examples of adaptive behavior we might cite the specific reactions acquired by the infant in learning to balance himself in the upright posture or to avoid falling over objects, and the behavior of mature persons in learning to handle a new machine or to use new tools. The eating reactions of an infant are also adaptive acts, while the acquisition of social graces by more mature persons continues the process of acquiring adjustive reaction systems.

[1] Cf. Morgan, T. H. *The Physical Basis of Heredity*, 1919; Child, C. M. *Individuality in Organisms*, 1915; and Goodrich, E. S. "Some Problems in Evolution," *Science*, 1921, LIV, 549.

[2] In such a study as this it is only fair to acknowledge the help which psychologists have received from the observations and descriptions of the development of behavior furnished by the psychiatrists. This acknowledgment, however, need not imply any sympathy for the theoretical formulations of the psychopathologists.

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2. Compensatory Reactions

Many acts there are which do not adapt the person directly to an object, but rather replace acts which would perform that office. The child who cannot ride his bicycle can compensate for the lack by pushing it. Or if a child cannot overcome his opponent he sticks out his tongue at him or otherwise attempts to overcome his own disability. In general, do not the lies told by children constitute an effort to compensate for incapacities of various sorts? In later stages of development an individual lacking a musical voice similar to one possessed by an admired or envied person, will compensate for this lack by acquiring histrionic capacities, and thus he will be able to meet what is to him a difficult situation. Many of our manners and ideals are reactions developed as compensations for acts which we cannot, dare not, or may not do. Some complex acts which may be referred to as talent and interest, develop at first as compensations and in many cases continue to expand because they serve an increasing need to compensate for various conditions. In recent years it has become quite generally recognized that much of the play activity of infancy and childhood is developed and indulged in as compensations or substitutions for acts and objects not available. Very good examples of compensatory behavior are the activities of the person presumed to possess great competence as a scholar or business man, but who in fact is only a splendid orator, conversationalist and punster, or one who merely possesses the reactions of a "good fellow."

3. Protective Reactions.

In our various contacts with other persons we build up reaction systems to serve as protective mechanisms. In simple form these are injury-inflicting responses involving the use of the hands, the head, and the feet for striking, kicking, and otherwise resisting the attacks of others upon oneself or playthings. For more complex situations the protective responses take on more subtle forms; they may be modes of speaking, the acquisition of various sorts of information as bulwarks of protection; they comprise also various forms of agreeing with people, organizing cliques, the distribution of gifts, and a host of other kinds of action.

4. Defensive Reactions

As contrasted with the protective mechanisms acquired by the individual, the defensive mechanisms are primarily modes of reducing the stimuli which we ourselves offer to the aggressive acts of others. The simplest defensive mechanisms are illustrated by hiding self and possessions, by smiling and otherwise conciliating the hostile individual, so that by appearing friendly and unarmed one avoids stimulating an attack. In more complex stages we can place under this classification the actions which are attempts to explain and rationalize one's behavior in defending it from self and others. As defensive behavior we probably acquire many of our most intimate social act-traits, such as suavity, pretension, etc. Enlightening in this connection is the question as to how much of our political, religious, and economic heterodoxy is ac-

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quired as defense reactions against unbearable conditions and doctrines.

Also acquired among the defensive mechanisms are various negative reactions serving to soften or remove the evil effects of certain noxious objects or situations. Such defense actions are best illustrated by the abnormal blindness, deafness, paralysis, and other negative responses met with in persons commonly referred to as hysterical. The acquisition of these negative responses occurs through contact with sights, sounds, and need for movement which appear to overwhelm the persons concerned. Of course, these negative responses are merely extreme exaggerations of everyday behavior of a similar sort. For instance in our everyday reactions we say we did not attend to a person who was disagreeable to us when in reality we had to pay attention to him first before we could blind ourselves to or avoid him.

5. Manipulative Reactions.

It is a very general observation that an infant will persist in manipulating all objects that come readily to hand. So widespread is this manipulative activity and so early does it appear that most writers on "instincts" include a manipulation instinct in their lists. More critical observation, however, indicates that such behavior is to a considerable extent orientative activity, indulged in because of the challenging stimulation of objects. What else could happen besides the opening and closing of a hinged door? Significantly enough observations show that only manipulative objects are manipulated and that the type of manipulation depends upon the shape, weight, and other qualities of objects. In no case do we observe any attempt to manipulate things which do not especially invite such responses. Illustrative of manipulative reactions in adults are such random acts as toying with a pencil while conversing and the many false moves performed while learning to operate a new machine.

6. Expressive Reactions

To all it must be self evident, that the human individual is not merely an adaptive mechanism, but also possesses an equipment of reaction systems making for self development and self expression. As a consequence of the affective conditions induced in individuals by surrounding stimuli, he imposes his personality in various ways upon surrounding objects and situations. When thus affected by surrounding conditions the person seeks out what from an adaptive standpoint might be called unnecessary but still congenial situations, and new experiences. Such pursuit of new experiences leads to behavior which may be called transformative and expressive. Among children we observe as examples of such action rhyming, and recounting of words heard or the names of playmates. The simplest expressive acts are not dissimilar to the kind we have called manipulatory. In the more complex and social types of behavior, expressive acts are illustrated by individual mannerisms, by peculiarities of language, handwriting, and prefer-

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ences of all sorts acquired by the individual. Further, the appreciation and creation of art objects and literature are modes of a positive, self-expressive action upon our surroundings, rather than mere adjustments to those surroundings. A very important and interesting type of expressive conduct is laughter in its various forms. By smiling and laughing reactions, the individual records and expresses the manner in which things appear to him and the character of his appreciation of them.

7. Exhibitive Reactions

Among the displaying or exhibitive reactions we place those which stimulate the interest, admiration, or repugnance of the observer. As in all elementary behavior the reacting person is not intentionally soliciting admiration, but the mere presence of other people stimulates him to indulge in various forms of ostentatious behavior, to produce sounds, act parts, repeat one's own actions, mimic others, and exhibit prowess of all sorts, etc. In the more mature person exhibitory behavior involves taking cognizance of the interests of the observing person and responding accordingly.

8. Approbative Reactions

With the individual's accumulating contacts with surrounding objects and persons he develops preference reactions. Later these responses become integrated with verbal and knowledge responses, thus becoming interest and aptitude behavior. Quite accidental may be the primary development of the preference reaction, in case it is not due to some factor reaching back to the biological stock of the person as superior color or tone sensitivity. Should the individual's first contact with certain colors throw him into relation with more or less brilliant hues or should the first contact with certain objects happen to favor some of them because of their variety or intensity, then those favored objects may be ever after preferred. Again, early preference responses may arise because of the affective conditions induced in the individual by various objects or because of their negative qualities, as the absence of thorns, or other injurious or pain-inflicting parts. No matter what the original influence of such particular integrations of reactions may be, the fact remains that when such integrations of reaction systems occur, then the person has a basis for interest or curiosity in particular objects and persons. The beginning of such a system of reactions begets a further pursuit and interest in similar objects with a consequent increase of the given type of reaction systems and still further pursuits of their exciting stimuli. In short, interest in certain objects and persons is proportionate to the knowledge and skill one has previously acquired in reacting to them.

Out of the simple preference reactions develop the complex admiration responses on the social and intellectual level of human intercourse. Thus the person acquires and expresses certain full-fledged value judgments concerning books, works of art, and per-

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sons found in his surroundings. Complex as this type of behavior appears it is still possible to trace the development of such intricate admiration reactions from the simpler preference responses.

9. Recessive Reactions

Just as certain types of cumulative responses condition the further pursuit of objects and persons, so the individual's first contacts may result in a withdrawing from and consequent lack of interest in some stimuli. Frequently the results are more positive, so that the person may shun and be very careful to avoid objects and persons for response to whom he has no reaction system. Lacking response systems and being unable to respond effectively, the individual may develop compensatory responses, which may amount to defamation and contempt for the other person or object.

10. Accommodative Reactions

Through constant stimulation from, and reaction to other persons, individuals, from their very infancy, learn to live with others. Through actual struggles with people and through overt teaching, persons build up reactions of toleration and even genuine sympathy. Of primary importance as a condition for building up sympathetic attitudes and acts are fairly common surrounding stimuli. These develop a common personality basis for harmonious and sympathetic action. It is because of the common surroundings that among children the more usual relationship is sympathetic until they are taught either by situations as casual stimuli, or by deliberate instruction that there are occasions for individual differences and conflicts.

11. Acquisitive Reactions

No activity of the person is more common than the collection and appropriation of objects for one's private use and control. Such responses are clearly cultural in character since they are stimulated by a great number of cultural institutions in the family group. These institutions reflect the general conditions in practically all Western civilizations.

With emphasis, we repeat that the classification of reactions proposed here is intended only to illustrate the fact that our complex maze of behavior may be arranged in some order. We are, therefore, far from asserting that these reactions are mutually unrelated behavior types. Rather, our purpose is to apply distinguishing names to actions that are inextricably interwined and interwoven in the total fabric of human behavior, and in fact many of which occur as factors in a single segment of behavior. Especially clear it should be made at this point that we find no necessary morphological differences whatsoever between the reactions that are considered to belong to the domain of physiological psychology and those classified under the rubric of social psychology. From an adjustment standpoint our reactions are all of a piece, but of course the stimuli to, and occasions for reaction, differ very markedly indeed.

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How Play Illustrates the Intermingling of Behavior Types

No better can the integration and intermingling of our various types of behavior be illustrated than in a study of that practically universal form of psychological activity called play—which activity it is safe to say, involves all of the types of behavior which we can isolate. But first we must note how crudely all sorts of activities are confounded under the name play—a term we apply to such widely divergent activities as (1) the complex of movements representing sheer biological vitality, (2) all sorts of direct intelligent and unintelligent responses to stimuli, besides (3) a host of different socially admonished and socially sanctioned responses. Let us not forget, however, that when we do attempt to analyze and determine what behavior may strictly be called play we find that it is an indefinitely complicated congeries of distinctive forms of psychological reaction.

Because play is so intricate a complex of various forms of psychological activity it is extremely difficult to describe and very troublesome to those who wish to explain it at a stroke. Those who conceive of human behavior as autonomous mental states, as manifestations of simple states of consciousness, or as in any sense a detached reaction, must perforce find play to be a very elusive and unaccountable phenomenon. Play is not merely a preparation for life, although it is clear that no matter under what circumstances one acquires and integrates responses they may later be used, nor is play merely a means of relieving surplus energies. Again, play is not merely a compensation for action which one is unable to perform. Rather, play activity involves all of these conditions and numerous others.[1]

It is our deep-seated conviction that play cannot be described or explained without a close and careful consideration of the specific conditions involved. For we cannot but think that there are as many differences in play as there are in work and that the differences between the various kinds of play actions are as great, if not greater than the differences between thinking and reflex action.

Much of what is true of play is also true of such activities as modesty, charity, coöperation, imitation, bashfulness, religiousness, love, jealousy, etc. Each of these terms stands not for sharply defined, isolated types of behavior, but for hosts of interrelated reaction systems built up in complex social situations. And further, each name stands for a multiplicity of classes of adaptive behavior. We cannot too strongly urge at this point nor emphasize too forcefully that what people usually call unaccountable inherited tend-

[1] Some insight is here afforded us into the difficulties of the play theories. We wish to point out in especial that only the compensation theory seems to have a solid psychological foundation in that it is based directly upon facts of stimulus and response. The others are teleological or at best physiological.

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encies or traits are really such complex integrative organizations of reaction systems that the simple correlations of stimuli and responses are lost sight of in the presence of the total mass of behavior.

One more point. All of the acquisitions of basic behavior that we have been indicating are entirely independent of the wishes or knowledge of the acquiring person. Not that the person need be unaware of his developing modes of behavior, but rather the person's knowledge is not an essential feature of the acquisitional process. The importance of this point lies in its warning not to confuse the unintentional and intentional acquisition of response systems. Clearly, there are two distinct processes here, as is illustrated by the difference in the learning of language by a native of the country in which the language is spoken, and by a mature person who deliberately undertakes to acquire it. Possibly, the term habits would more suitably symbolize the type of acquisition in which the person deliberately undertakes the development of some skill or other type of reaction.

Conflicting Basic Behavior and Dissociated Personalities

The pathological conditions called dissociations of personality well illustrate the integrative character of our reactions, for the possibility of the various dissociations arises precisely from the fact that the individual's responses are integrated and organized into types and groups through contact with his various surroundings. Since he develops his particular reaction systems by contact with stimulating situations it seems clear enough that, as those stimulating conditions are of various sorts, he will build up systems which may be mutually inharmonious. Just how inharmonious the organizations of response systems will be, depends upon the variability in the stimulating situations. Thus the multifarious stimulating circumstances of the ordinary family would supply no striking occasion for acquiring such incompatible responses as could later result in dissociation. If, however, the family conditions are not homogeneous and orderly the personality resulting may be fertile ground for disorganization. In every case of dissociation, of course, the crisis involves the person's facing an overwhelming or at least a tremendously shocking situation. What we are especially interested to point out is that the facts of multiple personality and other forms of dissociation-phenomena convincingly show us how complex reactions are integrated from simpler responses, and organized personalities developed from complex systems of responses.

Some Influences Determining the Acquisition of Basic Behavior

In addition to the stimuli influences on basic behavior acquisition we must point out other conditions having an effect upon such acquisition. For clearly individuals differentiate themselves in the matter of amenability to the influences of their stimuli surroundings. Also we must consider what conditions the presence in the individual's surroundings of any particular sort of stimuli

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objects and conditions. These different influences upon the acquisition process we may consider as both psychological and non-psychological.

Among the primary psychological influences we may consider at any particular moment the behavior equipment which the individual already possesses. The stimulational function of any object depends upon the person's reactional make up. This means to say that unless a person has in his behavior equipment reactions to objects similar to those with which he is now in contact, they will not have the same influence upon his behavior as they would have were such reactions present in his behavior history. In general, then, we might indicate that a very important influence upon basic behavior acquisition is the reactional biography of the individual. This consideration will throw considerable light upon the problem why personalities differ in spite of the fact that they are surrounded by the same objects and circumstances.

Among the non-psychological conditions of basic behavior acquisitions we must consider the individual's health. A person who is not in good hygienic condition cannot be expected to participate in such activities as put him into close contact with surrounding objects. Consequently such surroundings will have little or no stimulational effect upon him and as a result he will develop few basic reactions to such objects and conditions.

Other important non-psychological factors are the general, social, or economic conditions of the parents or other persons who are in close contact with the infant whose behavior acquisition we are considering. For it is precisely the economic and social status of surrounding persons which determines exactly what stimuli in the form of objects and actions will constitute the psychological milieu of the individual. The poverty of the child's parents may together with other circumstances condition whether the child will build up basic acquisition reactions or not. Similarly whether or not the parents are religious and partake in the social activities of religion, will have its influence in providing stimuli for the child's acquisition of religious beliefs and custom behavior.

Naturally these influences we have mentioned constitute only random sample suggestions. In any actual behavior situation numerous other influences occur to condition the acquisition of new behavior elements. As numerous as such conditions are, however, and in view of their extreme importance, to neglect them means to overlook some essential features of basic behavior acquisition. For it is such conditions that provide the intrinsic empirical facts governing the development of early basic conduct.

In offering these various suggestions of the ways and means by which persons develop their early fundamental types of behavior, we must emphatically point out that no attempt has been made, nor can it be made, to do anything more than illustrate

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a principle. For the very principle which we have attempted to illustrate stands opposed to any such *a priori* procedure as the narration of how any one has acquired response systems without having observed the process. Precisely what circumstances lead to the development of specific reactions can only be known from a direct study of a particular individual and the surroundings in which he is found. There is more point to this suggestion when we consider that there is no determination or inevitability about our developing reaction systems. With the exception of the stimulating circumstances and the biological factors we have mentioned, the development of reactions is wholly a fortuitous process. Our position is, that all psychological phenomena must be considered as involving always the two phases of stimulus and response. Under no circumstances can we admit that our reactions are but the sheer unfolding of forces within the person entirely uninfluenced by stimuli which are presumed merely to set off reactions without conditioning their existence. In psychological writings this latter view is very prevalent, irrespective of whether the powers in the individual are conceived of as exclusively mental or physiological.

What we have attempted to do has been to point to some facts observed in a number of cases, which exemplify the law that the number and kind of reaction systems we acquire depend entirely upon the type and frequency of stimuli with which we are in contact, plus the reaction systems previously acquired. Because we are dealing with what are essentially intricate and highly evolved adaptations to surroundings, we cannot expect to find exclusively in the person the conditions for such adaptations; rather we must seek for these conditions in the inter-relationship between the individuals and their surrounding stimuli. It is needless to assert, therefore, that we must not confine our study of human behavior to an exclusive analysis of its physiological phases and to the complete neglect of essential social factors.

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We may safely assert that one of the conditions of a natural science is its total abjuration of all teleological conceptions. This means in effect that only interacting objects and conditions can be dealt with and never forces or powers, which are presumed to be responsible for the inter-connections between things. Now it is clear enough from studying the development of psychological science that a number of very definite teleological factors manage to persist in the field in spite of determined efforts to eradicate them.

Not infrequently does it happen that an extremely false conception may have its roots in definitely scientific material. As a record of fact, then, we may trace out a number of teleological conceptions in psychology that have been derived from biological facts or analogies to the latter. Especially since the Darwinian hypothesis has exerted a profound influence upon psychology, notions of inherited capacities, traits, and powers have been reintroduced into psychology. These result in the belief that the human organism possesses various sorts of psychological characteristics or processes which have not been developed or acquired. Among such teleological or vitalistic factors are innate intelligence, and instincts of various types, which are presumed to make for ultimate innate differences between individuals or groups of individuals.

Now, although these teleological powers are derived from the analogy of factual parent-offspring transmissibility of structural or morphological traits, they are none the less pernicious influences in psychological thought. Probably the main objection to such conceptions may be summed up in the statement that they lead us away from the description of actually observable conditions and therefore represent a predetermining power or force of some sort. In many cases what actually happens is that the name of some action or even the result of some behavior is hypostasized into a force considered as responsible for the existence of that action.

Adhering absolutely, as we do in this work, to the description of the interaction of the responding organism with the stimulating object or condition, we manage to keep clear of any sort of teleological or vitalistic factor. In every case we study only observable interactions of organisms with things, occurring for the first time or as repetitions of previous interactions. In the latter case, of course, previous interactions of persons and objects have resulted in the addition to the person's behavior equipment of reaction sys-

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tems which operate in later situations. Here we find sufficient observable facts to account for concrete and genuine predeterminations of various sorts having an influence upon present behavior situations. Such predeterminations are empirical and not teleological in any sense. These predeterminations merely refer to the reactional biography of the individual during which he has acquired behavior equipments in contact with appropriate stimuli which now play important rôles in present behavior. As we have pointed out in the present chapter, in the actual behavior histories of individuals we can trace out the earliest beginnings of complex reactional equipments.

Such empirical behavioristic predeterminers of later conduct as we have been discussing may be more or less permanent or basic in the genetic history of the individual. Thus, as we have indicated in the preceding chapter, our present behavior may be conditioned by more intimate factors than our earlier acquired basic reactions. Reflex actions can be predeterminers of action, even if they are themselves not so much derived from immediate interactions of the person with surrounding objects or from the biological organization of the organism. But in the case of reflex actions we have again the same general type of development of behavior factors, even if they do go farther back in the developmental history of the organism.

One important difference between the reflex action and the more complex action determiners must be remarked upon, namely, that in the case of the reflex and other simpler actions we find influences only upon similar types of simple action, never upon more complicated ones. So that it would be utterly fallacious to assume that our hunger or sex reflexes have an influence upon our complicated social conduct.

Finally we might indicate that none of our organs or the fact that they exist in our morphological make-up, may correctly be said to constitute teleological determinations of conduct. For the existence of the organs and the functions that they subserve all must be developed through actual interactions of the organism with surrounding objects and situations. Accordingly the development and presence of organs and their coördinate functions are concrete results of active biological situations and not purposive forces of any variety. For bibliographical material bearing upon the present discussion of the immediate problem, especially as localized in the instinct problem, consult Allport, (*Social Psychology,* 1924, Chapter III), Tolman, ("The Nature of Instincts," *Psychological Bulletin,* 1923, XX, 200), McDougall, ("The Use and Abuse of Instincts in Social Psychology," *Journal of Abnormal and Social Psychology,* 1921–1922, XVI, 285, and Kantor, ("The Problem of Instincts and Its Relation to Social Psychology," *Journal of Abnormal and Social Psychology,* 1923, XVIII, 50).

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CHAPTER VII

THE DEVELOPMENT AND OPERATION OF COMPLEX HUMAN OR SOCIETAL CONDUCT

The Problem and Nature of Complex Human Conduct

Our study of psychological phenomena has already revealed that the behavior life history of persons constitutes an uninterrupted process of acquiring reaction systems and further that these reaction systems later operate when their coördinate stimuli objects and conditions appear. This condition is only to be expected when we consider that the person is constantly meeting with new and different types of objects and circumstances. Furthermore, the reacting individual is continually having contact with other persons coming from places in which different objects, customs, and situations are found, and who as a consequence bring to him very diverse types of stimulating conditions. Depending upon the activity and mobility of the person, his surroundings are continuously offering him varied and broader opportunities for developing and performing diverse sorts of new behavior.

Our psychological study has further informed us that in spite of this constant modification and development of behavior we may still distinguish in the reactional biography of all individuals fairly definite points marking changes in their behavior status. One of these points we have seen marks the change of the personality from the simpler or foundation type of action to the more complicated basic forms. In this chapter we must study a third such outstanding change in the individual's personality development. This is the point at which he emerges from infantile behavior life, consisting of adjustments to family dependency, to enter the broader and freer domain of mature contacts with the world. In the preceding chapter we have already suggested the beginning of a development of behavior outside the immediate circle of the family, but there we were considering the very elementary basic societal behavior and not the mature complex activity which is to be more particularly the subject matter of the present chapter. Thus from the primary confines of the intimate family life the individual is ushered into a societal behavior existence. In line with these facts we may consider that in addition to the (1) simpler and (2) basic levels of behavior we have (3) a third level which receives the general name of complex human or societal action and which name supplies us with an additional category under which to

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classify the innumerable specific instances of human conduct.

Our investigative approach to the problems of complex human conduct impresses us immediately with the fact that such behavior constitutes very complicated and intricate responses to complicated stimuli conditions. Such stimuli conditions we may say comprise in a very prominent way innumerable human circumstances and conditions. Even when these complex reactions involve responses to natural objects the latter are intricate and possessed of distinctly human character. These human stimuli situations we may conceive of as products of long ages of development, by which natural phenomena are overlaid with centuries of human incrustations. Our world is cultural in character. All natural phenomena, rivers, mountains, the flora and fauna, and also persons, are modified in their psychological qualities because of having been endowed with various stimulational functions. On the behavior side, as well, human organisms do not eat, sleep, play and reproduce according to animal or natural conditions but always with distinctly human elaboration of such acts. Obviously, then, the complex human behavior constituting the responses to such multiplex situations must be very involved indeed.

In general, our present aim is to study the conduct of complex adult persons with respect to distinctly human situations, situations infinitely complicated by the multiplex interactions of human persons with other persons and institutions. In detail, we must study the adjustments and adaptations that individuals make to domestic life, to group organizations of persons of all varieties, and in consequence to all of the objects, conditions, and situations involved in such contacts. Such reactions adapt the person to the industrial, technical, and other economic conditions in which he lives. Every individual must enter into the work life of his community. He must become able or skilled in some sort of work resulting in the production or distribution of objects or in their use or enjoyment. The same thing is true for intellectual behavior. The person must adjust himself to his intellectual environment; he must develop knowledge and information with respect to objects, and learn to appreciate the character of his surroundings, namely, the events and conditions constituting his intellectual milieu.

Again, the character of complex human societal behavior may be illustrated by the intricate reactions which the individual performs in his domestic environment. Under this term we may include all the facts of personal relations, and especially the activities of individuals of opposite sex, courtship, mating, and the development of a family with all its complicated needs and adjustments. Similarly we find the person adjusting himself to æsthetic objects and situations. He makes and looks at the representations of objects of all sorts; he learns to make drawings or paintings. and to appreciate them. Again he reacts to disabilities,

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frustations and unknown and fearful things and conditions he encounters in his life, by revering, awing, or worshipping things and persons.

Clearly, this humanistic aspect of the surroundings of human organisms is, as we mentioned in the beginning of the chapter, prevalent also in the second level of behavior, namely the basic stage. Both the basic and complex levels of conduct can in this manner be differentiated from the foundation level of action. That is to say, human individuals in the foundation stage of action hardly represent more than organisms in a definite stage of transition from an infrahuman to a human behavior level. In the second or basic level, however, the organism is actively taking on definitely human behavior equipment. But in the third level not only is there discernible a unique assumption by individuals of human behavior traits, but also their constant operation. To a certain extent this is merely the assumption of human behavior traits in a more mature and specific fashion. The individual acquires in his behavior equipment specific conventional activities because of his contact with specialized economic, professional, intellectual, and other groups. This distinction between basic and complex human actions on a criterion of maturity of action must be qualified, however, in view of the fact that the two types of behavior decidedly overlap. Our statement, then, concerning the relatively more human character of the third type of action can be true only in general and as a whole. The statement will not be true for all specific and particular actions.

A striking characteristic of our societal conduct is that in addition to being enormously complex it is exceedingly intermingled in the behavior life of the person. Within each field of action our various behavior forms are interrelated. To illustrate, when we enter upon some kind of work, we develop, with the increasing contacts with the details of such occupation, more and more personality equipments all of which have a unique relation to specific phases of that work or to the work as a whole. In this sense all of our work reactions are very intimately related and thus constitute links in a fairly unbroken chain.[1] This fact of interconnection of our reactions symptomatizes the uninterrupted continuity of behavior. In our normal existence behavior is all of a piece. To our former illustration of this condition we might add another. For instance, so far as our contacts with persons are concerned we are always related to the same set of people, or at least we might say that of the whole set of people with whom we are in contact none can be without certain features common to

[1] It might be here pointed out that unless one's behavior is fairly continuous we consider the individual as unstable; also, that when such a continuous behavior existence is sharply interrupted we have a definite abnormal personality.

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the others. Even though we outlive or outgrow particular individuals we find that the behavior influences which new acquaintances have upon us, overlap the influence of former individuals.

But not only are our complex reactions of particular sorts fairly continuous, but our reactions of different types are also completely interpenetrative. Thus, when purchasing an object we react to it not only in an economic way, but in an æsthetic and intellectual manner as well. Similarly our artistic and intellectual reactions are in turn complicated by economic situations. Intellectual and social reactions are modified and made intricate by religious and moral influences of implicit and explicit types. This interpenetration of activities is obvious because on the behavior side, reaction systems cannot be absolutely different; they must have numerous common elements. Again, on the side of the stimuli conditions, it is rarely found that a person's domestic, economic, intellectual, and æsthetic surroundings are of entirely different sorts.

Clearly the task of describing complex human conduct is a most difficult one. Without doubt we are dealing here with what is probably the most intricate and complicated type of phenomena belonging to any domain of science. In fact, it is almost impossible to render any sort of adequate account of even the minimum of any event which would be necessary to characterize such behavior. Unfortunately also the attempt to study complex human conduct inevitably leads to generalization and to the attempt to typify the activities which take place in actual human situations. This seems almost necessary if we are to be able to describe them at all. In order to study this complex human behavior in any adequate way we are forced to fall back on the expedient of dividing up such complicated activities in fairly elementary units of description which can be more easily and effectively handled. In the first place, our complex human conduct must be artificially separated into intellectual, æsthetic, social, political, domestic, behavior, etc., etc. Such activities must be still further subdivided by reducing them to simple and partial activities, such as voluntary actions, thinking, speaking, reasoning, perceiving, etc.[1]

But such a procedure must still leave our descriptive needs unfulfilled. For even if we do find it expedient to study such behavior in detailed parts we need still to construct a behavior picture of societal conduct as a living movement of the person's adaptations. In other words we must attempt a description of the actual individual in his vital contacts with his concrete human surroundings. Such a description of societal behavior can indeed

[1] Such studies constitute the subject matter of most of the chapters of this work. It might be suggested here that the violence of chopping up our complex conduct is somewhat softened by the fact that such partial activities, besides being parts of larger activities, operate themselves as wholes or complete behavior situations.

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be accomplished to a degree, in working out a partially classificatory and partially descriptive study of some distinct types of societal action of adult human individuals. A serviceable study of this sort we believe we can perform in such a way as to constitute a distinct departure in the method of handling this class of psychological phenomena, without in the least misinterpreting our data. Accordingly we may isolate four types or groups of societal conduct, the comparative description of which we hope will add to the understanding of the most complex types of psychological facts. We name these groups of action as follows:

(1) Suprabasic behavior.
(2) Contingential behavior.
(3) Idiosyncratic behavior.
(4) Cultural behavior.

Comparison of Complex Human Conduct With Basic Behavior

Before proceeding to an intimate study of our four types of societal behavior it would be well to compare and contrast in more detail the general class of conduct now under discussion, with the basic activity studied in the last chapter.

In the first place, complex human actions as we have seen have a common characteristic with basic behavior in that both are independent of the biological constitution of the reacting organism. That is to say, what specific acts the individual performs are not in any essential way determined by their anatomical or physiological organization. On the contrary, such conduct depends very definitely upon the person's reactional biography, his present conduct equipment, the character of the present psychological environment, and the stimuli opportunities for action.

But the very fact that societal conduct is conditioned by the factors we have enumerated means necessarily that numerous important differences mark off such conduct from basic behavior. For the individual's behavior status at this level of conduct is vastly different from that of the second level. Furthermore, the stimuli opportunities for the development and operation of societal and basic conduct could hardly be less similar. Accordingly, in our study as we go from the simpler to the more complex forms of behavior our descriptions must increasingly be concerned with the interactions between the person and complicated, environmental conditions.

The difference between the individual's surroundings in the basic and societal stages may be pointed out in various ways. In the first place, because of the relatively much simpler condition of the personality in all of its phases in the basic stage, the objects met with in that period must be psychologically simpler, that is, have simpler stimulational functions. Thus the fact that the individual lives in the city or country, along a seashore or inland, in a valley or in the mountains, while exerting considerable influence

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upon the person's behavior development, does so in the earlier stages of infancy only indirectly, that is, through first modifying the behavior of other persons who are the infants' only direct stimuli objects. And even when the developing individual himself finally gets into direct contact with such stimuli in the basic stage, his limited behavior equipment must naturally be correlated with simpler stimuli objects.

In the second place, the person in the third or societal level of psychological behavior is in direct contact with things and conditions which do not exist for him in the basic stage at all. For instance, he is surrounded by conditions constituting and representing his economic and social status, as well as economic and social opportunities. On the whole, of course, the person in the third level of activity lives in infinitely more complex surroundings than in the second or basic stage of development. While this is true of every human individual, the contrast between the two stages of development is much greater in proportion as the respective adult persons live in more or less complicated cultural communities.

Finally, since the complexity of the surroundings of the mature person who moves about within his own group and among different groups is greater than that of the less mature person who is not so mobile, it is inevitable then that the individual in the infantile stage of development must have much simpler behavior, in spite of the fact that such behavior simulates the action of the mature individual. Thus, while the person in the basic stage of conduct thinks, believes and acts intelligently etc., such actions have little in common with the same type of behavior on the mature, societal level.

The contrast between societal and basic behavior is sharpened by considering that the two types of activity are continuous. Accordingly, societal responses are in many instances extreme elaborations of basic conduct. Much of our societal conduct, in fact, consists of the enlargement and complication of basic behavior. The liking for colors in infancy may under proper stimulational conditions develop into elaborate taste and preference reactions of a complex æsthetic sort. The acquisition of manipulative responses to mechanical objects may be developed into elaborate engineering skills.

Even those societal activities which are so new as to be developed in contact with objects and conditions not found in the basic surroundings of the individual may still be described as built upon a simple core of basic action. This fact suggests another relation as well as a difference between the two types of activity. On the one hand, it suggests that societal activity may be so complicated as compared with basic behavior (even though the former may be built up out of the latter) that the resemblance is invisible. On

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the other hand, we observe that basic behavior may be said to constitute the primary equipmental basis for all the later complex activities.

SUPRABASIC REACTIONS

General Nature of Suprabasic Reactions

As our first type of societal behavior we shall consider the suprabasic reactions. These activities consist of complicated equipmental responses constituting modified and enlarged modes of activity derived from and built up on the basis of previously acquired basic reactions. The direct derivation of this type of action from basic conduct gives it its chief descriptive character. It remains to emphasize the exact manner in which the development takes place.

Suprabasic reactions, as a superstructure of the basic equipment, are merely elaborated and enlarged actions of the basic type. In general this means that the individual's expressive acts are expanded into definite language activities serving as communicative responses, the expression of thought and desires, the reference to things and events of all sorts. Play activities, which already are combinations of basic activities at the suprabasic level, become elaborated into techniques, games, drawing, and designing. Smiling or simple laughter is amplified into wit, teasing, and responses to natural and contrived comical situations. The elementary likes and dislikes become developed into various sorts of interests, intellectual attitudes and aptitudes with respect to the same or similar objects which were the stimuli for the basic conduct.

More specifically do the suprabasic activities comprise particular kinds of language activities as determined by the person's language surroundings. This means not only that individuals must speak the language of their groups, but also that the things and conditions referred to (the thoughts expressed) are conditioned by the reactional history of the individual and their immediate stimuli conditions. Similarly, the person acquires his beliefs, ideas, customs, and other complex human conduct. As might be expected the suprabasic behavior of different individuals varies in essential details in proportion to the differences in their respective basic equipments.

Specific Characteristics of Suprabasic Reactions

To the general description of this type of societal behavior we may add a series of characteristics under categories that may be usefully employed for comparative purposes. The enumeration of these characteristics will not only give more intimate description to these reactions but will mark them off from the other three societal types to follow.

Essentially equipmental

Suprabasic responses are essential and peculiar possessions of the given personality. Because they are modifications and elaborations of the basic responses they constitute the unique and char-

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acteristic responses of persons. For the basic reactions, as we have seen, not only are chronologically early developments (thus marking the identity of the individual), but they also influence the number and variety of activities which the person will later develop. In a genuine way, then, the suprabasic equipment symbolizes individual differences between persons, and in this sense serves as a basis for the prediction of what the individual may do under stated behavior conditions.

Strength

Since the type of conduct now under discussion dates back in some fashion to the very earliest acquisitions of behavior, the specific acts are forceful and even imperious in their operation. Once having acquired beliefs, likes, tastes and intellectual attitudes, such activities constantly operating, as they ordinarily do, become rather powerful in their function. With what vigorous and on the whole futile effort do we attempt to soften the prejudices and tastes which embarrass us by their violence. No less forceful in their operation are the basic desires, knowledge, and beliefs, which have become powerful by being elaborated into societal conduct.

Permanency

The same conditions that make suprabasic responses so powerful operate to make them permanent features of an individual's behavior equipment. Suprabasic reactions, however, may be modified, although they will still retain much of their original form and place in the personality make-up of individuals. Prejudices and beliefs developed on a basic substructure are not easily got rid of, if they can be disposed of at all. Fairly illustrative is the case of suprabasic religious behavior. Much as such conduct may be rationalized and refashioned it still remains a persisting part of the person's reactions, even in spite of all the efforts of the individual himself to get rid of it. What is true of religious conduct is equally true of abilities, techniques, and other activities carried over from the infantile stages of personality development.

Importance and Prominence

On the whole, suprabasic responses are not very important or very prominent in the behavior equipment of highly developed individuals. In less highly developed personalities, however, they do form an emphatic feature of the total series of actions. Such lack of prominence and importance must be considered as decidedly relative with respect to the person's other behavior equipment. Reactions representing in a sense the maturation of the person, cannot be thought of as being very important. In complex personalities suprabasic activities are overshadowed by unique idiosyncratic reactions of all sorts. Similarly overshadowed are the suprabasic activities in simpler personalities by cultural conventional conduct, which in such individuals is by far the most distinctive of all their behavior.

Distribution

For the most part reactions developed upon basic behavior must, when considered as specific responses, be the unique possessions

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of particular persons. For it is not likely that different persons can have even slightly common family surroundings. In consequence not only will their respective basic behavior equipment be different but the added suprabasic conduct will be even more uniquely personal. Considered in their more general aspects we may expect that individuals who live under more or less common auspices will share such activities. Individuals coming from families who live in inadequately heated houses may build up in common basic dreads of such situations and carry over such recessive actions into their suprabasic equipment.

Number

In every individual's equipment there must be large numbers of suprabasic actions. Generally speaking, the exact number of such actions in the person's equipment will depend upon the continued presence in his surroundings of much the same fairly simple objects and situations as he was in contact with in his early infancy. It follows, then, that the individuals taken out of their early family conditions and removed to a very different sort of psychological surroundings will be relatively lacking in suprabasic actions. Emigrants at an early age whose family surroundings suddenly become very different will exhibit personality developments in which the three other complex human or societal responses will preponderate. Here we are prompted to suggest another condition influencing the number of suprabasic reactions in a given individual's equipment. Namely, no matter how constant the individual's surroundings remain, the prepotency of the stimuli for the development of the other three forms of societal equipment will crowd out the suprabasic reactions.

Unwitting and Non-Intentional Acquisition of Suprabasic Conduct

From our descriptions of suprabasic conduct it seems plain that the acquisition and number of such activities are directly contingent upon the presence of the proper stimuli objects and conditions. Persons have no initiative in the matter at all. No more is there present any intention or desire on the part of the person to add such behavior to his equipment. The mere fact of living among particular stimuli conditions in conjunction with the presence of basic reactions serves to induce the development of suprabasic activities.

From the conditions we have just observed we readily conclude that the suprabasic reactions are not acquired with any knowledge on the part of the individual who develops the activity. Such reactions merely grow gradually into the equipment of the person. No less unwittingly do such activities operate after they have become part of the person's equipment. Here again the mere presence of the stimuli elicit the responses.

Stimuli Factors of Suprabasic Behavior Segments

So far as the actual stimuli objects and conditions for suprabasic behavior are concerned there is little difference, if any, between them and the objects which serve as stimuli for basic activities. For instance, such stimuli objects and conditions constitute

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natural objects of all sorts, persons in their natural aspects, and in general, tangible things and situations of all varieties. One fundamental difference, however, is obviously found in the respective stimuli for the basic and the suprabasic activities, namely, that in the latter case the same objects serve in much more elaborate functional capacities. This condition follows of necessity from the fact that at this period of activity the person has passed through a considerably extended reactional history and has acquired large numbers of activities in his behavior equipment.

A very important process with respect to stimuli in the suprabasic stage of development is the carrying over of responses from the original basic stage. This means that in the suprabasic level the individual will endow those objects resembling basic stimuli objects with much the same sort of stimulational function and react to them analogously. A very good illustration of this situation is found in the analogous responses which children make to new words. They carry over grammatical forms from one type of word already known to another unknown. For instance, a child will say "morether" on the analogy of long and longer.

The Behavior Significance of Suprabasic Reactions

The present type of activity comprises actions which are possibly the simplest of all in the complex human or societal group. In a genuine sense we may look upon these suprabasic reactions as contributing the raw material for the development of practically all of the later complex behavior. It is through the individual's possession of these activities in his equipment that he is able to move about in his psychological surroundings and get into different contacts with objects and situations. As we have indicated already the capacity which the possession of such reactions gives the individual, is limited in scope, since it enables the individual to react only analogously to new objects and situations. In detail, this means that no matter how large and varied the equipment of suprabasic reactions may be the mere possession of them does not induce any initiative or originality of action on the part of a person. Nevertheless without such a foundation the individual could not move freely in his surroundings and develop all of his more complicated activities, since these reactions are the indispensable behavior links between the more primary basic actions and later complex human behavior. Without developing tastes one cannot become a *connoisseur*.

CONTINGENTIAL REACTIONS

The General Nature of Contingential Reactions

Possibly these responses may be best characterized by first differentiating them from suprabasic behavior. Briefly, contingential responses do not represent any very definite permanent equipmental activities; rather they are occasional and incidental, developed at the moment under the stress and need of a particular

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situation. They represent, however, complicated activities developed or occurring under intricate human circumstances of every economical, æsthetic, intellectual or domestic sort. Such activities are behavior events depending much more upon immediately contrived reaction circumstances than upon any specific behavior equipment. Here we have situations in which the person at the moment develops an adaptational response to meet some comparatively new and perhaps unfamiliar situation. How infrequently does a mechanic meet with a repair problem to which he can react precisely as he did in another situation! In practically every case he must contrive new modes of action to fit immediate individual conditions. Similarly, practically every one of our complex actions requires organization of effort contingent upon certain specific conditions.

It is important to observe here that contingential reactions constitute rearrangements and reorganizations of actions which already comprise equipmental reactions of the person. The point is, however, that these complex actions in themselves are not single particular reactions sufficient to serve as adaptations to well-defined stimulating conditions. Without the availability of the raw-material reactions the person could not contrive suitable responses to meet the immediate needs of the stimulus situation. Such raw-material reactions may constitute any or all of the types of behavior belonging to the individual's reactional personality. They may comprise reflexes of all sorts, basic conduct remaining in the individual's equipment, suprabasic reactions, as well as cultural and idiosyncratic behavior. Just which type and what number, as well as the actual combination of reactions, will function in any situation depends, of course, upon the specific conditions of that situation.

Contingential reactions may be considered in two phases. In the first place we might consider them as actions which are organized and developed at particular periods in order to meet stimulating situations. This is the phase we have been chiefly considering. In the second place there are activities which are not so much contingential in their organization as in their immediate operation. For example, the purchasing agent of a manufacturing corporation does not necessarily have to develop any new techniques of action at particular periods, but his customary activity is contingent upon whether supplies are needed at some particular moment and upon the type of supply that he is required to purchase.

Some descriptive value may be derived from comparing contingential reactions with the momentarily acquired behavior of the foundation stage of development. In the case of the latter we find that the needs of particular stimulating situations induce the individual to acquire suitable responses at the particular

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moment they are needed. In that situation the behavior basis for such acquisitions is the biological organization of the individual. Contingential reactions represent the same behavior situation in the sense of the organisms required to build up a particular response at a particular moment, but here the enormous complexity of the activity is such that the response is developed not upon the basis of the biological make-up but upon the basis of the person's psychological equipment. In contingential situations the individual draws upon all of his personality or behavior biography.

From our description of contingential activity it is manifest that such activities cover a very wide range of behavior. In the simplest situations contingential conduct operates to adapt the individual to comparatively simple objects and situations, such as we find in dressing to meet changes in weather, or in meeting the emergencies of driving along new roads or crowded familiar ones. The more complicated situations involve activities in which the individual must solve practical problems, and in general perform rational activities of various sorts.

Specific Characteristics of Contingential Reactions

We may enumerate the specific characteristics of contingential reactions by continuing the use of several of the same categories previously used. Incidentally we shall point out specific differences in these actions as compared with the other three classes in the societal group.

Contingential responses not essentially equipmental

Already our study of this type of action has indicated that one of its chief characteristics is that it is not in any essential way part of the permanent equipment of the individual. Rather, such activity is more definitely a function of the stimuli situations. This is not to deny, however, that to a certain extent specific instances of such action may be considered as process responses, since often they cannot operate without definite equipment being present. The differences, however, between such complex activities and the more elementary process reactions—as in multiplication responses—cannot be overlooked.

Strength

As contingential responses are not essentially equipmental but rather stimulational in character they cannot be unconditionally imperious or forceful in their operation. In other words, since such activities are functions of specific occasions, the force with which they operate depends upon the immediate stimuli conditions. When the latter demand it, the contingential reactions operate vigorously and inevitably. However, there is never any certainty that such activities will dominate the behavior life of the person at any particular time because his personality equipment may operate to prevent this.

For the same reason contingential responses do not have any great influence upon the operation or character of other reactions. Especially contingential behavior cannot modify to any extent the

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equipmental reaction systems nor add to their number in any effective way.

Permanence No question of permanence of such responses of occasion can be raised. As specific actions we may ascribe existence to them only as long as their occasioning stimuli operate. Upon the cessation of stimulation contingential activities terminate and do not carry over to any later period.

Importance and prominence Contingential reactions may be exceedingly important features of the person's general adaptation to his surroundings, since they symbolize numerous interactions with the shifting scene of his activities. As characterizing the type of individual who performs the action, however, the present type of behavior is not important, for it indicates only indirectly his behavior character or personality make-up. How little we may learn from the study of a person's contingential behavior is apparent from the consideration that while in some cases such responses may constitute an individual's most important contacts with his behavior surroundings, they amount in other situations to very insignificant activities.

Actually, the prominence of these actions in the total behavior of the person is on the whole exceedingly slight. For contingential behavior, although it may be of the most striking sort, is so only when the appropriate stimuli circumstances present themselves. As a matter of fact the occasions to respond to striking contingential stimuli are proportionately not very numerous.

Distribution Concerning the distribution of contingential responses we obtain information from their general description. Only those persons who are in contact with the same stimuli conditions and occasions for reaction can perform common contingential reactions. Their distribution depends therefore upon the presence of common contingential stimuli in the surroundings of individuals.

Number The number of contingential responses is exceedingly large. Possibly there are more acts performed by the individual determined by the surroundings than those prominently conditioned by his equipmental processes.

Witting Operation As we would expect there is always present a high degree of awareness on the part of the person in his contingential contacts with his stimuli surroundings. At the very least the acting individual must be alive to the occasions for action. In most cases also he must be highly cognizant of the specific conditions for response, for it is only in such manner that he can utilize his stock of reaction systems in order to respond to the stimulating conditions present.

Stimuli Situations for Contingential Reactions Naturally the stimuli for contingential behavior consist to a considerable extent of changing situations and circumstances rather than objects permanently fixed in an individual's surroundings. In every day's living human individuals must face numerous situations consisting of combinations of circumstances

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at particular times and places but which do not necessarily comprise any constant feature of their surroundings. Such occasional situations inevitably arise within every one of the individual's spheres of action. In the economic domain stimuli appear calling for responses as to how to proceed in making and using objects, in buying and selling them, creating and satisfying desires for particular things, etc. Similarly, in the æsthetic field, stimuli come into view demanding discriminating comparison, judgment, and appreciation of æsthetic objects, discussions of their relative merits, etc. In the intellectual field numerous attitudes, beliefs, criticisms, and assumptions must constantly form the reactional contacts of persons with their daily surroundings. Domestic life offers the individual thousands upon thousands of occasions to perform contingential responses, either as complexes of reactions present in one's equipment or as entirely new reactional contrivances dictated by the needs of the moment.

CULTURAL REACTIONS

General Nature of Cultural Reactions

Cultural reactions constitute very intimate and very definite features of the person's behavior equipment and are acquired in specialized types of behavior contacts with unique forms of stimuli conditions. They consist of both simple and complex actions to all sorts of human situations. It happens that whether the cultural reactions are simple or complex they are developed or acquired practically in the manner in which they later operate. In other words, they do not in their morphological character constitute gradual response developments but are acquired in all their complexity as definite modes of adaptation to specific intricate human environing circumstances. When we acquire the cultural reactions of worshipping, of thinking, dressing, believing, or of speaking, we acquire complete acts, finished ways of doing things.[1]

Cultural conduct is activity acquired in a fixed system of behavior conditions and stimulational circumstances. In effect this means that cultural reactions are acquired and function in a restricted human community. Such actions whether industrial techniques, table manners, religious beliefs or social prejudices, the individual acquires and uses as a member of a particular group. For this reason one does what the behavior conditions of the various groups demand with only such variation as arises from being a member of closely related or intermingling groups. But in each case the activities come to the individual as wholly formed

[1] This is not to deny of course that in the use of such actions practise is required for perfect performance. Thus when the individual acquires a particular language he must learn to utter his words and sentences correctly. Also in acquiring linguistic cultural conduct one can only gradually learn to employ the vocabulary in the completeness with which one finally uses it.

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and prescribed from some external source, rather than from his own particular experience.

Of such behavior groups there exists a very large number for each individual. In the final analysis these groups consist merely of the distinct sets of individuals who perform distinct modes of conduct. Some of the most outstanding of these groups are the national, political, religious, professional, social, and intellectual sets of people of a given community or number of communities. In each of these groups the individual acquires by virtue of his living and acting in them, a set of definite ways of speaking, thinking, believing, praying, eating, etc. Considered as entirely different groups, he develops in some his cultural industrial actions, in others his cultural religious beliefs, and in still others his national language behavior or professional vocabulary and so on throughout the whole series of groups of which he is a member.

Not only must we consider these cultural responses as group acquisitions of distinctly different types of human associations, but within each specific group such as the religious, professional, industrial and linguistic, we find smaller groups. Especially valuable as an illustration of this point is the linguistic situation. Not only does an individual speak a national language, such as English rather than French, but within this English group the individual always acquires localized or provincial cultural responses. These constitute the local or provincial dialect. Not only do such cultural language responses consist of the use of different vocabularies but also different pronunciations and grammatical usages. While language is an especially useful illustration the same conditions prevail with respect to religious beliefs, industrial techniques and practically all other cultural conduct.

So far as the institutions for such reactions are concerned they consist of objects and situations which take on very specialized stimulational functions. Thus for example objects are differently named by the members of the different groups. Also these different groups develop different beliefs with respect to such objects. As a distinctive name for such stimuli we adopt the term institution. Thus such natural objects as the stars, when they are reacted to as sacred, become institutions in the sense that they serve a common unique function for a particular set of reacting individuals. In surveying the specific field of cultural conduct we discover that no type of object or situation is extempt from taking on the peculiar institutional function through the conformity action of numbers of persons.

Specific Characteristics of Cultural Responses

When we attempt an enumeration of the specific characteristics of cultural reactions we find that they differ very markedly from those of the other behavior types in the complex class. As members of the same class, however, they are not without certain similarities both in character and operation.

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Artificial

Cultural reactions are distinctly artificial in character since they constitute cumulative growths of human conduct developing both in disregard of transformations of environmental circumstances, and of changes in the location and habituation of individuals to natural circumstances. Another way to state the artificiality of cultural responses is to point out that they represent purely conventional and formal modes of adaptation on the part of human individuals. The precise way in which these cultural reactions work is absolutely unpredictable from other kinds of data, such as biological, geological etc.

How we culturally dress, speak, think and act with respect to objects and conditions surrounding us varies tremendously from group to group of individuals, even though all the different individuals may live in the same climatic location, eat the same kind of food, speak about the same things, believe in the same kind of god, etc.

Accidental and Historical

Not only are cultural reactions artificial and conventional, but they are accidental and historical. They are historical in the sense that the particular form of any reaction may be traced to some other preceding form comporting with the general character of the institutional stimuli for such reactions. For example, the development and use of particular art reactions may be a very widely distributed mode of behavior among human individuals, but we may none the less be lacking data wherewith to determine anything about the primary origin of this special type of activity.

A general guiding principle concerning the history of cultural conduct is the existence and development of the stimuli for such conduct. Not only is cultural behavior made possible by the presence of such institutions, but these same institutions located among particular groups, supply a basis for the building up of peculiarities of stimulation, making for variety and distinction of cultural conduct. Typical here is the case of some language, English for example, which as it becomes diffused over narrower or wider geographical limits becomes very much modified in character.

Again, cultural reactions are accidental from the fact that we are sure that they have multiple origins. The conditions present in their origin and development are multiple in character. We have already indicated that cultural reactions are not entirely psychological either. They are accidental in the sense that there may be a contribution toward their development of natural, psychological, biological, geographical, commercial, and military conditions. For example, the kind of language a particular group speaks may be due to the imposition of military victors, the intercourse of traders, the advent of travelers, etc. Here again it is the presence of the institutional stimuli which makes possible the combinations of influence, making for the multiple and accidental character of cultural reactions.

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It must be added here that however accidental and historical the character of cultural conduct is, the individual's possession of such behavior is directly and very definitely determined by the existence of institutional stimuli in the places where the individual finds himself. There is positively nothing accidental about the individual's developing and performing cultural behavior.

Arbitrary

As cultural reactions are not necessarily adaptational they are in consequence arbitrary. They do not bring about any better relationship between persons and their natural surroundings. In fact they may be completely obstructive. To illustrate, although in some groups there is a population problem, in the sense that individuals are increasing much more rapidly than economic and hygienic conditions warrant, there may at the same time be practices and beliefs which interfere with any inhibition of population growth. In some cases there may not be any interference with the welfare of the individual or group but merely the absence of a positive advantage. In still other situations the cultural conduct may operate as positive biological or economic disadvantages. Such situations are illustrated by the foot and waist bindings of women and by the general industrial, social and economic wastes practiced by practically all complexly civilized groups. Cultural reactions may also be arbitrary from the standpoint of the æsthetic standard of some particular group or of any group. The art practices of persons of a particular group may be entirely inartistic from another viewpoint.

Similarly, cultural activities may be arbitrary from the standpoint of judgments of rationality. Such actions may be totally irrational and not in accord with any sort of logical principles. Finally, cultural reactions may be arbitrary from the standpoint of the immediately present or past practices and beliefs of the same individuals.

Strength

Cultural reactions usually are exceedingly imperious in their effect upon the individual's behavior. For example, present forms of cultural action, such as loyalty to oneself and others in the groups of which one is a member may be so strong in the individual that he would rather die than act in a contrary way. Such is for the most part the history of martyrdom. Again, the cultural reactions that are closely tied up with group interests or reactions that have been present in the individual's behavior equipment from earliest youth operate against even great opposition. Among such activities is the behavior called race prejudice, and intolerances of a religious, national and economic sort. With a tenacity and persistence duplicated only in the preservative reactions of a reflex type, one maintains the attitudes of the group, whether it be an economic or political viewpoint.

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Permanency and Dynamic Character

In considering the permanence of cultural conduct we may make a distinction between the formal and content phases of such reactions. By the formal phase we mean the more general features of cultural conduct which embody and perpetuate the name such as religious, artistic, economic, and other forms of behavior. The content feature of such behavior, on the other hand, refers to the intimate specific movements and performances constituting the actual appreciation or creation of an art object, or the act of worshipping, etc.

So far as the formal character is concerned we might indicate that some of our cultural actions are constant and permanent. Through the continuation of the stimuli phases of cultural reaction segments these activities are not only permanent features of the individual's behavior life but have endured from the earliest history of mankind. With specific activities such as particular religious and æsthetic action (these are the essential psychological facts) the duration is always brief. This temporary and modifiable character of cultural behavior well indicates its dynamic nature, in the sense that cultural responses vary in intimate details from year to year, and especially from generation to generation. The most obvious changes of course are found in the dress fashions of the European populations and also in the language activities of freely moving groups.

Fundamental Nature of Cultural Responses

Although cultural responses are not concerned essentially with the preservation of the individual, we find that much of our cultural behavior constitutes the functioning of the organism in a very fundamental and elementary manner. For it is such action that comprises a very large part of the distinctly human activities. This means to say that although cultural reactions are arbitrary and artificial they do constitute the intimate adaptations of persons to most of the specific conditions and objects of their surroundings. Not only do such activities comprise the more elaborate responses that correspond to historical institutional stimuli, such as religions, æsthetic and mythological things, but they also have to do with the intimate details of personal and private life. For instance, our cultural behavior involves methods and manners of eating, of sexual activity, methods of breathing, bodily carriage, etc. In such adaptations to cultural stimuli our anatomical and physiological equipment constitute the same means and instruments of adjustments as in every type of response. Cultural conduct is therefore a very fundamental feature of the person's total behavior equipment. As such these reactions have a large and central place in the person's behavior life.

Limited and Distributed Character

Cultural responses are essentially limited in their distribution. They belong to particular individuals of certain national, political, or geographical groupings. These reactions vary then with indi-

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viduals depending upon the isolation of their groups from the group locations of other individuals. Similarly, the actual number of persons who share particular forms of action with other individuals depends entirely upon the conditions which limit the presence of cultural or institutional stimuli to places where such or such another number of persons are found.

Here again we must distinguish between the formal and particular, or content phases of such reactions. Considered from a formal standpoint, we find that some of our reactions may be said to be universally distributed in the sense that all human beings have art, religious actions, and social organizations. When we consider the specific activities which constitute the cultural behavior, however, we find that these are exceedingly limited. We may turn to language again for a very good example. If we consider English to be the language in question, it has a very wide distribution, but when we take the actual psychological language adjustments which involve the English language institutions, we find a very limited distribution of them. Besides the very obvious differences between American English and English English we may consider in this connection the very different types of English spoken in the United States or England alone.

Quantity

When we consider the equipment of a person, that is to say, when we observe the number and kind of reactions which an individual comprises in his behavior equipment, we find that cultural reactions constitute as large a number—or perhaps larger—of these reactions than any of the other complex responses. In fact it is not far from the truth that about nine-tenths of all of our behavior consists of these arbitrary and accidental modes of adaptation which we acquire from other members of our group.

Importance and Prominence

Cultural responses may be so prominent among the behavior activities of an individual that they serve to mark off the person performing such actions as a member of a specified group. In other words, cultural activities may appear as the most prominent factors in a person's behavior. In this sense, of course, the importance and prominence of activities depends upon their variation from other kinds of behavior. And we find that among the most outstanding of our cultural reactions are those that differentiate individuals and members of well defined racial or national groups. Between the reactions of individuals who belong to the more restricted groups within the larger racial or national communities there is not so much outstanding difference or apparent importance.

Enforced Character

Cultural behavior may be imposed upon the individual in a very rigid manner; so that his actions of a cultural sort though artificial from a natural standpoint, are very definitely determined

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for him from a social standpoint. Only gradually and with difficulty can an individual deviate from group standards of action. This is especially true of homogeneous groups in which the cultural behavior is more or less standardized and the individual has no good chance of varying his activities. When the person does have a chance to alter his behavior this modified activity is very prominent and produces disturbances in the group. This point is made merely to illuminate the disciplinary and enforced character of cultural conduct.

As we have already indicated whatever opportunities the individual has to modify and to reject cultural behavior arises from his contacts with more than one group. In this manner the individual can change one type of action by analogy with another type, or by a deliberate comparison and choice of one in preference to another.

Formal Character

Cultural reactions are typical. They conform to some more or less definite description. This is true because, unlike other complex behavior, cultural reactions are not results of trial and error procedures on the part of the person. Much as he may modify the cultural reactions which he acquires from other members of the group, his reaction still maintains a very definite likeness to the original one. To illustrate, however much one's grammar and pronunciation may differ from the individual from whom one acquired one's language, still one's language retains a decided similarity to the original model.

Unwitting Acquisition of Cultural Responses

Cultural behavior for the most part is acquired and performed without the individual's knowledge that he is taking on a typical mode of behavior or that he is performing conventional actions. As a consequence, the acquisition and performance of cultural responses appear to the individual as normal and natural if not eternal. They are performed in a matter-of-course way as though there never could be any question whether one should acquire such behavior or perform it after its acquisition. Moreover, the unwittingness of such responses means that individuals are exceptionally sensitive to the current traditions of their group and so we think, believe, talk, as Christians, radicals, workers or whatever other groups of which we are members.

The Stimuli For Cultural Reactions

The stimuli for cultural reactions differ from those of our ordinary individual responses in that the objects or conditions constituting the bases for cultural stimulation, are in a sense officially or authoritatively, though not deliberately, determined by the activities of the group. In other words, the functional character of the objects is determined not by the manner in which the individual left alone responds to these objects but by the fact that these objects already have some kind of stimulational function. They already have called out standard reactions in other members of the group. The individual at present is merely building up

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similar reactions to the same stimuli and therefore his reactions are like the reactions of the other individuals. This means that he is merely attaching the same reactions to institutional stimuli in the identical way that his predecessors have done.

As in the case of other stimuli these social stimuli may involve the same sorts of physical objects, conditions and events, but when these objects are institutional stimuli their functions are on the whole more elaborate than is true of the stimuli for any of the other societal activities. Moreover, cultural stimuli functions are distinctly more artificial and arbitrary; that is to say, the functions may have as little basis as possible in the actual natural properties of the things to which persons react. Rather, the stimulational functions are determined by the traditional conformity responses which accrue to the stimuli objects because of the way they are reacted to.

The point just made suggests a decidedly characteristic fact concerning institutional stimuli, namely, that besides consisting of things and situations of all sorts, institutional stimuli comprise a large percentage of actions of all kinds. Possibly it is the flexibility and modifiability of actions and their susceptibility to all sorts of reciprocal influences that fit them so well to be factors of the arbitrary and artificial conduct that constitutes cultural behavior. On the other hand, behavior institutions are almost as well adapted as natural objects to persist and form the tangible stimulation basis for generations of cultural conduct.

The Significance of Cultural Reactions

When the person acquires, as he inevitably must, an equipment of cultural reactions these activities make of him the kind of social person he is. They determine to what class of cultural individuals he belongs. This fact follows because the cultural responses constitute ideas, beliefs, habits of action, mannerisms, etc. The particular set of cultural responses, then, that the individual acquires, marks him off as belonging to specific groups having particular ideals, fears, superstitions, ambitions, etc. Thus, on the basis of various attitudes and tastes individuals are differentiated from each other as possessing Oriental attitudes or Western European attitudes concerning life in general, or political, social, economic and religious phenomena. The same is true for other kinds of human groupings. Consequently intellectual, moral, and æsthetic characteristics depend upon the particular kinds of cultural institutions flourishing in the places where the individuals are born or become nationalized.

Within particular communities also, whether national, political, religious, or intellectual, the individual's possession of a given complement of cultural behavior equipment marks him as a member of a particular level of a given cultural group. Possibly the most striking instance of such societal differentiation is that which

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marks off the persons belonging to the male and female sexual groups. Women have equipments of tastes, skills, capacities, social, and moral conduct which most effectively separate them off from the men of the community. These sex group equipments differ most profoundly, of course, in the different national and geographical communities.

Furthermore, not only does the person's complement of cultural behavior equipment identify him, but this also accounts to a very considerable extent for the motives and provocatives of action which guide him through the maze of personal and group behavior. It is such behavior equipment that accounts for his participation in æsthetic action involving tastes, preferences, judgments, and appreciations, in economic activity requiring choice, technical proficiencies, etc., in intellectual and moral conduct calling for inferences of various sorts, and conformity.

Acquisition of Cultural Reactions

As a consequence of the formal and stable character of institutional stimuli we face a definite problem of acquisition in the study of cultural behavior. In brief, we may point out that our cultural reactions are acquired by a more or less definite process which we call culturalization. To a great extent this process parallels the general acquisitive processes constituting the subject matter of genetic psychology. In other words, we may indicate here that the individual at birth finds himself amidst certain institutional conditions to which he immediately begins to develop particular conformity responses. This acquisition or culturalization process is inevitable. That is, the person is bound to be the kind of individual that his institutional stimuli dictate. But the rigidity of this process depends, as we have already suggested, upon whether there are or are not alternative institutions present. The latter situation is undoubtedly frequently the case. When alternative institutions are present the sort of cultural reactions the individual will develop depends upon the interrelationship between varying institutions. Sometimes this may almost amount to choice of certain institutions by the individual.

Besides the rather inflexible casual acquisition of cultural behavior equipment the person is also subject to a dictatorial and prescribed culturalization procedure. In the latter case various schemes are employed by the members of the various groups to induce individuals to build up such reactions as they demand, and to perform them. As instruments for inducing the development of prescribed forms of culturalization equipment the schools, laws, and various forms of organized opinion are extensively employed. All of these instruments of culturalization are successfully manipulated to the end that persons acquire exceedingly numerous, specific, cultural responses in addition to the other actions falling under the classification of societal behavior.

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IDIOSYNCRATIC REACTIONS

General Nature of Idiosyncratic Reactions

In many ways idiosyncratic behavior segments constitute the most complex and unique of all the types that we have put into the class of complex human behavior. In general, idiosyncratic responses are the most vigorous and most independent actions which the individual performs with respect to surrounding stimuli objects.

Most vigorous we call these types of action because in performing them the person makes pronounced responses resulting in the taking of striking attitudes toward objects and situations or in bringing about decided transformations in stimuli objects and conditions. Idiosyncratic reactions are independent. They represent a greater contribution on the part of the person to the occurrence of the behavior event than is supplied by the immediate stimuli objects or situations. To illustrate, a typical complex idiosyncratic action is the solution of a problem by the person. Now in such behavior events we find that, if the problem is to be solved the ways and means of doing so must be supplied by the individual on the basis of his reactional biography and present behavior equipment rather than upon the basis of clues supplied by the specific problem conditions or their settings. Our illustration also indicates why we may call such actions original and unique. Another characteristic of idiosyncratic reactions is that they are the most radically individualized activities of persons in every case. It is to be expected, then, that they are on the whole the most intimately personal of all our conduct. Finally we may point out another characteristic, especially of the more complex idiosyncratic responses, namely that they are reflective in character and thus represent the individual's critical and analytical contacts with surrounding objects and conditions.

In addition, idiosyncratic reactions may be described as the most typically human of all the societal responses. For they are not only examples of activities which are too infinitely complex for infrahuman animals to perform, but they require for their performance what are essentially human modes of psychological functioning. Idiosyncratic reactions constitute the deliberate, constructive, transformative, introspective, and retrospective adaptations of individuals to their surroundings.

As we have already intimated, idiosyncratic activities may be subdivided into two types or degrees. On the one hand, the originality and independence of such actions depend upon the person's possession of a unique behavior equipment acquired in his own personal contacts with his psychological surroundings. On the other hand we have a reflective contact with objects and situ-

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ations based upon an introspective and retrospective analysis of one's own behavior equipment and past contacts with similar or analogous situations.

An important characteristic of idiosyncratic behavior is that every concrete instance of such conduct depends in an extremely singular way upon the individual's behavior equipment. Not only is the actual action which the person performs based upon the particular equipment which he has acquired in his previous contacts with similar objects and situations but such actions are still further based upon a deliberate use of that behavior equipment. He deliberately employs his knowledge, desires, tastes, and other equipment in order to adapt himself in some particular way to objects and conditions.

Better to appreciate the nature of idiosyncratic actions we may compare such activities with others of the societal level. We find that idiosyncratic behavior differs from cultural conduct (which seems to show the closest similarity of any type of behavior) in that the former actions are the unique acquisitions of the individual. Idiosyncratic actions are not acquired as cultural responses are, through the almost inevitable influences of conditions which by their very existence in the behavior situations of the individual make his acquisitions of cultural responses necessary. On the contrary, idiosyncratic responses depend for their acquisition upon the initiative of the person and much more upon his already possessed behavior equipment than upon stimuli conditions. As compared with suprabasic reactions the emphasis in idiosyncratic behavior must be placed upon the mode of origin, since in both types the equipment origin is to be stressed rather than the stimulational influences important in cultural conduct. As over against the suprabasic reactions in which the new elaborate activities are determined by the prior basic acquisitions, the new activities following almost as a matter of course, in the case of idiosyncratic actions the person's initiative and activity are of primary importance.

Unlike the contingential responses the operation of idiosyncratic actions is conditioned very decidedly by the types and conditions of the individual's equipment. Not only does the presence of equipment have a bearing upon the action to a stimulus, which is also the case in contingential actions but in addition the specific and characteristic features of the behavior equipment are significant factors. In the former case the equipment has a bearing merely upon what kind of stimuli objects and conditions the individual will react to when occasion offers. But in the idiosyncratic behavior situation the intimate details of the type of response offered must also be taken into serious consideration.

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Specific Characteristics of Idiosyncratic Behavior

The enumeration and description of the specific characteristics of idiosyncratic behavior stresses and elaborates the general description of such conduct and serves to emphasize the differences between such activities and the other members of the same class.

Idiosyncratic reactions are especially relevant forms of activity. They are relevant both from the standpoint of the behavior equipment of a particular individual and the specific stimuli situations with which he is in contact. Idiosyncratic reactions are developed not by imposition through residence in a particular community, nor yet because of the fact that the person has undergone general previous experiences and behavior development. Because

Relevancy

the idiosyncratic activities are developed in a person's self-initiated manner of reacting to objects and in his critical appreciation of the results of such action they appear to be especially fitted to the situations in which they operate. Such relevancy we should naturally expect when we consider that idiosyncratic activities include the most deliberate forms of behavior of the complex type.

Strength

Such complex actions as we are now discussing naturally vary tremendously in the strength with which they operate. Such force as they have must depend upon a number of particular conditions. In the first place, the force with which we take an intellectual attitude or criticize some situation is owing to the facts that not only does the individual have such critical attitudes in his behavior equipment, but also to the circumstances and types of situation under which he has acquired them. Again, the strength of the activities of this type will depend upon the particular stimulating conditions under which they presently operate. If the situation calls for decided individual reaction we may expect such reaction to occur, while otherwise the person may be indifferent to his surroundings. Once more, the strength of operation of idiosyncratic reactions depends upon whether they actually are confirmed factors in the person's behavior equipment or whether they are activities which are now only developing as equipmental responses. When one is just becoming critical of certain conditions one is not very forceful in the attitude taken toward the critical situation. Finally we might point out that the strength of idiosyncratic reactions is contingent upon the individual's interest in the general situation. A person's critical or constructive responses to conditions depend upon his permanent needs and desires, and upon such needs as arise in the immediate circumstances.

Permanency

In one sense idiosyncratic conduct is not equipmental and thus does not even involve the question of permanence. On the whole only the behavior of an individual which is acquired without his deliberate coöperation, namely, through the existence of certain conditions forcing the activities upon him, is a permanent feature

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of his equipment. Idiosyncratic activities are not so developed but are acquired through the existence of particular conditions especially pertinent and important to the acting individual and to which he reacts in an original and personal way. Such conditions normally cannot remain fixed; so that in general idiosyncratic reactions may be considered as among the least permanent features of any of the person's complex activity.

Importance and Prominence

In some ways idiosyncratic reactions constitute the most important of human activities, marking as they do the most unique and personal conduct which individuals perform. This statement of fact is equivalent to saying that idiosyncratic actions operate in the most complicated and most delicate of circumstances, circumstances calling for the person's most refined and subtle behavior. Among such subtle and refined reactions are the individual's reminiscences of interesting and important events, his intimate likes and dislikes, etc. Necessarily then, idiosyncratic reactions are also very prominent features of the person's reactional contacts with his surroundings. It must be pointed out, however, that the prominence and importance of such activities refer to a particular level of behavior, namely, the social, intellectual, and æsthetic situations which are met with only by the most highly organized psychological individuals.

Distribution

Idiosyncratic reactions considered as specific adjustments can have no wide-spread distribution. For as we have so frequently pointed out they constitute the unique personal responses of particular individuals. Unlike cultural reactions which definitely have distribution among all the members of specific groups, idiosyncratic activities may be possessed by only a single individual and no others. Because of their personal character idiosyncratic reactions may, however, be found in common in the behavior equipment of individuals of widely different communities. For example, we may find persons from very different groups, from different economic levels who have common intellectual interests and tastes of a particular sort.

Fundamental

From the description of the development and operation of idiosyncratic behavior we may conclude that such activities are only in special ways fundamental characteristics of the person's behavior life. The development and operation of such activities depend upon too many precarious factors to permit us to conceive of them as bases for predictions. Such behavior does not constitute essential reactional characteristics symbolizing a person who is individually different from other persons. In this sense idiosyncratic actions are strikingly different from cultural reactions which separate persons as members of definite groups. In another and more general sense idiosyncratic reactions are fundamental in that we may well mark off individuals from each other on the basis of whether they do or do not perform such complex, self-

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initiated action. We may also consider such activities as fundamental in that they are especially influential in the acquisition of other types of behavior.

Artificial and Arbitrary

Like the cultural reaction the idiosyncratic response may also be artificial and arbitrary, with this distinction, however, that in the case of cultural reactions the artificial character of the responses is due to a cumulative growth of stimulational function. That is to say the cultural activities develop as they do primarily through the continuation and modification of institutions which keep alive specific types of responses. In the case of idiosyncratic reactions, on the contrary, their arbitrary and artificial character is owing primarily to the extremely individual and personal activities of the individual who performs the action. But just as in the case of the cultural reactions, idiosyncratic behavior displays modes of responses which sometimes are not at all in conformity with the biological and other natural conditions of the behavior situation. In some cases, of course, this may mean, more often in the idiosyncratic situations than in the cultural situations, that the action is better suited to biological and other natural conditions than would be the case with actions developed primarily on the basis of the needs of such situations. Here again there is a contrast between idiosyncratic and cultural reactions, for in the latter case the behavior which is in accordance with natural conditions seldom if ever surpasses in effectiveness reactions normally built up to natural conditions.

Quantity

In spite of the fairly precarious and many conditioned character of idiosyncratic reactions it is probably true that in individuals of complex behavior development and equipment the number of idiosyncratic forms of reaction is very large. This distribution and quantity must be different in different types of individuals. There are some persons who live almost entirely behavior lives of conventional, cultural sorts, and who alternate their conventional with their contingential reactions but who possess an extreme minimum of idiosyncratic forms of conduct. On the other hand, as we have suggested, individuals of complicated personality equipment must possess enormous numbers of these personalized actions. They have their own individual forms of belief, tastes, thought, reasoning and intellectual attitudes of all sorts concerning the objects, institutions, and conditions among which they live.

Unwitting Development

Although idiosyncratic reactions number among their classes the most deliberate reactional activities that we possess, still in some instances these idiosyncratic reactions may be acquired by the individual without his coöperation or consent. In some cases the person is led to acquire activities of a peculiarly personal and unique sort but which have not been critically tested and accepted with respect to their value or fitness. As instances of such behavior we may cite the relatively simple mannerisms of carriage

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or speech as well as more complicated social and æsthetic attitudes.

The Stimuli for Idiosyncratic Reactions

In addition to the fact which has already been mentioned, namely, that the stimuli for idiosyncratic reactions must be objects and situations which are the intimate surroundings of the individual we may consider some other essential facts concerning such stimuli. One of the most important points is that idiosyncratic stimuli usually would not and very frequently could not be the behavior surroundings of other individuals, since in a very peculiar way such objects only become the arousers of actions in a specified person because of the particular types of acts he already possesses in his equipment. To illustrate, some of the prominent forms of idiosyncratic stimuli are the personal beliefs and attitudes of an individual which are not even known to any other person. It is for this reason that persons see things differently and understand things in unique ways. Different individuals, in other words, react to the same objects in exceedingly specialized ways because those objects through idiosyncratic contacts of individuals take on very intimate unique stimulational functions.

When we attempt to enumerate the different kinds of objects and situations functioning as idiosyncratic stimuli we must consider as prominent forms of such stimuli the responses of the acting person himself. Thus we might indicate that an individual's own mode of thinking, ways of believing, as well as his own personal habits of all sorts, constitute stimuli for the unique responses that he performs. Again, a large number of the stimuli for idiosyncratic behavior comprise activities of other persons. For instance one person may have particular attitudes toward the reacting individual and such attitudes when communicated or otherwise made manifest to him constitute stimuli for his action.

Among other specific types of idiosyncratic stimuli we may consider events and situations which are phases of the private life of persons, and as such can in no sense be shared by other individuals. Very striking illustrations of such situations are the affective responses, especially with respect to persons of one's own or opposite sex, as well as the advances in thought and art which at some periods comprise the unique activities of single scientists, scholars, or artists.

The Significance of Idiosyncratic Responses

Need we stress further the exceptionally significant type of conduct idiosyncratic behavior represents? As we have sufficiently intimated it is the idiosyncratic actions which give the individual his distinctly human as well as his distinctive individualistic character. Especially is such behavior at the basis of effective performance, and reflective types of action. Possibly the most distinctively human of our activities in the sense of being the most elaborate and deliberate of our actions, are subsumed under the idiosyncratic heading.

More specifically can the full significance of idiosyncratic behav-

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ior be inferred from the fact that it is such conduct which constitutes all of the original thinking of a person, such as his possession of ideas and attitudes toward himself and others. Idiosyncratic actions are critical. Our unique comparison and discrimination of things with respect to their own constitutive elements or their comparison and contrast to different things, are illustrations of idiosyncratic behavior.

Further idiosyncratic examples are inventions of all sorts and the development of new processes and techniques. In many cases, however, inventions may consist of the slow accumulation of activities common to a number of individuals, but all special inventions, all unique discoveries, insofar as they represent psychological behavior may, however, be considered as idiosyncratic types of action. In general, the creative powers of persons in whatever field of behavior must be looked upon as idiosyncratic modes of response, rather than any other sort.

As compared with cultural behavior which holds the individual down to particular group levels of all sorts, idiosyncratic action makes for progress not only of the individual, but through him, of the group also. For it is idiosyncratic reactions which are productive of changes of all sorts in human behavior and circumstances. That the frequently occurring idiosyncratic responses do not bring about more progress in human activity from any particular standpoint we may judge it, is explained by the fact that such changes are always counterbalanced by repressive modifications of such reactions.

In a significant way idiosyncratic behavior also comprises all the genuine moral behavior of individuals, since such action must be responses uniquely determined in specific circumstances on the basis of the person's previous behavior development and equipment, in addition to the stimuli conditions. When the latter are conventional or so standardized as to allow for no choice or initiative, of course no idiosyncratic moral behavior is possible.

In the response to all these types of complex creative, moral, or progressive human situations we discover that the idiosyncratic form of societal behavior operates along with contingential responses rather than with any other type of complex human or societal action.

In concluding our discussion of the complex human or societal reactions we must add a word concerning the specific activities which may be classified as such behavior. We must be careful to observe that any particular action of an economic or æsthetic type, for example, may be a specific instance of two or more types of societal behavior. That is, such action may be at the same time idiosyncratic and cultural, or idiosyncratic and suprabasic. In such a case we find usually that the specific action as idiosyncratic represents the original stage of behavior. To illustrate, an in-

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dividual performing a specific religious reaction may be performing a conformity cultural response, and at the same time still be doing it in a unique and original manner of his own, perhaps in contrary manner to the expected form of behavior. This same situation may prevail with respect to every type of action.

Language responses which so often prove to be excellent examples of the complex intermingling character of human behavior, serve in this instance also to give us an excellent example of how a particular type of action can be classified under all four societal headings. For instance we might find that a language response is suprabasic in the sense that we have an expressive reaction of a complicated sort developed on a foundation of the infantile basis of action. This action is at the same time contingential when we consider that the individual is saying a particular thing conditioned by the presence of a given linguistic stimulus. Also such a reaction is cultural in the sense that the response consists of a conformity vocabulary and a localized idiom with a distinctive grammatical characteristic besides a particular stress and pronunciation. And finally our language behavior may at the same time be idiosyncratic, in the sense that it represents a unique personal mode of reacting to the particular situation on the part of the answering individual, even if such unique activity consists mainly of the referential character of the words employed.

It is hardly necessary to add that if a specific action such as language can belong to all four types of societal conduct that no class name of any action implies that that action belongs only to that one class.

With the description of complex reactions we conclude our general study of the primarily genetic character of psychological phenomena, that is to say, genetic as they result in the building up of the personality equipment. Our next step, then, is to make a thorough analytic study of a number of the more important types of behavior segments and reactions systems. Probably with a view to logical organization we will begin this analytic study with the attention reactions. Accordingly, these activities will constitute the subject matter of our next chapter.

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Doubtless it is owing to the historical influence of the physiological tradition upon psychology that virtually nothing has been done to further the study of the complex, distinctly human reactions. Psychology has not even penetrated the outer surface of æsthetic, social, economic, religious, and similar human or societal responses.

This is not to say that such activities have not come under the notice of psychologists. As a matter of fact, Wundt has built up a complicated system in ten volumes, of what he calls "*Völkerpsychologie.*" This material, however, merely takes over ethnological data, to which Wundt adds the conception of a structuralistic psychology. Briefly he attempts to point out that just as in the ordinary, physiological psychology he can trace out the combination of simpler elements into more complex elements, so in the case of folk psychology he can show that religion, language, art, custom, etc. as psychological facts are complications of mental states, the totality of which makes up a group mind, just as simpler organizations of mental states compose a complex state of consciousness. Analogously to the individual psychological phenomenon in which the state of consciousness is manifested in a physiological response, so the group consciousness is expressed in the production or creation of worship, myth, language, law, custom, etc.

As we have indicated there is no actual handling here of concrete psychological facts in the sense of a study of actual interactions of persons with stimuli. Instead we have what is practically a metaphysical theory of a creative synthesis of simpler mentalities to form a group or universal mind. The result of Wundt's activity in this domain is inevitable. It is obvious that such complex ethnological phenomena as he deals with cannot readily be connected with physiological processes, and so to a considerable extent for Wundt folk psychology has to be a very different type of discipline from general psychology. Incidentally it may be pointed out that Wundt makes no place for different cultural reactions of individuals in a single ethnic or national community. As we have indicated Wundt's material is derived from the anthropologist and in consequence it is folk (group) rather than cultural reaction material.

Another line of development for the handling of complex human and societal activities reveals itself in the form of an attempt

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to treat and explain such activities as the result of a certain limited number of processes, such as imitation, consciousness of kind, suggestion, etc. But this development hardly touches the problems of an objective psychology.

In striking contrast to these treatments of complex behavior, we have attempted to study such activity as actual responses of individuals exactly in the same sense as any other kind of activity. The result of such an analysis as we have worked out in the present chapter, indicates the specific differentiations between the behavior situations in which complex reactions occur as over against simpler responses. Incidentally this study has thrown considerable light upon the great variations in stimulating conditions. An advantage accruing from this method of handling the data lies in eliciting the fact that not all our complex conduct is cultural in character, but that we perform at least three other types. This result indicates a clear line of demarcation between the psychological study of complex conduct and the ethnological handling of human facts, even when the latter can be made definitely psychological in character.

For more detailed studies of various phases of the cultural type of complex human reactions consult the writer's following papers: "An Essay toward an Institutional Conception of Social Psychology," *American Journal of Sociology*, 1922, 27, 611–627, 758–779; "How is a Science of Social Psychology Possible?" *Journal of Abnormal and Social Psychology*, 1922, 17, 62; "Concerning Some Faulty Conceptions of Social Psychology," *Journal of Philosophy*, 1923, 20, 421; "What are the Data and Problems of Social Psychology?" *ibid.* 449.

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CHAPTER VIII

ATTENTION BEHAVIOR AS THE ACTUALIZATION OF STIMULI

What are Attention Reactions?

On the intimate functional side attention activity consists essentially of a process by which the objects and conditions in the person's surroundings assume their particular stimulational functions. Through the attention action the objects surrounding an individual become actualized into stimuli which call forth responses to them. In general, every specific attentional process, namely the actualization of a stimulus object into a stimulus, is a result of a definite historical development in the lifetime of the reacting individual. In the first place, attentional reactions presuppose the prior[1] transforming of objects into stimuli objects, in other words, a prior attentional process. This means to say that the person has been in contact with objects so that they have taken on specialized functions and become for him stimuli objects, that is, objects to which he performs specific forms of action when those objects stimulate him. In just what ways (for there may be several) such objects will stimulate him depends upon his reactional biography, the acquisition of reactional equipment, insofar as it involves the particular objects in question. Also what particular stimuli objects of all those surrounding him become stimuli at any particular time, depends upon immediate specific behavior conditions.

Once the surrounding objects have taken on stimulational functions they may be said to have entered into a psychological relation with the given individual in addition to the non-psychological relation of merely constituting his surroundings; so that in the future these objects can at a particular moment change in their

[1] Prior as a general rule, but there must also be attention to the objects while they are first being made into stimuli objects, in infancy, say. And so apparently attention reactions must also occur while the objects are becoming stimuli objects. The solution of this seeming difficulty is that doubtless we have here a progressive development of simpler actions to things, into more complex actions; so that the process of an object becoming actualized into a stimulus object really involves an attention act to an already present simpler stimulus object, along with the development of a more complex stimulus object which is to make possible in the future another type of attentional action. All this assumes that the attention reaction is a distinct response, but as we shall see, this is not always the case, for when the attention is merely a phase of a single reaction system no process of prior stimulus object development is involved.

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relations to him from the non-psychological relation of being present to the psychological relation of being responded to. Before the individual can perform any sort of psychological response to his surrounding objects, persons, and conditions, he must get into such a psychological relation with them. He must actualize the latent stimulational function of those objects and thus make them into stimuli. This is essentially what we discover upon analyzing the event which we ordinarily refer to as attending to an object.

Attention reactions are then indispensable preliminary [1] reactions to all psychological conduct. Only after a stimulus has been actualized can the person proceed with the performance of whatever response is elicited by the specific stimulus. In this sense attention reactions are not only preliminary but they are definite preparatory actions. They function to prepare the individual for whatever type of action is to follow. In more complex behavior situations attentional reactions are more than preparatory, they are in a genuine sense anticipatory of some immediate future and further response. Listening in its various degrees of efficiency is preparatory to the hearing of what is said, and in a secondary way, to whatever act follows the hearing.[2] Among the various postures of the catcher in a baseball game many constitute actual and deliberate anticipatory actions operating to make more effective that individual's participation in the game.

Whether attentional reactions are preparatory or anticipatory, in each case they constitute auxiliary responses which are not only essential for the actual performance of a psychological activity, but also are necessary to increase the efficiency with which reactions are made. In themselves these auxiliary attentional reactions do not constitute adjustments to the objects and situations which perform stimulational functions. Whatever the attentional responses contribute to the various adjustments of the individual, they accomplish by placing him in specific contact with things necessitated by the reactions he is to perform with respect to them. In other cases the attentional reactions put the individual in more advantageous relation to objects than he now is in. Consider the opponents in a tennis match, each supremely alive to the slightest movements of the other, balancing themselves, manœuvering in various ways and in general striving to achieve the best position for responding (striking ball) to the movement and ball stimulus which the opponent is about to offer. Upon analyzing any such complex behavior segment or situation we can more or less easily trace out the distinct attentional auxiliaries for the whole series of events.

[1] Preliminary where only one behavior segment is involved. In complex behavior situations the preliminary acts may also parallel some responses of other behavior segments.

[2] The latter reactions may also require preparatory attention responses.

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Attention reactions are always concrete responses. In fact we can satisfy ourselves that they comprise specific reaction systems. With ease we can analyze all the factors as in any typical reaction unit. The actual behavior feature of attention reactions is frequently overlooked because of their subtle operation and because as a rule we center our observations upon the adjustment act rather than upon any auxiliary or preliminary response.

What particular sort of action the attention response happens to be in a particular case depends upon the specific function the attention act serves. Since, in general, attention reactions are activities of the organism which facilitate behavior and make the person more effective in his adaptations, the specific attention reaction systems must vary according to behavior conditions. They may consist of postures, attitudes or sets of various kinds. They may be shiftings in positions whether of the whole individual in relation to objects or merely slight movements of the head, arms or shoulders, or more complex acts. The coördinate types of attention action which are found in various activities may be well illustrated by considering the development of behavior from infancy to maturity. Constituting the early attention acts of the infant are large performative movements which correlate with bulky gross objects and conditions. As the person develops and becomes surrounded by smaller and more subtle stimuli the attention actions become less and less massive.

Precisely how stimuli objects are actualized into stimuli also depends upon specific situations. In some instances this process merely consists of the person changing his status of not doing anything in particular, that is to say, merely sitting or lying down, to a more active contact with things around him. Thus perhaps by unwittingly turning in the direction of some particular thing that object will as a consequence stimulate him to perform some response to it. In other situations the person may very definitely stop reacting to an object in order to respond to some other object or situation. This stoppage of action may be owing to the shift of objects in the person's milieu, so that new things and conditions appear upon the horizon. Or, it may be the result of some condition which induces the individual to anticipate the appearance of an object or otherwise to hasten its performance of some stimulational function. In probably all cases the performance of the psychological function is centered in the non-psychological shift of position respecting the relation of the stimulating objects.

Now it is to be carefully observed that while we are deliberately stressing the attentional acts of the person the entire attentional event consists of a coöperative process on the part of the stimuli objects and persons. Both features must operate together and simultaneously in order that the attentional event shall transpire

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at all. True it is, however, that in most cases either the stimulus or response factor appears predominant in the event. Thus, in comparing the situation in which the person brings out the stimulational function of an object by anticipating its appearance, with the condition in which he makes the object function merely because it happens to present itself, we find a definite predominance of influence on the side of the objects in the latter case, and on the side of the acting person in the former situation.

Biological Origin of Attention Activities

Considering the psychological organism as a phylogenetic development from a simpler biological organism, we might trace out the hypothetical development of attention responses from the individual's vague organic movements. These are not sufficiently organized with specific stimuli to be called psychological acts. Such biological movements are in fact merely conditions of sensitivity. Every normal organism by virtue of its living character is sensitive to modifications in surrounding conditions, and responds accordingly.

Such activity may be thought of as merely maintaining a biological balance or coördination between the organism and its surroundings. The surroundings at this stage constitute the gross ecological (food, shelter) conditions which influence the variability of the organism. Now when the biological individual becomes more highly developed and organized, its surroundings develop functionally, becoming specific things, and as a consequence require more definite modes of adaptation. Consequently, in the developing acquaintance of the individual with objects, with his own organism and its needs, his actions become organized and interrelated with particular objects and conditions at particular times. All of this leads to a definite alertness on the part of the individual, since he now comes into contact with so many and such different objects. In its most complicated form the result of all this sensitivity amounts to an anticipation of the different possible stimuli to be met with. In still more complicated situations the individual may also anticipate his own reactions to stimuli. Clearly when the individual reaches the stage of performing activities which have previously been organized with respect to particular qualities and other characteristics of objects and situations, we have definite psychological attention conditions.

The Fundamental Psychological Bases of Attention

The particular characteristic of attention phenomena may be most definitely traced to two of the general characteristics of all psychological behavior, namely, inhibition and integration.

At least some forms of attention reactions, mainly of the complicated type, have a definite psychological basis in the inhibition of action. As we have pointed out, a fundamental principle of attention is that the individual checks and totally stops his reactions to some stimuli in order to respond to other stimuli

Inhibition

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objects or conditions. Here we have a definite inhibitory situation, influenced and conditioned by particular factors operating in the case of any particular attention activity.

Integration

In order that the organism can react in a preferred way to particular objects and conditions in its surroundings it must have much of its activity integrated into larger acts than those representing specific sensitivity and movements to particular qualities of objects. Also the acts of the individual must be integrated into larger units than constitute responses to single objects or conditions of various sorts. So we might indicate that the psychological principle of integration must operate in both the very elementary developments of attention reactions and in the later complex operations of such auxiliary precurrent behavior.

The Place of Attention in a Segment of Behavior

As a preparatory efficiency response the attentional reaction must always be an essential factor in all behavior segments. Unfortunately, however, because attentional responses are most frequently subtle in their operation they elude observation. It is especially important, therefore, to note their actual place in all behavior segments. Most guardedly must we prevent the confusion of the attentional response with some phase of an action following it in the series of processes constituting a complete behavior pattern. Especially prone are we to overlook the essential place of attention in behavior segments when the complete behavior pattern comprises only very simple rapidly occurring responses such as the fleeting perceptions of reading or conversational language.

What we are insisting upon, then, is that, be the attentional reaction ever so subtle and imperceptible in its functioning, we must not fail to accord it its proper place in the behavior segment. All too frequently the attentional reaction is slighted by referring to it as an attitude or posture in the sense of a shadowy happening, undeserving of the dignity attached to the name reaction. But it is a reaction nevertheless and as such we must regard it.

Following upon the performance of the attentional act the perceptual reaction system occurs. The attention phase of the behavior segment definitely precedes the perceptual reaction system. Howsoever rapid both of these features operate we must still insist that there is as much difference between the attention and perception features as there is between the attention reaction and some overt final response. To a certain extent the distinction between the attentional and perceptual reaction systems may be attested by the distinct functions which they serve in the behavior segment. Succinctly this distinction may be summarized in this way. Attentional reactions determine whether the organism will perform a given reaction at all. In

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plainer words, before we can respond at all to an object we must perform an orientation reaction with respect to it. In some cases, as we have seen, this means stopping whatever act we happen to be doing at the time and getting set for the new stimulus object. This process of getting set is the attention reaction system proper.

The perceptual reaction, on the other hand, comes next in the series as a complete or partial [1] determiner of the final reaction system. What the character of the final reaction shall be depends of course upon the character or setting of the stimulus object. Now it is the perceptual reaction system which operates as an identifying and distinguishing mode of conduct. Functioning as such the perceptual reaction system constitutes the cognitive feature of the behavior pattern which connects up the final response and the stimulus.[2]

But our interest here is to point out that the attention reaction system is a distinct and indispensable feature of the total behavior pattern. Without the prior attentional response neither the perceptual nor final act can occur. As a matter of course, therefore, the attentional reaction precedes final reactions of response patterns as well as all other reaction systems.

The Analysis of an Attention Act

Since an attention response is a concrete form of behavior in principle similar to any other type of reaction, we may expect that an analysis of an attentional reaction system will disclose the same number and general kind of component factors. Such is precisely the situation.

The attentional reaction system comprises specific muscular functions of all varieties depending, as in all other cases of psychological action, upon the individual's reactional biography and his previous and present stimuli conditions. Although this statement cannot so confidently be made with respect to the glandular mechanisms the situation doubtless merely reflects the analytical difficulties to be expected in the case. Attention reaction systems likewise are composed of the same general types of afferent, efferent, and central neural functions found in other forms of reaction systems. Similarly the specific character and prominence of each of the component factors are functions of the equipmental and stimulational conditions. In any case of a reaction system, whether attentional or some other, the specific components must be phases of particular action acquisitions.

Nor is the affective factor excluded from the attentional reaction

[1] Partial when the behavior pattern involves additional and later operating ideational reactions. Complete when the behavior pattern involves no ideational reactions.

[2] The machinery for all of this is of course a double association, (1) between the stimulus and the perceptual act, and (2) between the perceptual and the final act.

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system. To be sure, this component must be a very simple form, probably hardly more than a symptom of the ease with which the total activity is carried out. But here, as at other points in our analysis, we cannot expect that the very intimate details of a fleeting and subtle reaction system will stand out in monumental isolation. But however difficult to analyze, the operational existence of such factors cannot on this account be doubted.

Unquestionably, of all the factors of an attention reaction system the cognitive component is the least easy to appreciate. Is the attention reaction in any sense a cognitive response? To this question we unhesitatingly reply in the affirmative, although it must be made as plain as possible that in the attention act there is no definite discrimination of the qualities of the stimulating object. This means that the cognitive component is an extremely simple factor. As a matter of actual fact, the cognitive factor in attention responses constitutes nothing more than a simple and momentary appreciation of the presence of a stimulus object.

The Prevalence and Types of Attention Reactions

From the nature and function of attention reactions we might readily infer that they are exceedingly widespread over the entire extent of our reactional activities. Obviously every complex act that we perform requires at least one definite stimulus-actualizing response. By a complex act, we recall, is meant every behavior segment in which the response consists of a pattern of action. In such behavior patterns the attention factor consists of a definite reaction system.

But how stands the case when the anticipatory response consists of a single reaction system? Here too there must be included an attention behavior factor, even if it cannot be an autonomous reaction system. Such is actually the case in reflex responses. In reflex activity, therefore, the attention factor constitutes one of the behavior phases of the single reaction system operating. In other words, the attention factor is an enormously simple coördinate factor along with affective, cognitive, muscular, neural and other components symptomatizing the performances of a particular type of movement and action by the person with respect to some stimulus object.

Whenever the attention action occurs in a complicated behavior situation involving a large number of specific behavior segments, it consists of a great many unit-attention reaction systems. When planning an experiment each detail of the stimulus situation, as well as the response to the act of planning, requires a separate and distinct attention response. In less important behavior situations the separate details of stimuli do not require distinct attentional responses. The stimuli factors may be organized into larger units while the responses are syncopated and run together. Such a situation may be exemplified by the large activity of lifting or moving a bulky object.

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Our discussion suggests that in the numerous instances of attention activity pervading our entire behavior life we find varied types of attention action. Such varying types comprise actions ranging from complex automatistic responses to, say, complicated personalistic reactions. Each given type, of course, takes its character from the behavior segment in which it operates. It remains to be added that in very complicated behavior situations, attention reactions of most all the varieties may operate in conjunction.

Some Effects of Attention Reactions

An observer studying an organism performing preliminary attention responses, can readily determine that the attention auxiliaries bring about, or (perhaps more accurately stated) are concerned with, certain effects, all of which make for more effective behavior on the part of the acting individual. These effects may be discussed under the headings of (1) selection, (2) organization, and (3) control.

(1) Selection

Every individual is constantly surrounded by many objects and persons, the number of which may run into the hundreds and thousands. At any moment, however, only some specific one, or at most a few particular objects, can be efficiently reacted to. Accordingly, the organism is called upon to select the particular object or person to which to respond. Attention responses therefore may be looked upon as preferences or selective activities. It is essentially this selective attentional function which arranges our surrounding objects into connected order by relating potent, prepotent, and impotent stimuli objects. Plainly, such a situation makes for an orderly and harmonious activity on the part of the acting individual. Those objects requiring more urgent and more rigid responses are prepared for preferably and sooner than other objects and situations. When a call for help is one of our surrounding conditions, along with the presence of much desired food, the former stimulus object is normally prepotent as an arouser of action and is consequently selectively actualized as a stimulus. Of all the sounds present among a group of people, those of our own language are most readily selected and attended to for auditory responses.

The selective effects of attention responses naturally depend upon the particular person who is acting. What things are potent as possible selective stimuli depend very decidedly upon the acting individual's reactional biography. The selective function of attention has its roots of course in the general stimulational character of objects developed through the historical contact of the person with them.

Because of the coöperative condition of stimulating objects and reacting persons present in the selectional activities of attention, we may infer that such selection is not a deliberate activity on the part of the person. The total situation, rather, is a selectional one. But from such situations are not excluded of course attention acts

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which involve so preponderant a functioning of the individual that they may be considered as deliberate stimulational selection by him.

(2) Organization [1]

In performing such preferential responses, the individual seems to organize his surroundings in a definite way. The various objects and situations with which he comes into contact become ordered and arranged into environmental systems of various sorts. Also, and as a reciprocal process, the person's activities become organized with respect to such surrounding objects and conditions; so that the individual's activities are performed each in its own proper time and place. In consequence his conduct is coordinated with the particular character of the stimuli objects and situations.

In detail this means that through the association of the individual by means of specific acts with objects around, these objects themselves get organized into stimuli units; so that a number of natural things may become a single psychological datum. Thus we have a number of trees, the horizon, the ground, all organized into a unit landscape. Similarly, all the structural features of a chair or table may be attended to as one thing. Since in every stimulus object or situation a number of phases or features may be discerned, this organizing or synthesizing activity is an important element in at least all complicated behavior. Thus in many cases what constitutes a single psychological object depends upon the attentional organization of various qualities of natural objects.

Naturally this attentional organization of stimuli is entirely relative from a reactional standpoint. Hence the stimulus for a reaction may be really but part of a natural object. It may happen then that one reacts only to the single feature of a face for which one is set. Very familiar in this connection is the situation in which we have what we may term a dominant attentional reaction to an important unit stimulus, whereas in the same reactional situation we may also have subordinate attention responses to other features of the same psychological surroundings. This distinction between the dominant and subordinate attentional reactions to their coördinate stimuli was referred to in the older psychological literature as the focus and fringe or margin of attention.

To a very considerable degree the organization of our surroundings into stimuli for particular activities may be considered as a

[1] In this section, organization contrasts with the organization implied in selection, in that selectional organization means primarily a temporal selection of one object to react to in preference to another, whereas here, organization is with reference to objects and their features simultaneously reacted to.

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negative process, or to be more explicit as a process of dropping out attentional acts and limiting their number. To illustrate, as we gaze at a picture we may react attentionally to a large number of simple stimuli or we may have such attentional reaction suppressed and dropped out or subsumed under a larger complete attention reaction to a stimulus unit, comprising all the specific smaller stimuli.

(3) Control

Finally the preferential adaptation of the person to his surrounding stimuli appears to give him a considerable measure of control over them. The elementary fact of actualizing the stimulational function of objects, with its consequent selectional and organizational implications, points to a satisfactory behavior relationship between the organism and its surroundings which well merits the name of control. That this control is not a control of the surroundings by the organism but rather a form of developed satisfactory interaction between the two, is evident from the fact that the stimuli play a very important part in attention situations.

In general also these effects of attention can be found only in more elaborate attention activities. In the case of infants the attention responses certainly do not show such effect. In fact it is more correct to say that the stimulating objects control the infant organism than that the organism controls the surrounding objects.

The Mechanism of Attention

The study of the mechanism of attention concerns the specific means whereby the individual actualizes a stimulus object into a stimulus or begins a reaction to a new stimulus. Incidentally it involves the fact whether the reacting person was previously engaged in responding to another object, or whether he was practically doing nothing before.

In the simplest attention situations the mechanisms consist of nothing more than the actual shifting of the person from one surrounding object to another. This means an actual change in spatial location with reference to objects. Because of fatigue arising from sitting in one position the individual turns; hence new objects become stimuli for his reaction. Essentially such a mechanism involves a non-psychological condition becoming the basis or condition of a psychological (attentional) activity. Here we might say that the person is beginning to perform an action, whereas immediately before he was not so engaged.[1]

The somewhat less simple attention mechanisms may be considered as simple psychological situations. Here the person starts to perform a new psychological act by easy transition from another

[1] Clearly the person is never wholly passive; accordingly when we say the person commences to act we must mean commences to act in some way interesting to the observer.

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similar activity. Typical in this connection is the interruption of the person's activities by the appearance of a new stimulus object in his immediate surroundings. This change may be brought about by the influence upon him of some alteration in the medium of stimulation. A decrease in light may be the primary factor in increasing the direction of one's response toward the page he is perusing, or the relatively more illuminated picture in the room may be a factor in inhibiting our reaction to another object in the same room. Similarly, changes in air waves and other forms of contact media may induce modifications in our attention conduct. In such a fairly elementary situation the attention act proper is a very simple movement or change of position involving perhaps primarily the head, or the head and shoulders, or larger segments of the organism.

Another type of attention mechanism is that in which an object, because of its structure and qualities, insinuates itself into the stimulational situation in which the person finds himself at the moment. Thus, when we are reacting to the speech reactions of another person, other speech reactions that the individual performs aside from those to which we are now reacting, will have a prepotency over other stimuli objects to become actualized into stimuli. Likewise, gestures and other stimuli objects or situations similar to or in some way usually associated with the stimuli to which we are now reacting, will have much influence in inducing the person to attend to them. And so the similarity between objects and the likenesses between actions constitute effective influences in attention mechanisms.

The point just made cannot be better illustrated than in the case of various ideational stimuli objects and reactions which inject themselves into the field of the individual's attention. Very frequently ideational stimuli (which as objects are the person's own implicit reactions), force themselves to become actualized as stimuli because of their own morphological character and relation to other objects. The most striking instances are naturally our thoughts of acts we regret having performed, or of situations we worry about, or in general of things and events which haunt and control us. Here we find that natural objects and conditions ordinarily having a powerful influence upon us, have this influence maximized when implicitly reacted to.

Specific attention mechanisms of a very complex and frequently occurring sort have their bases in customs and conventions. Habits or customs of the individual himself and the conventions of the group in which he lives, exert a tremendous influence upon the person's attentional conduct. Such conventions operate to make various objects and situations potent, prepotent, or impotent, as stimuli for a particular individual, personally, or as a member

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of a particular group. Convention dictates and is responsible for our deferential attention to what goes on at the dinner table, in church, in a public meeting or even in private converse with someone.

Possibly the most informing illustration is that of language. The existence for us of particular language institutions makes us more sensitive to them as possible stimuli, than to language institutions belonging to other individuals and groups. But what is true of language is also true of numerous other psychological institutions. The supposed superiority of certain peoples, for instance, such as the efficiency of the Indian in tracing trails, is owing to the prepotency of certain stimuli because of the particular culturalization of his group. As a consequence we may consider that persons of every distinct cultural group, whether national or professional, perform attentional acts which operate through cultural mechanisms of all sorts.

Still more complex mechanisms than any we have yet discussed are those depending upon the carrying out of a task or purpose, such as when a person is employed to inspect a new building or a new machine. The request to undertake the work or the agreement to do so may be considered to be the stimulus for the performance of the task. Now the inspector, governed by the stimulus mentioned, will as a consequence attend to each detail of the building or machine. The task or purpose is a potent influence in actualizing every possible stimulus depending upon how well the task or purpose is carried out. The mechanism here involves a great deal of expectancy and anticipation of stimuli on the part of the person. The significant point is that what stimuli objects will at any particular time become actualized into the stimuli phases of behavior segments, depends upon the actual details of a person's behavior conditions. It depends upon his immediate economic, social, and intellectual surroundings. Why the person cannot cease attending to a particular event, say the loss of a sum of money, is because of his particular economic status. For instance, the loss of the money means a disastrous effect upon the person's whole life.

By far the most complex of attentional mechanisms are those in which the reacting person is actuated by some intense interest, curiosity, or need of his own. We have here instances of specialized idiosyncratic attentional mechanisms. Consider the research worker deliberately setting himself not only to actualize all possible stimuli but also to discover such objects in the situations which comprise potential stimuli. In many cases this intense and deliberate attentional mechanism is necessary because the original object has not yet been made into a stimulus object. In other words, the scientist who is on the point of discovering the fact for

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which he is searching, must utilize his attentional mechanisms in the most intense manner possible in order to actualize the original object into a stimulus.

Specific Conditions of Mechanisms

Our discussion of the mechanisms of attention, or how we make our surrounding objects and conditions into definite stimuli, indicates that there must be a number of definite conditions which effectively influence the precise way the attention mechanisms shall operate. Such conditions are of course infinite in number. All of these conditions may be considered as specific phases of the general attentional mechanisms, conditions which enable the mechanisms to operate.

The necessity arises at once to develop a scheme by means of which these conditions can be illustrated if not accurately described. A suggestion for such a scheme is found in the fact that, since every behavior segment can be polarized into a stimulus and response, we can have three sorts of conditioning influences. Either the stimulus or response conditions alone may influence the attention set, or both may be operative together. By response conditions we mean naturally the customary readiness of the person to respond to certain objects because of his interest, let us say. We may therefore indicate the following attention conditions under the headings of (A) stimulus conditions, (B) response conditions and (C) combinations of both.

A. *Stimulus Conditions.*

(1) Change and Movement of Objects

Since the psychological individual constantly faces the necessity of adjusting and adapting himself to his surroundings he must be especially sensitive to changes in the objects about him. Because the person has around him innumerable possible stimuli it may be necessary to have some definite and decided change take place in some particular object, or in the surroundings in general, in order to attract the individual's attention. Unless the change is rapid enough it will not be observable as change, and therefore does not attract attention. How important change is as a condition of attention may be determined from the observation of the ease with which we can find a moving insect on a plant and the practical impossibility of finding it when it is at rest.

(2) Intensity of Stimulus Object

Such objects as have loud sounds or strong odors offer greater inducement than others to secure our attention. When the stimuli are intense enough there is in fact no resistance possible. Whatever we are doing at the moment we will, when an explosion occurs, cease doing and start out of our position in preparation for some new behavior. In like manner, distant shouting is more efficacious than near conversation in holding our attention.

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(3) Repetition of Contact with a Stimulus Object

Frequently the appearance of a person or the sound of a bell, when there is but a single occurrence, fails to attract our attention, whereas the repetition of the event puts us into a distinct attitude of response. The repeating alarm clock serves as a practical illustration of this point.

(4) Prolongation of Contact with a Stimulus Object

In many instances the momentary occurrence of a sound or the bare appearance of a light may not move us to change our immediate occupation if we happen to be intent upon what we are doing. When such contacts are prolonged, however, then we are forced to actualize the stimulus object by reacting to it. A steamer may have to continue blowing its horn to attract the attention of those on board another boat. As in all cases of these attention-influence conditions, definite limits are found beyond which the condition is no longer effective in influencing our attentional reactions. Any stimulus prolonged too much becomes monotonous, and makes us rather inattentive; that is to say, it makes us especially susceptible to other stimuli than the prolonged one.

(5) Size of Stimulus Object

The relative sizes of objects offer distinct advantages in favor of some objects over others, in the matter of attracting attention. A large building, other conditions being equal, stands a greater chance of making us attend to it than does a smaller one. A large figure in a newspaper advertisement or the larger of two advertisements, is a strong claimant for attention. We are not assuming that size in this discussion includes abnormal largeness, for that we take to be another condition which might be called strikingness.

(6) Novelty and Peculiarity of Objects Stimuli

Everyone recalls how whole populations were attracted to the movements of an aëroplane in the air. Most imperious appeared such an object in its influence upon our attention. The same thing was true of the automobile some years ago, and it is a matter of daily observation how anything new or peculiar attracts and holds us. The peculiarity of a stimulating object may extend to its intricateness and apparent usedness. Familiar is the experience of coming across a large pumping or an electrical machine or other intricate apparatus which challenges the individual to actualize the details as stimuli. Such attention is not very long sustained, however, when we are equipped to trace out the intricacies of the apparatus. To hold our attention objects must be more or less definite and clear-cut.

(7) Sudden Contact with Stimuli Objects

Whether or not an object calls out an attentional reaction by virtue of its own qualities, it will do so inevitably when the person suddenly comes into contact with it. Frequently when we suddenly hear a name called we are startled and pay strict attention, while when the name is less suddenly called out we give the person little or no attention. Almost any suddenly presented stimulus

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object may elicit from us the rapid and irregular action which we describe ordinarily as "being startled."

(8) Striking, Important, or Impressive Stimuli Objects

Under this heading we meet with the more complicated stimuli objects and events which involve a large element of convention, and on the whole seem to be much more social than physical in nature. (a) First, we might consider the advantage which interesting things have in getting and holding our attention over objects and events which are not of interest to us. Frequenters of museums and other exhibition places are prompted to attend to the objects most interesting to them. This interest and attraction are manifest both when the person is especially familiar with things, whether specimens of nature or places and people, and when he is unfamiliar with them, and is thus merely impressed by them. (b) Beautiful objects also possess great power of attraction over persons capable of enjoying or appreciating them. (c) Another class of striking stimuli are important events of a personal or general sort. Wars, rebellions, the great natural phenomena such as epidemics, floods, and earthquakes, deaths, the persons we love and their activities are tremendously effective in holding our attention captive. (d) Of the attentional conditions found in actually or seemingly important objects and situations we have already spoken in another section. We need only add that the potency of these stimuli-objects to become stimuli is so great that the individual is in such immediate reactional contact with them that no preparatory stimulus action seems necessary.

In precisely the same way as our attention is attracted by a stimulus object or event, so may the setting of that object condition our attention reaction. Of two objects of equal intensity and qualities, the one which has a setting in some form striking, strange, or impressive, will elicit our attention. A house of ordinary architectural qualities placed in a prominent or otherwise attractive location, may force us to respond when such was not at all our expectation or intention.

B. *Response Influences.*

(1) Familiarity with Objects

One of the primary response influences upon our attentional reactions is the familiarity with objects. Not only must we have acquired reaction systems for responding to certain objects in order that they shall be stimuli at all, but frequent contacts with such objects gives us a decided advantage in actualizing them into stimuli. This point is exceedingly well illustrated by the student who is requested to make observations for the first time upon a unicellular organism. He may not only not be able to determine how the paramecium swims but may not even see it at all, simply because he has not had any previous contact with the animal which would build up attention

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and other behavior equipment for the observation. Further the degree of efficiency with which the individual observes the animalcule in question is a direct function of the number of contacts he has had with it. Such familiarity is a distinct advantage in the operation of the attentional mechanisms.

(2) Immediate Concerns of the Person

What objects shall be actualized into stimuli at any moment depends very much upon what our immediate duties or business happen to be at the time. Our attention is directed toward those things which are elements in some specific situation in which for the time we have an interest. When we are contemplating the purchase of a new automobile we find ourselves giving unusual attention to advertisements of cars and to the cars we see on the boulevards as well as the statistics of mechanical perfection and cost of various cars, even to those which are many times more expensive than the cars we can afford to buy. This condition of attention is also exemplified by the mere momentary interest of looking for a hammer, or when riding in the train on the way to the theatre, by employing ourselves in reading theatrical amusements, which at the moment have an unusual attraction for us. In more important affairs the condition is still better illustrated. The watch on a vessel misses very few objects for which he is definitely set by the exigencies of his employment.

(3) Permanent Interests

Equally significant as conditions of attention are the person's permanent interests. The day's quotations for the stock broker are extremely potent stimuli objects. For the physician disease conditions and symptoms appear always as the most prominent features of the individual whom he is examining. This attentional potency may and frequently does carry over to stimuli objects and affairs. Even weather phenomena, which are not of immediate interest at the time, arouse the farmer's attention at appropriate seasons. The scientist likewise is alive to phases of his surroundings which at the moment he is not called upon to consider. Such attentional activity to objects of related but not direct interest makes for more effective behavior on the person's part as well as more direct interest attitudes.

(4) General Conditions of the Person

The individual's general conditions have a dominating influence upon the process of actualizing stimuli. These conditions are only in part reactional. For the other part we may consider them as hygienic or physiological in character. Thus, when we are fatigued, benches and other possible seating objects become especially prepotent stimuli objects for attentional preparations for sitting or lying reactions. Illness or other unusual personal conditions create most favorable attentional mechanism situations for hygienic and insurance stimuli objects. Sexual excitement, likewise, is commonly appreciated as exerting a manifest influence upon particular types of the person's activities, through the means, and because of various predispositions imposed upon the

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attentional mechanisms. Similarly, emotional disturbances of particular sorts induce the individual to seize upon certain objects as stimuli for reaction. The embarrassed individual is alert and watchful for any object that can stimulate him to do something to alleviate his predicament.

(5) Feelings

Passions, melancholy, and other types of feeling actions produce marked effects upon all sorts of attentional mechanisms. These effects may be considered as both positive and negative. In the first place, exciting feelings predispose us in general to be attentive to our surroundings, while on the other hand, to be happy or grief-stricken may mean that we will not actualize other stimuli objects into stimuli because of an absorption in the things, persons, or conditions that are concerned in our happiness or grief.

(6) Present Acts

In addition to the feeling responses which condition attentional mechanisms, any activity which the person is performing makes him either ready or unready to perform still another action. Hence, the immediately preceding response conditions what objects shall be actualized as stimuli. But here we must observe that such influences upon the attentional mechanisms can be effective only when the stimuli objects are not so striking or impressive as to force attention irrespective of what the person is doing at the time.

C. *Combination of Both Kinds of Conditions.*

In each of the two cases discussed we have stressed the influence of a single sort upon our attention reactions. Now it is clear that in none but exceptional cases is there as a matter of fact but one type of conditioning influence. Rather, the influences in any individual case are more often of both types. This point is readily inferred from the fact that, although a segment of behavior may be analyzed into its stimulus and response factors, no segment can be considered as anything but a continuous series of phenomena of which the stimulus and response are not autonomous but interdependent members. Not only may an object be attractive but we may at the same time desire to see it or possess it, and it may be the operation of the two types of factors which motivates the attention mechanisms.

Attention Acts as Reaction Systems, as Behavior Segments, and as Behavior Complexes

When attention reactions are considered in their intimate functions as actualizing stimuli objects into stimuli, they necessarily constitute single precurrent reaction systems and unit response patterns. But clearly there must be other forms of attentional acts. Two such distinct forms may be distinguished. The first of these may be considered as a final or at least relatively final reaction system instead of a precurrent act. Now since the name of a behavior segment is usually derived from the final response we may look upon the whole behavior segment in which a final

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attentional response occurs as an attention behavior segment. The second of these two additional types of attention acts may be described as a complex efficiency response which finds a place in large behavior situations. Here we refer to the attentional activity popularly considered as sustained attention or the concentration of attention. What we have here are many specific actualizing reaction systems operating in a complex of action along with other reactions intimately related to the attention responses. Considering any one of the specific attention acts in the attention complex we find that each consists of a precurrent reaction system or of a final attention response.

The description of the single attention reaction system need not here be enlarged upon, thus we may turn directly to a description of the second or the final attention reaction.

Consider the soldier responding to the command "attention" or the track runner who is set on his mark awaiting the starting signal. Or to take a more general situation, observe the individuals who are transporting a piano around a turn in the staircase. In each of these three examples a command or other stimulus has to put the person in a relatively permanent attitude of expectancy for a signal to run, execute a command, or lift or move the piano. Now we might readily conclude that the positions or attitudes assumed by the illustrative persons constitute final adjustments to the commands or signals. Certainly we can differentiate between these attention acts and the simple and frequently subtle preliminary movements which precede the perception of the different words while reading a book, and similar sorts of subtle attention acts precurrent to observing the various individual details of a picture.

Assuming that we have here genuine attentional behavior segments we may point out a few details of the operation of such activity. In the first place, such attentional acts have their own stimuli which arouse them to action. This stimulus as in the command of our illustration may be considered also as a preliminary or partial stimulus for other actions which are to follow the attentional behavior segment. That this interpretation is valid appears from the fact that a very close connection exists between the attention behavior segments and others which follow. The entire attentional behavior segment is a preliminary and preparatory reaction to some other action. In this sense the attentional reaction even here maintains its position as a precurrent reaction.

Attentional behavior segments, it must be pointed out, really contain two attentional elements. In addition to the final reaction system, which gives the segment its name, we find that there must be a precurrent attention reaction system preceding the final action. This is also precedent to the perceptual activity of distinguishing the nature of the stimulus in such a way as to get set

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or stand at attention. The precurrent attention phase of the behavior segment constitutes the essential actualizing process in the total activity. In this sense it differs markedly from the final attention reaction system or the behavior segment taken as a whole, in that the latter constitutes in the main a behavior attitude or behavior posture which is in effect an anticipatory action. This act of the person, through the type of stimulus which he perceives, puts him into an attitude of expectancy for the appearance of another or additional stimulus object he knows is to come, rather than constitutes the actualization of a present stimulus object.

Let us now consider the attention complex. Here, as we have pointed out, the specific attention responses may operate along with other actions. We have also indicated that the attention complex may consist, though not necessarily, of both behavior segments and reaction systems. As I read page after page in a book, I inevitably find that I must attend to the different words or phrases as well as to the things or conditions to which they refer. Also as I near the end of the page I must attend to the reading action in order to turn over the leaf. In such instances a variety of attention acts occur quite or nearly simultaneously. At least there is much paralleling of attention acts with other attention and non-attention actions. In some of these cases we undoubtedly have the attentional reaction systems of one behavior segment paralleling the attention or other reaction systems of other behavior segments. This would be the case when the attentional reaction system for the implicit [1] response to the referent of a word paralleled the attention reaction system of seeing or the attention reaction system preceding, or perhaps the reaction system of pronouncing the word. But in other cases the paralleling attention reaction constitutes a behavior segment. The sample here is the anticipatory act for the leaf turning. It is these attention complexes in various degrees of intricacy which raise specific problems concerning the efficiency of our action with reference to particular performances. These problems we shall consider in the next section.

Attention, Intention, and Non-Attention

Although attention acts serve in general to increase the efficiency of the reacting person we know of course that not all of our attention actions are themselves effective forms of action. Whereas in some cases we are especially adapted to stimuli objects and situations and consequently our attention responses are thoroughly effective, in others we must adopt heroic efforts to keep our attention responses focussed upon the matter in hand at all. So difficult is it for us to attend to certain tasks, so unpleasant and

[1] Here it may be remarked that whenever we have an implicit factor in a reaction, the attention phase must be a reaction system, since the latter must always be an overt action and hence only a part of a behavior segment in which the final reaction system is implicit.

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disagreeable are they to us, that we spend much time and energy doing the most unnecessary action if it can only serve to avoid or stall off doing the unpleasant task. To such activities we say we are not attentive. Usually we can discover in such cases that the work itself is unimpressive and uninteresting and also that we have no special urge to do it, in spite of the fact that it may be very important. We will now turn to an examination of the three kinds or degrees of attention into which we may conveniently divide our attention behavior. It is, of course, unnecessary to say that we are dealing in this section exclusively with attention complexes. These we name, (1) non-attention, (2) attention and (3) intention.

(1) Non-Attention

Practically speaking non-attention is a very inexact term since it can only have reference to situations in which we are not reacting at all; hence there is no question of attending to a stimulus. Therefore by non-attention we must refer either to one of four kinds of behavior. Either we mean (1) the relatively inattentive behavior of the infant, who is just beginning to acquire reaction systems, and who is attracted by every passing stimulus as the beginning phases of orientation to his general surroundings, (2) the socially or individually disapproved action of the person whether infant or adult, who is not attending to what he is expected to attend to in favor of something else, (3) the situation in which the person's attentional action is distracted from some stimulus object by another which forces itself upon him, or (4) the resisting partial attention which one is forced to give to a stimulus object.

Now in the first case we do have a kind of indifferent preparation for simple action which is entirely conditioned by the stimulating objects. Only very simple reaction systems are possessed by the organisms and almost any object can arouse them to action. Various names have been given to the non-attention sort of reaction. Sometimes it is called spontaneous attention, and sometimes involuntary, while still another name applied to it is primary attention. None of these terms is entirely without descriptive value, especially when it refers to different periods of personality development. The term involuntary attention is most properly reserved for the third type of case, while non-voluntary attention perhaps is more descriptive for the other two.

In the adult this type of spontaneous attention is manifested most prominently by abnormal persons. Psychopathic conditions of various sorts have among their most marked symptoms the complete inattentiveness of individuals. In other words, there is no sustained or controlled attention; all objects are equal claimants for the person's attention responses. In all probability this attentional condition represents the general and constant situation among infrahuman animals.

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The second condition we refer to by non-attention is of course an entirely different thing. This is in no sense a case of not attending, much as the person may be called inattentive, but may be rather an instance of strict and sustained attention to some object or condition which we do not expect the individual to react to or his attention to which we disapprove.

In our third type of non-attention situations the person cannot attend to whatever he has been in contact with because some other stimulus object exerts a more compelling influence upon him. Frequently such situations demand that the person exercise considerable effort to overcome the influence of the distraction stimulus. In the meantime he is unable to attend or to attend effectually to the stimulus object or situation at hand. Therefore when the person is distracted from some work he is doing, for instance, by an unusual sight or an explosive sound, we may consider his action as a case of involuntary attention; that is to say, he is forced involuntarily to attend to the distracting stimulus object.

A very frequent form of distraction is that in which the person is reacting to implicit stimuli which compete with each other for attention. Assuming that we can determine the idea to which the individual attends or desires to attend we may consider the other idea as the distracting stimulus.

So much is true of situations in which the distracting stimulus object is extreme in its power and influence upon the person. We cannot overlook here, however, the fact that slight distractions may improve the effectiveness of the person's response to desired or required stimuli conditions and especially after he has become somewhat adapted to the disturbance. Such mild distractions effect a general alertness on the part of the person which adds to his attentional capacity. In such cases the non-attention is at first only slight or later disappears entirely.

The fourth type of non-attentional situation involves a very general distraught condition of the person. The great effort required to prevent oneself from attentively responding to some undesirable situation prevents one from doing anything in the ordinary organized way. A classic illustration of this situation in connection with perceptual objects is that of Leontius whose disgust and abhorrence of the sight of the bodies left by the executioner was powerless to overcome his curiosity to look at them. This struggle preceding the actual attention action typifies a decided non-attention situation.

In implicit action we have many such non-attentional struggles. Instance the effect not to attend to an idea or some tune which we cannot wholly or successfully resist. In many such cases of course the attention stimuli are the implicit acts of the person himself. But the non-attentional behavior situations may have as their

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stimuli a sort of condition or event which may be reacted to through a substitute stimulus.

(2) Attention

As the character of non-attention is conditioned primarily by stimulational objects and situations, so the types of action under this caption involve the coördinate influence of both stimulus and response factors. Here we find that the individual is well equipped with reaction systems for responding to the particular types of stimuli objects operating in these attention situations. Also the person may in addition have a desire or interest in the stimuli objects or events. Further, the stimuli objects may have a particular appeal to the reacting person. All this means that the attention activity works smoothly and without effort. Probably the term spontaneous attention finds its best application when used in connection with this kind of action. From a genetic standpoint the term derived attention is certainly not inappropriately applied.

(3) Intention

By intention we refer to the sustained and relatively continuous responses to some large situation or complex object. Here the conditioning influences are primarily the person's interests and other reactional determiners, although we also find general stimuli influences. Additional reactional determiners are the desire to accomplish some end and the motives and ideals referring to accepted and prescribed duties of various kinds. Intentional acts are doubtless most seriously interfered with by distraction. Whenever the person is interested in a certain class of stimuli objects and is making a special effort to attend to them, he is likely to be completely disturbed by the intrusion of another object. To illustrate, in learning any bimanual operation such as typewriting or piano playing, or an action requiring the coördination of both hands and feet, even the need to use the other hand or foot constitutes a distraction.

The Training and Control of Attention Responses

Very important apparently must be the training and control of attention reactions if they are efficiency responses, since through their improvement we can genuinely further the efficacy of our adjustments. It must be clear that no control over the simple actualization of objects is possible other than keeping out of the presence of objects to which one does not wish to respond. Whatever training or control of attention reactions is possible, then, can only occur with respect to attentional behavior segments and attention complexes, for only in such situations can we find a basis to effect training and to bring about control of our attention behavior. Further, it is important to note that when the process of control or training of attention occurs the attention activity must be considered as a stimulus for the observation, modification, and control responses involved in the training and control.

In the behavior segment training of attention there is involved

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the process of achieving familiarity with particular kinds of objects; so that the person knows what to look for and in general becomes sensitive to those objects. Only when we know the different plays of a game can we train ourselves to be alert and attentive to them.

Our control over attention activities considered both as behavior segments and behavior complexes involves both the modification and choice of stimuli situations as well as the development and application of behavior equipment. When we wish especially to control our attention preliminary to some final act we choose the most favorable setting surrounding the stimulus. For instance, the cleaner and newer the volume is, the easier it is for us to read particular material. Sometimes we can contrive to control the quality potencies of the stimuli objects themselves. For example, we may assure the proper intensity of possible stimuli as when we purchase an alarm clock with a loud bell or intensify the sound of our telephone bell. Through various manipulations of the stimuli objects and their settings we may enhance their interest or value for us. It is hardly necessary to mention so obvious a method of attention control as the exclusion from the situation of as many possibly distracting stimuli circumstances as will admit. We cannot study as effectively with conversation going on about us, even when we have learned to make ourselves oblivious to distractions.

Again we may control our attention by directing and limiting our interest in a set of similar objects to the present representative of the set. Where no similar original interest exists, it has been found expedient, to control attention by taking advantage of a related interest. A child in the early stages of learning to read may be induced to attend closely to the uninteresting letters if he is made to see that thereby he will be enabled to discover the meaning of the fascinating pictures accompanying the text.

In performing complex acts of skill it is found expedient to have the primary attention directed toward the goal or the result of the act. Golfers find that the most successful players attend to the ball rather than to the motion of the club when the stroke is the act in question, but when the act is landing the ball in a particular place then the attention is best directed toward the goal. The student who is to profit most from his reading must attend to the problem of the chapter, "What for example, is attention and how do such acts operate?" This problem must have the student's attention if he is to get much, if anything, from the details he is going over concerning the phenomena under question.

As another control factor we might add one which may not be immediately apparent, namely the personal hygiene and general health of the individual. Among the most effective and persistent distractions are the functional disturbances of the unhealthy per-

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son. To be uncomfortable because of pain, worry, or any other condition means that it is impossible to attain to a very high degree of attention. When we can overcome the distraction of pain then we have an example of the most effective control of attention reactions. How can such control be accomplished? A physiologist of an older generation, Dr. Carpenter, describes how he has

> "frequently begun a lecture, whilst suffering neuralgic pain so severe as to make him apprehend that he would find it impossible to proceed; yet no sooner has he, by a determined effort, fairly launched himself into the stream of thought, than he has found himself continuously borne along without the least distraction, until the end has come, and the attention has been released; when the pain has recurred with a force that has overmastered all resistance, making him wonder how he could have ever ceased to feel it."[1]

Such control consists primarily, then, of determining to do something which we have on hand. If the circumstances are such as to give us definite and absorbing employment we overcome the distraction completely. The discomforts of humidity, heat, or cold are likewise overcome on the basis of this same general rule.

Somewhat paradoxical appears one of the attention controls. We all know that in many cases the efficiency of our action is easier and better obtained by a minimum of attentional effort. It is not true, therefore, that by trying to attend to the maximum degree in all cases is effectiveness secured. How well could we walk if we watched our steps? This principle of expending no more attention than is necessary will be easily recognized by all in connection with the simpler behavior situations. But how it is to the advantage of the person to minimize his attention will not appear so evident when the more complex responses are in question.

When we consider, however, that attentional reactions are preliminary efficiency responses, we observe that no more attention responses are necessary than will serve to bring about an effective response. Now in the complex reactions that we perform we are constantly integrating our acts to form larger and larger responses. In these larger reactions, it becomes unnecessary to attend to the many details which we had to look out for in the beginning. Therefore in such cases we materially reduce the occasions for attentional responses. In a sense we look upon these activities as becoming automatized when they are manual operations of some sort. An example would be the reduction of attention responses in piano playing or swimming. With the completion of

[1] *Mental Physiology*, 1884, p. 138.

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such a process of integration, a condition which, taken strictly, is impossible, the individual would only have his attention directed toward the original stimulating condition. In actual practice the main attention reaction is directed toward the prominent stimulus situation and slighter attention is given to small individual stimuli and the reactions to them.

Duration of Attention Behavior

In inquiring concerning the duration of attention acts we must distinguish in our problem three distinct attention situations. In the first place, we ask how long it requires to actualize a stimulus object to perform its stimulational function. Such a process naturally varies for different specific stimuli objects. In the second place, we are investigating the duration of an attentional behavior segment which on the whole requires a much longer time than the mere actualizing of a stimulus. Still a third problem of time is involved here. It refers to the complex organization of precurrent attentional reaction systems combined with other acts of a non-attentional sort, and with complete attentional behavior segments. Such an organization we have called an attention complex.

All three of these attention situations may be illustrated by various forms of musical responses. Only a very short time is required to actualize into a stimulus a note or phrase in the same composition, although it may require longer to respond to a bar than to a note. To respond with all the actualizing reactions required in listening to a long symphony may consume a durational period of several hours. Time intervals intermediate in length are required to anticipate the sounds of some particular instrument which are intermittently introduced into the composition.

(1) Duration of Actualization Process

To actualize an object into a stimulus consumes but a few seconds or less. The exact duration of the attention act depends upon the kind of stimulus object, how familiar it is and how recently we have had occasion to react to it. Stimuli situations as units doubtless take more time than single objects. Possibly also the condition of the individual at the moment affects the time required to perform attentional responses. The important principle to remember in considering the duration of attention is the specific function of the action. It is most reasonable to suppose that the duration of attention will be just long enough to prepare the person for the specific act which is to follow. Obviously the attentional act precurrent to a perceptual response will be less than the attentional act preceding some more deliberate form of reaction.

How rapidly the attention shifts from one subject to another can be most definitely observed by studying the rapidity of one's reading. Notice that each new stimulus in the material requires a new adjustment act, a new actualizing process. It will be found that in a rapid reader the attentional reaction will require

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less than a second. An interesting mode of observing the rapidity of the attention shift indicating different adjustments is the study of ambiguous figures.

The short duration and rapid change of attention is very well illustrated by the phenomena of binocular rivalry. When we place before our eyes a stereoscopic card with two different pictures or two different colors the attention will shift and continue to shift from one to the other, staying longer, however, at the picture with the greatest details, or at the side of the card which has some pattern if the other side be entirely plain.

Most strikingly perhaps is the brief duration of the attention response shown by the experiment in which we insist upon directing our reactions toward a single object. The greater the persistence with which we try to attend to an objectionable object the greater is the person's revolt until he stimulates himself into a most disagreeable feeling state. When the stimulus is faint, as in the case of holding our watch at such a distance from the ear that the sound is barely perceptible, then in addition to the feeling aroused our shift of attention is relatively so active that we cease any perceptible behavior and stop hearing the sound at all. Doubtless, the phenomenon is facilitated by its complication with a condition of uneasiness and general distress of the person.

(2) Duration of Attentional Behavior Segments

How long the attentional behavior segment lasts depends upon the specified conditions determining the advent of the stimulus object or the occurrence of the stimulus event to be actualized into a stimulus. It is primarily these conditions that determine how long the person remains in an expectant attitude prepared to actualize an emerging or transpiring stimulus object or event. As a matter of actual practice, however, the person is surrounded with so many objects and conditions (while at the same time his own implicit responses, ideas, etc., surge in upon him) that a single uninterrupted attention attitude does not consume a very long time.[1] As compared with the operation of a single precurrent reaction system the time interval is of considerable duration, perhaps thirty seconds or more at the most.

Other conditions determining the duration of an attentional behavior segment are the importance and significance to the person of the original stimuli conditions which originally aroused the attention attitude. Especially influential in determining duration of attention are personal stimuli, such as the command of an officer in the army or in civil life, the request of a person for whom one entertains respect, fear, or a personal regard.

(3) Duration of Attention Complexes

Complicated attention situations or attention complexes endure as long as the vividness of the problem is an inducement or the interest of the person demands. From the various records extant the duration of attentional situations may exceed fifteen hours.

[1] Unless the activity is a single behavior unit it is not a behavior segment.

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In such cases, while the attentional activity represents a close succession of innumerable single attention reaction systems and behavior segments, the general attention continuum may be exceedingly resistful to the distracting onslaught of objects and conditions unrelated to the task at hand.

How Many Stimuli Can Be Actualized At Once?

So complex an organism as the human individual never at any particular time performs merely a single action. So much is plain. Now the question arises as to whether this multiplicity of operation extends to attentional responses as well as to other actions. We can typewrite, ask and answer questions and keep time to nearby music all at once. Now in this sort of performance, do we at the same time actualize more than one stimulus? Or, do we actualize a number in turn which are finally reacted to at the same time? In other words, are each of the different things to which we react at once, prepared for by distinct attention acts?

In order to obtain light upon these questions it is necessary to distinguish carefully three distinct behavior problems. The first refers to the intimate actualization activity, the process, that is, in which a stimulus object comes to perform its stimulational function. The second concerns the scope or range of attention. The problem here is how many objects or other things can be unified into a single stimulus object and in consequence perform a specific stimulus function. Another form of the same problem refers to the amount of structural detail encompassed in a single object. Our third problem deals with the question as to how many acts we can perform at once.

To consider the range of attention problems first. How many actual objects or details of objects can be included in a unit stimulus object or serve a stimulus function is entirely indefinite so far as mere number goes. But we have a very definite guiding principle as to how much can be included in a stimulus object. The principle is that as many details or as many objects as can be organized psychologically into a single unit can simultaneously constitute a stimulus object or serve a stimulational function. In experimental determinations the actual number of such objects forming a unit is around six but these objects may themselves be composed of smaller objects.

As we might expect, the attentional reactions preceding implicit responses may include a very much larger number of elements in a unit stimulus object than is the case with overt attentional responses. When planning a course of action we can simultaneously range over an enormous amount of detail, whereas in the direct manipulation of objects and conditions our limitations in this direction are obvious.

Again, the attentional range without doubt is influenced by the type of objects involved in attentional reactions as well as by the relations between such objects. On the whole, things similar in

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character and structure combine more easily into stimulational units than objects not so related. Relations of function or use are certainly potent here. Things which operate together in the person's contact with his surroundings combine more easily into stimulational units.

Attention range also is influenced by the fact whether our attention response is a unit reaction system or a complete behavior segment. In the latter case probably the range is very much more restricted than is true for reaction systems. Whether considering attentional reaction systems or attention behavior segments, in either case the attention range is definitely dependent upon the individual's psychological experiences and behavior equipment.

To consider next the question as to the number of actions that we can perform at once, we find the answer to be that the number of such acts depends upon their organization into unit performances. Our simultaneous responses can comprise as many actual reactions as can be organized into a single system. This problem is more precisely an attention problem at the point where it involves the efficiency with which we can attend to the details of our surroundings, so that acts can be syncopated and harmonized with other acts. At another point we find the problem tied up with the question as to how easily we can dispose of deliberate attentional acts in certain performances. Acts which can be joined together so that the attentional responses can be dropped may be combined in large numbers into reactional units.

Besides the factor of likeness and harmony of actions the number of responses combinable into larger behavior units depends upon the experiences of the individual, the needs of particular situations, etc.

Turning finally to the problem of the number of actualizations of stimuli, which we can simultaneously perform, we find that such simultaneous performances are quite limited. But contrary to the answer given to this question when stated in other forms [1] such simultaneous performances are doubtless possible. Especially clear is the possibility of simultaneously actualizing two stimuli objects into stimuli when both stimuli objects are the same natural thing. To illustrate, when in contact with a person or some thing the reacting individual through his response may at the same time be actualizing the thing as a perceptual stimulus of a given sort as well as a stimulus for some implicit response. He may attend to the object at once both as a thing to be seen and to be thought about.

The Morphological Varieties of Attention Responses

Because of our differing modes of behavior it is obvious that our attention reactions will assume very different morphological forms. Let it be at once observed that the morphology of such attention reactions will depend directly upon the following acts,

[1] For example as to whether we can have two states of mind simultaneously.

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whether precurrent or final. These different attention phases constitute a graded series of which the near members are not markedly different, although there are decided differences between those attention responses which stand at distant points on the scale. For practical purposes we will distinguish between three extreme types which we will arbitrarily name (1) imperceptible responses, (2) segmental manifest responses and (3) complete manifest responses.

(1) Imperceptible General Attention Responses

In the simplest type of behavior the attention responses are practically imperceptible to the observer. Probably the best description we can give of them would not go beyond the statement that they are subtle forms of responses representing a break in the continuity of our behavior and a change from one kind of response to another. In some cases, however, we may isolate these attention reactions as slight respiratory and circulatory changes or breaks in rhythm. Again, in case of reading or writing, such attention responses comprise the shifting of the hands and slight bodily movements, besides eye movements. In the majority of cases then, the imperceptible attention responses are not definitely localized in a segment of the organism, although the eye movement reactions gradually become definitely local and grade into the next class of action. It is probably unnecessary to say that this type of attention reaction is found in situations in which the stimulating circumstances are very much the same, and consequently the person need not perform very different forms of action. Reading, writing, that is to say, series of homogenous reactions, may serve here as examples:

(2) Segmental Manifest Attention Responses

When we have reactions to perform which are markedly different from others just previously performed, our attention reactions must perforce be more definite and consequently more manifest to the observer. Examples of this type of attention reactions are legion. We will merely enumerate a few which have become classic in psychological literature. The principle of these responses is that they are definitely localizable in a segment of the organism, although this does not mean that strictly only the part mentioned is involved in the act.

The most definite of these acts and therefore the most easily described are the eye movements which we perform in preparation for reading and for the inspection of objects. Preliminary to seeing words and phrases of printed or written material are the more or less regular jumps and pauses of the eyes. Studies on reading have demonstrated that eyes move from word to word or from phrase to phrase with a jump, and, often pausing at a new place, they jump again, performing a bigger and farther reaching jump at the end of a line. These are definitely preparatory responses, for the perceptual reaction connected with such movements are

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the convergent and focusing actions of the eyes which may likewise be considered as parts of the attention reactions.

Much the same sort of behavior occurs in other stimuli situations. To hear better we turn our heads and ears toward the directions of sounds. To smell more effectively we inhale and sniff, while the more efficient taste responses involve much movement of the tongue, palate, and lips. Everyone is familiar with the tactually exploratory movements of the fingers upon textiles when we wish adequately to determine their qualities.

(3) Complete Manifest Attention Responses

In more complex perceptual situations and in many cases of implicit behavior the reacting person performs definite responses of the whole organism as a preparation for and aid to a more efficient final response. Not confined to any specific segment of the organism the reaction may be said to consist of a total attitude or general set of the entire person. As general examples we might refer to any complex final attention act. The strained position of a spectator at an exciting foot-ball game and the intent listener at a lecture, show us in an admirable way these poses and movements of penetrating into the very heart of the stimulating conditions. While these postures and attitudes which we have described are for the most part overt reactions, this class of attention responses includes many which are completely, or almost completely, implicit. Typical of such an attention are the stillness and the gaze into vacantness which characterize the involved thinker. More familiar, however, are the poses in which the brow is wrinkled, the head bent, and the whole body in a posture as though to exclude all but one particular adjustment stimulus.

After thus briefly sketching the previous types of attentional reaction we have yet to make closer specification of the facts with which we are dealing. First we must make sure not to confuse attentional reactions with byplay responses found in the same segment. We assume that no one will confuse the attentional reaction with the perceptual responses or final adjustments in various behavior segments, but such a confusion of attention actions with the byplay responses is possible. By these byplay responses we mean definite movements and organized acts found in behavior segments which have no definite function in adjusting the person to the stimulus. Examples of such reactions are the shifting of the feet or toying with the cap by the boy who is addressing an unfamiliar person in a rather delicate situation. The scratching of the head or the biting of the nails, which many adults incorporate in their thinking operations, may sometimes be considered as byplay responses, although in other cases such acts may form part of the attention set or response.

Another point of no mean importance in this connection is the fact that the three types of attention reaction mentioned may all

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be found in the same segment of behavior, especially if that segment be a complex act.

Perhaps it is unnecessary to repeat again that in view of our exposition these attention responses are reaction systems exactly as all other behavior units and not merely motor phases of a mentalistic happening. As we have observed in our analysis of attention acts the attention reaction systems contain discriminative, muscular, feeling, and other components precisely as does any other response. Psychologists who think of psychological phenomena as stuff and processes different from bodily action consider the perceptible actions of attention as concomitants of those so-called psychic processes. On the contrary, no such division of processes exist, although in every case of attention reactions from the simplest to the most complex we are dealing with a positive act of a person.

The reader will observe, no doubt, that attention reactions vary not only with the kind of segment of behavior in which they are found but also with the individual who performs the reaction. What we must observe here is that in any given situation the individual responds in his attention reactions in a manner which he has previously acquired by contact with other stimuli. Also, the individual differences in attention behavior depend upon the person's biological organization.

In general the morphological type of attention reaction system depends upon the specific behavior segments in which it operates in the sense that it conforms to the behavior necessity of placing the organism in functional contact with surrounding objects. Nevertheless, with practice and the person's familiarity with situations this correlation of the attention reaction system with the specific stimulational situation is not imperative. Probably the best type of instance of such lack of correlation is the fact that in implicit behavior segments we find attentional responses in all respects similar to those found in overt behavior situations.

The Problem of Interest in Attentional Behavior

Psychologists have long sought for a solution to the problem of the relation between interest and attention. On the one hand, it has been asserted that interest is a primary fact, presupposed by all attentional actions; so that it is improbable that one should be actualizing a stimulus unless he has some interest in the object. As we have seen this is certainly sometimes the case. Without doubt the actualization of some particular stimuli must be motivated by specific interests which the individual may have in the stimuli objects involved. But, on the other hand, it is asserted that unless we were attending to the stimulus object we could not have or hold interest in it. In our terms the point here is that unless we actualize a stimulus object into a stimulus we could not have interest in it or react to it at all. In other words, interest is an activity, a response to some stimulus and consequently unless

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this stimulus is functioning the interest activity cannot be operating.

The solution of this apparent conflict in view-point may be neatly solved by discerning that we are dealing with different situations in two different orders of events. In the first order we must differentiate between (1) the actualization of a stimulus for any specific action (in such an instance it is certainly true that the attentional phase of a behavior segment must precede all other action components of that response pattern); and (2) the fact that the individual in selecting objects to which to react may be motivated by his interest in some problem or object. The point may be stressed here again that if I am a real estate operator it is almost certain that my interests in the relative merits of different pieces of ground for improvement purposes will be responsible for the fact that I will attend to features of the landscape across which I am passing, and especially if there is a possibility of "improving" the land. Here we speak of an activity (interest) which itself, although it must succeed some specific actualization process, may on the other hand be responsible for other attentional acts. But here we are already indicating that there is such a difference between the attention and interest action that the former cannot be responsible for the latter.

That interest cannot be the absolute basis for all attention we have also already amply observed when we pointed out that many actualization processes occur primarily because of the insinuation into our behavior situation of various objects and persons which force us to actualize them into stimuli. Our second order of two distinguishable situations involves (1) the genetic development of attention and (2) the immediate fact of attention as an actualizing of some stimulus object. Beyond doubt there are innumerable attention acts, which depend for their operation upon the individual's building up of specific types of reaction systems. When we consider the development of such attention acts in the individual it is clear that his non-possession of reaction systems of a particular sort at any stage in his development makes it impossible for interest to be the motivating agent in his attention reactions. Later, of course, when the individual has acquired a whole set of behavior equipments he may be influenced by the possession of these reaction equipments to perform certain attentional reactions. We must, however, be very careful at this point and not assume that the mere possession by the individual of particular reaction systems constitutes an interest in certain objects and situations. Interest activity comprises a very distinct and complicated form of psychological behavior. At all events it is clear that interest need not by any means be an essential feature in all attentional responses.

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Exceedingly meagre are the materials for the discussion of the background for the study of attention phenomena. As James has pointed out (*Principles of Psychology,* Chapter XI) his work on attention represents one of the very few discussions of the subject in the English language. The continental writers also have accorded the subject of attention very slight courtesy, not getting much beyond the conception that attention activity constitutes the operation of a faculty of some kind, or else a result in consciousness, some sort of clarification of some points in consciousness or a distribution of the things attended to, the latter being considered as contents of consciousness. So far as James is concerned his main contribution consisted in stressing the selective character of attentional activities. This selective activity James thought of as signifying that attention behavior is primarily dependent upon the initiative of the acting individual. Besides overstressing the rôle of the reacting person in attentional behavior, the precise nature of the selective function has never received very adequate characterization, and as a result has remained a vague and often mysterious process.

Although expressed in purely mental terms the discussion of Stout (*Analytic Psychology,* 1896) brings out a number of important facts descriptive of attentional behavior. Also the works of Bain (*Emotions and Will,* 1875), Ribot (*The Psychology of Attention* (4) 1898), and Sully (*The Human Mind,* 1892), which stress the so-called motor factors, have added details making for a better understanding of the subject. But on the whole, the fact still remains that the actual intimate nature of attentional phenomena has never been adequately worked out. Accordingly, the treatment of attention as a definite form of actual response to surrounding objects and conditions may not incorrectly be considered as a fairly new departure in the handling of the subject. This suggestion has still more merit, perhaps, since the present treatise not only takes account of the contribution of the surrounding objects to the total reaction, as well as of the acting individual, but it also emphasizes the previous reactional history of the person as a basis for his present selective power.

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CHAPTER IX

THE NATURE OF SENSING AND PERCEIVING

The Problem of Perception

All psychological reactions, it has been repeatedly observed, normally constitute closely coördinated phases of behavior segments with particular stimuli objects. Even the simpler response activities, the reflexes, for example, seem to be especially appropriate to the stimuli objects and situations with which they are connected. To a certain extent, then, we might say that at least from the standpoint of the observer the reacting individual appears to appreciate or apprehend the nature of the object to which he reacts. When we investigate the action of the responding individual, however, we may be very sure that in extremely simple actions he does not really know or have definite awareness of the object; that is to say, the stimuli functions of such objects are not explicit. The person's actions are or appear to be appropriate merely because they are the reaction phases of behavior segments of which the stimuli functions of the objects reacted to constitute reciprocal phases. The primary principle operative here is based upon the character or properties of the objects and the character of the organism, so that different things produce different reactional effects upon the latter.

Upon investigating our more complicated behavior we find another situation prevailing. The stimuli functions of the objects and conditions comprising the stimuli for our more complex behavior are more explicit and thus exert a more elaborate and more effective influence upon the total behavior situation than in the case of simpler activity. To illustrate, in the simpler or mere differential reaction situations, sensing the heat of the stimulus object in reflex behavior constitutes an integral part of the hand-withdrawing action. This means that the heat of the object or the object itself and its function are not separable; they are identical both in their natural existence and in their effect upon the individual. In more elaborate activities a different condition prevails. In such cases the act of sensing (seeing, hearing, smelling, tasting, etc.,) may be considered as a different action although very intimately integrated with some other action. Thus in looking at the ball which one is on the point of catching, the seeing and catching which may be very closely connected, are still distinct. This means that the stimulus object has its mere existence func-

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tion differentiated from its function of stimulating an action of the person. This fact may be made clearer by indicating that whereas in the former case (reflex illustration, heat-sensing-hand-withdrawing) only one action is elicited, in the present case (seeing, catching-ball) more than one action is brought out by the object. The explicit character of stimulational functions may thus be illustrated by distinguishing between the different functions of objects and by the definite separation of the reaction from the stimulus object because of the interpolation of the perceptual reaction system.[1]

Perception is the traditional name given to the psychological activities in which explicit stimuli functions operate. Otherwise stated, perceptual activities are those in which the person reacts to explicit stimuli. Perhaps this may be still better put by saying that the person in perceptual situations reacts definitely to the meanings or significances of objects. Things not only are hot or red, but these qualities function to stimulate the individual to perform a reaction to the total object of which these qualities are parts or phases. In most cases such responses as we may be induced to perform to phases of the objects with which we are not immediately in contact may be of such a vague and indefinite character that we may be said to appreciate them only very vaguely or indistinctly. Since this explication of stimuli functions of objects is always a developmental process we might say that *perceptual activities constitute a type of psychological action in and through which are developed the significance of meanings of things and relations operating in the adaptation of the individual to his surroundings and in the control of them.* As a record of psychological fact, whatever meanings are developed, that is to say, whatever explication of stimulational functions is achieved, is later made full use of by the individual in his succeeding contacts with the same or similar objects. To a certain extent, then, we may consider perceptual actions after they have developed, as knowledge or awareness functions. They serve as acts of appreciation of the character and qualities of objects to which the person is in the act of adapting himself. In this sense we may assume that perceptual activities involve an elementary understanding of the objects to which the person is reacting.

In an essential way the knowledge of perceptual reactions consists entirely in the building up of specific types of reaction systems to objects on the basis of actual contact with them. Perceptual knowledge reactions as we have seen previously are such because they influence the later operation of some response to stimuli objects. Now these knowledge reactions are derived invariably from the actual properties of the object with which the person comes into contact. As our study of perception indicates in more

[1] As a matter of fact a distinct attention action is also interpolated.

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than one place, these various properties of the actual object are reacted to as known about, through actual contact with some other or others of them, so that on the whole we thus achieve our detached reactions to things.

The character and consequences of perceptual reactions may all be traced back to the fact that such acts always constitute behavior of the person in which he is not intimately bound up with stimuli objects, as he is in the case of ordinary differential responses. Perceiving or sensing action constitutes a more deliberate form of conduct than mere differential behavior; namely, the acting individual has some control over objects or at least is not rigidly subject to them. Thus, for example, whether our seeing or hearing responses are or are not considered as immediate responses, such as withdrawing the hand from a hot object, at least the person in the former instance is not so much at the mercy of the object being reacted to as in the latter case.[1]

Similarly, the control which is a feature of perceptual activity might also be looked upon as merely an advantage accruing to the individual because the response is somewhat detached from the stimuli objects. If we can appreciate that a certain action must be performed before we are actually doing it we can more effectively prepare to do it and to accomplish more thereby.[2] Thus if one appreciates the character of a dangerous thing before actually getting into contact with it one may run away or dodge the object.

The various degrees of an individual's detachedness from stimuli objects make place for a variety of forms of perceptual behavior. We may perform a perceptual reaction which is detached from another reaction but so intimately related to it that the two are parts of a single activity (behavior pattern). In other activities the perceptual reaction is more independent of the following reactions than in the first case; it allows for a larger and more effective survey of the total behavior situation before the second action occurs. In still other conditions, the perceptual reaction is an orientative response and may be entirely free of any later or further performing action. Such perceptual reaction systems are connected with implicit consummatory responses. Here the perceptual action symptomatizes a deliberate and purely cognitive rela-

[1] Notice that the so-called distant reactions, seeing, hearing, etc., stand naturally between immediate adjustments and definite knowledge processes. Seeing can substitute for touching. We have here the problem also of having to see what there is to be seen but we do not have to do the seeing. With touch objects of course we do. Thus we see that as a matter of fact the lesser inter-connection of the person and his stimuli objects in perception may be even a matter of spatial proximity. It must be observed that the psychological inter-connection is in inverse ratio to the spatial and physical contiguity of the person and the stimuli objects.

[2] It is understood that the temporal element is relative. The entire time may be a second or less.

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tionship between the person and his surrounding stimuli objects. As we shall have numerous occasions to point out the different types of perceptual functions condition different types of behavior segments. Also our study will indicate that the different perceptual reactions occupy different positions of importance in their respective behavior segments.

The Specific Character of Perceptual Behavior

More specifically to delimit the character of perceptual activities we may point out that such behavior constitutes, with problematic exceptions, factors or phases of complicated behavior patterns, the perceptual phases constituting one of the reaction systems in the pattern.

From our study of the general character of perceptual activities it appears clear that such behavior forms must constitute parts of the precurrent features of responses or patterns of reaction. As will appear in our further study, these range from mere precurrent determiners of the final or other later reaction systems in the pattern to very definite anticipatory acts connected with succeeding responses.

Still other forms of perceptual actions are those in which the final reaction fades into insignificance beside the precurrent perceptual contact of the person with the stimulus object or condition constituting the stimulus phase of the entire behavior segment.

Perceptual reaction systems may also be connected with complex knowledge and thinking processes of all sorts. In these cases the perceptual activity constitutes an important link between the problems and conditions constituting the stimuli for thought behavior, and the thought activities themselves.

An essential specific characteristic of perceptual activities is that they are to a certain extent non-performance reactions, responses which are definite enough adaptations but which do not constitute a performance in the sense of modifying directly the stimulus object. Perceptual reactions we should note, however, in common with all meaning responses, are definitely derived from performance reactions. Thus their degree of development is marked by their degree of removal from actual performance situations. Accordingly, perceptual reactions of the most elementary sort are such slight variants from ordinary effective activities that they merely operate in conjunction with some other act in the sense of determining it. In more elaborate and complex situations the perceptual action may be entirely a non-effective reaction system, that is to say, a mere referential and orientational response.

Perceptual actions consequently are most frequently, if not always, partially implicit activity in the sense that they are representative and orientative in character. The person's action not only constitutes always a direct response to some object with which he is in actual contact but also to some phase of the object with which he is not in direct contact. For this reason perceptive ac-

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tivities are partially implicit, but only partially so, it must be remembered, for some phase or portion of the stimulus object in the sense of its qualities and parts must always be in direct contact with the reacting person.

Fundamental Psychological Bases of Perceptual Activities

As is true of all complex psychological activities so in the case of perception we can trace back the performance of the person to simpler forms of action from which the complex actions may be considered to be derived. Accordingly we find that perceptual responses have their basis in and involve the operation of a number of the characteristic psychological activities.

Although perceptual activities are very different sorts of actions from ordinary differential responses, nevertheless, they are essentially built up from such psychological activities.

Differential Behavior

Differential reactions, we may recall, depend upon the particular quality of the object with which the person is in contact and the fact that any specific quality or character of an object produces a different reactional effect upon the responding individuals. Now, whenever the person gets into such contact with an object that its varying or different qualities affect him, he will develop so many and such different reactions to things that his responses may be looked upon as involving the appreciation of the nature and actions of the stimuli objects. This type of behavior marks the development of perceptual actions from mere differential behavior.

To trace further the development of perceptual responses from differential behavior we may observe that the meeting of the person with qualities in an object not implied by its original or a former stimulational function so far as he is concerned, produces in the individual a halting or inhibitory response in his later contacts with that object. These inhibitory activities definitely imply a reference to its untoward qualities, or we might say, an appreciation of it beyond that of a mere differential reaction. In slightly more developed situations the original halting action may become interposed as a mediating and conditioning response between the stimulus object and later mediated and determined action.

Modifiability of Behavior

Perceptual reactions as meaning responses have a definite basis in modifiability of behavior. Thus even the simplest forms of meaning reactions constitute responses to an object some or all of whose properties previously called out, and perhaps normally call out, a particular sort of reaction, but which now call out a different kind of response. The stimuli of perceptual responses consist then essentially of objects, situations, or persons that have taken on newer or different stimulational functions. Thus in the case of the candle illustration, whereas in the original situation the object called out a finger-projecting and object-touching response, it later calls out a retraction or non-touching reaction. In such comparatively complex cases of meaning activity as perceptual

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reactions are, we find that behavior segments have become enlarged to admit a precurrent determining perceptual response besides the final or consummatory reaction.

Inhibition

Our familiar candle illustration sufficiently indicates that at least in the development of perceptual reactions the person inhibits his action as a part of the process of developing the referential or orientative reaction to the perceptual stimulus object. In this situation we have probably the simplest type of inhibitory activity, which may be described as the inhibition of one reaction stimulated by one phase or quality of the object, while another action presumably stimulated by another phase of the same object, is actually performed and carried out. In more complicated perceptual situations also we find the same inhibition feature operating. In fact it is probably a feature of the operation of all perceptual acts in the sense that a non-performance reaction system forms one phase of the behavior segment. For we assume that the non-performance response implies an inhibition of a specific reaction system to some quality of the object which at the time is exercising a stimulational function, because of the predominance of some other stimulational feature of the object.

Association

We have already indicated a number of times that in the definite, meaning activity found in perception, for example, as over against the ordinary differential response situation, we have the development of a complicated behavior segment, namely one in which the response is a pattern. Now clearly in such cases a specific perceptual reaction system must become associated with some other reaction system in its pattern of response. Thus, in the case of the candle flame the visual reaction system becomes very definitely connected with the non-touching reaction system. This connection feature really consists of a development of the two reaction systems which we consider as being associated. Both processes, namely, the development of the two reaction systems instead of one and the intimate association of the two constitute a part of the development of the perceptual behavior segment. Again we may note that this associational connection between the perceptual reaction system proper and the latter final or consummatory reaction is stronger in the simpler perceptual activities, in which the precurrent perceptual reaction is merely a determiner of the operation of the later final or consummatory reaction. In more complicated situations this association is of a looser sort.

Delay

Possibly the essential character of the connection between the precurrent perceptual reaction system and the later consummatory reaction system or systems may be best appreciated by the observation that perceptual reactions of the more complicated sort involve a longer delay between the operation of the precurrent and consummatory reaction systems in the behavior segment. Even in the simplest cases, however, we might assume that there exists a

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slight delay, since as we have already sufficiently indicated, in an ordinary differential reaction situation the seeing and touching of an object constitute only one reaction system, whereas in even the simplest cases of perceptual activity the two are distinct phases of a behavior pattern.

The Operation of Perceptual Behavior Segments

In attempting an analytic description of perception we are greatly assisted by the fact that practically always a perceptual reaction system constitutes one phase of the total pattern of response. Also we are aided in our descriptive enterprise by the fact that the perceptual reaction consists of a precurrent phase of the total pattern. Thus the form of analysis is fairly definite. We have only to be cautious to distinguish between the operation of a standard perceptual pattern and one which is at present in course of development. We may then proceed to tabulate the specific arrangement of reaction systems in a perceptual behavior segment as follows:

(1) Attention reaction system. } precurrent reaction systems.
(2) Perceptual reaction system. }
(3) Final reaction system. } final or consummatory reaction system.

When the action involves the development of a new meaning function the series proceeds thus:

(4) Emergence of new meaning, associated with a
(5) New Consummatory reaction system.

(1) Attention Reaction System

The attention factor may be regarded, as we have seen in the chapter on attention, as the actualizing of the stimulus and as a selective process serving to prepare the individual for a new reaction. Or in simpler cases, we might look upon the attention factor as the change in focus of one's activity from one object to another. At any moment of time innumerable possibilities for action naturally exist because of the person's previous acquisition of many reaction systems and the actual presence of the objects to which they constitute responses. Any change in the actual interrelationship between the person and his surrounding objects provides occasion for a new form of action. This may happen when the individual walks into the presence of new objects or when the latter change their position with respect to the person (walk towards him, are thrown toward him). Sometimes this new relationship between the person and the surrounding object is established by some change in the medium of contact between the two factors of the activity, as when an object casts a shadow into the visual field of the acting person. As we have already seen in studying attention, the attention processes depend not only upon the stimulating object and its setting but also upon the condition of the organism at the time. That is to say, the selection process depends very directly upon

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what the activities of the person were prior to the present contact. Such activities condition also what precise phase of an object we will react to at a given time. Thus, for example, the problem as to why at one time our attention is attracted to a red solid instead of a smooth surface, when both form the phases of a book, is solved by an investigation of the previous activities of the person.

(2) Perceptual Reaction System

Next follows the perceptual reaction system proper. We have frequently pointed out already that it is non-performative in character, although of course it involves all of the component functions of every reaction system. The fact that the perceptual reaction system is referential in character often means that there is very little muscular action visible to the observer, such as for example when one sees or hears something. But even in such cases, depending upon the character of the stimulus object, the perceptual reaction system may involve very apparent activities of all sorts. Possibly the least apparent perceptual reaction systems are those which involve mainly the operation of the head segment of the individual such as in seeing or hearing for example. There are, however, classes of inapparent perceptual activities in which the details of the individual's behavior is of extreme importance in the total behavior pattern. For example when the objects are such as we ordinarily call disgusting or nasty, the perceptual reaction system may involve a very extensive suffusion of behavior involving a great deal of visceral activity. Such perceptual reaction systems color and modify tremendously the entire behavior segments in which they operate.

(3) Final Reaction System

Following upon the operation of the perceptual reaction system comes the final activity which has been associated with the former in some previous time. In simpler activities the final action is a fairly simple effective adjustment and follows very closely upon the operation of the perceptual phase. In other cases the consummatory reaction system may be affective in character in the sense that the individual will perform approving, disgust, liking, or pleasing responses etc., to the stimulus object. Again, in other situations the perceptual reaction system is followed by a final action which is a knowledge or reasoning action. That is to say, the perceptual response to an object may be succeeded by a judging or evaluating activity with respect to it. In general, we might point out that in elaborate perceptual behavior segments the perceptual reaction system may be connected with every type or variety of psychological activity.

(4) Emergence of New Meaning

As a result of the operation of the reaction pattern a new effect may be produced upon the organism. Should the object or person reacted to, with all the involved relations, remain constant, no new reaction is called out; that is, the previously developed reaction pattern remains unmodified despite the present contact. The object, then, will not take on any new meaning and the consummatory

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act following the appreciation of the identity of the object may be precisely like one that has previously occurred. We can readily determine this to be the case of perception in use. On the other hand, should the previously developed reaction systems prove inadequate for the present purpose, new features may develop. Instead of the old perceptual or orientative response continuing to operate a new one will ensue. Just what its character and importance will be depends of course upon specific circumstances, in other words, upon the actual changes in the behavior situation and also upon the nature of the old perceptual behavior pattern. Naturally these changes may be very great in number and will depend of course upon what particular person is performing the behavior.

(5) New Consummatory Reaction System

Correlated with the development of a new specific perceptual reaction system there is also developed a new consummatory reaction system, contingent for its specific character upon the same elements that operate in the case of the perceptual reaction system. To illustrate, should the apple previously sound and firm to touch later not offer the same resistance to our tactual perception of it, it will call out different handling responses. Similarly, should it present color surfaces varying in hue, turning from red to brown, the object thus acquires a new meaning and will be reacted to in a different way, that is, as a deteriorated instead of a sound apple.

The student of psychological phenomena will appreciate that to a certain extent this analysis of a behavior segment is logical in character, in the sense that it is only by considering a great number of such activities that we can detect a chronological order in the stages of the total action. No question exists, however, but that this analysis represents an actual description of the behavior in question, even though in some cases the specific stages must be considered as operating almost, if not quite, simultaneously.

Functional Forms of Perception

The character of perceptual reaction systems differs very markedly in different behavior situations, so markedly in fact that there is great variation in the way such reaction systems operate in different behavior segments. We may accordingly analyze and describe at least four definite functional forms of perceptual activity. These forms we may tabulate as follows:

(1) Primary Perception.
(2) Simple Apprehension.
(3) Complex Apprehension.
(4) Comprehension.

Primary Perception

This type may be considered as the simplest form of perception. That is to say, we have here a form of psychological act but little removed from differential sensitivity or differential action. So far as the meaning and reference function of the primary perceptual reaction system is concerned we might point out that it is exceedingly closely connected with an immediate action or movement

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toward or away from an object. The main point is that the bare seeing or hearing reaction system is inseparably connected with a definite overt and even effective reaction system. Such inseparability of the precurrent and final phase of the behavior segment symptomatizes the slight emergence (logical) of such action from the class of mere differential behavior.

In primary perception, then, the behavior segment discloses to us a definitely performative behavior picture. Not only is the final behavior factor a definite overt act, but the precurrent perceptual factor is hardly much less performative in character.[1] This type of activity may be well illustrated by the training of the winking reflex. The procedure here is to attempt so to divide up the winking reflex that the observer may see the stimulus object coming toward him and yet not close the eye. Great difficulty is ordinarily experienced in this training, for the separation of the seeing from the lid-closure act is not easy of accomplishment. In so far as this is accomplished we can definitely observe the operation of this particular form of primary perception.

On the functional side we may consider that the primary perceptual reaction system merely conditions or determines the operation of the final reaction system. This function arises from the historical relationship of the two phases of the response in which the primary perceptual reaction system operates. In other words, this determinative influence is merely a reminiscence of the emergence of both behavior factors from a common behavior matrix. In general, we might say that in performing primary perceptual actions the individual merely appreciates and senses the presence and absence of objects or of their qualities, rather than the nature and operation of such stimuli objects.

Simple Apprehension

In this more complex form of perceptual activity a lesser connection exists between the precurrent perceptual reaction system and the final or consummatory response in the behavior pattern. Consequently, the perceptual process comprises a more definite referential and meaning activity. This situation is excellently illustrated by the fact that we may well consider any specific perceptual function to be associated with a series of different consummatory reaction systems. We might point out also that in simple apprehension activities the preceding attention factor is likewise a more definite and distinct activity than is true in primary perception.

Although in simple apprehension we still have a definite performative situation there is nevertheless visible a more distinctive referential process. Indicative of such a referential character is the fact that this type of perceptual act marks a greater control over stimuli situations on the part of the acting individual, because

[1] In this description the term performative may be considered as including affective behavior.

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when the person appreciates the character of the object before further reacting to it the type of final response is widely variable between certain limits. The lessened attachment between simple apprehension reaction systems and the associated final reactions, and also the greater complexities and effectiveness of conduct that this makes possible, are a direct result of the different origins of such activities. Briefly, such behavior segments constitute intimate developments of the person's reactional biography; that is, they are organized during the individual's various contacts with his stimuli surroundings and not primarily through the breaking up of simple differentiation reactions.

The specific function of simple apprehension reactions may be here described as elementary anticipatory activities. The person not only appreciates the presence of an object but its status also. If the ball approaches rapidly or slowly the consummatory reaction is modified accordingly. In these reactions the individual not only refers to the object, but in a very elementary way the perceptual reaction system points to the associated final reaction also.

Complex Apprehension

The perceptual factor in this type is still more autonomous than in the other situations already described, although the primary function of the perceptual action is to mediate and direct a final reaction. Here we have the situation of the deliberate interest in the character of a stimulus object in order to perform an appropriate final response. The performance of a final reaction and its character will depend not only upon the identity and operation of a thing but upon its significance and use as determined by the immediate and direct appreciation of it. The primary interest of the person may be to call upon a friend, but in order that the act shall be carried out he must first perceive the proper number upon the house. If that number is perceived, then the entrance reaction immediately follows but if not, the person goes on to the next house, etc. Possibly a better illustration would be the perceptual act in a multiple choice reaction experiment, for we must insist upon the precurrent reaction system belonging to and being connected with an immediately following consummatory reaction system, both reaction systems being factors in a single behavior pattern or behavior segment. In a similar way complex apprehension may be connected with feeling responses. During the past behavior history of the individual a certain object has taken on affective stimulational functions for him so that now the perception of that object results in an affective response. Here the operation of the affective reaction system depends absolutely upon the perceptual function for its occurrence and quality. But the two activites are distinct and different.

Complex apprehension reaction systems are not very definitely performative reactions although they are not completely severable from performance acts. As in simple apprehension the connec-

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tions between the perceptual and the consummatory phases of behavior patterns are developed in a person's long reactional history, but here the actual connections are not the products of that history. On the contrary, in this case the connections are developed only as possibilities through the past experiences of the person. Not only are the connections between the perceptual and final reaction systems in complex apprehension behavior dependent upon the reactional biography of the individual, but also upon various immediate contingencies. And so at particular periods when the individual is doing something, when he is stimulated to get some particular book for example, his ability to get into contact with that book is derived from prior perceptual activities. But not only has he acquired the reaction of touching this book upon visually perceiving it, but also of kicking it, nodding at it, etc.

In complex apprehension, then, the perceptual reaction system is much more autonomous than in the simpler types, for here a large number of particular consummatory acts may be very closely associated with one particular perceptual response. The complex perceptual reaction system is autonomous in the sense that it operates in the service of a final act and is less a part of it than in the two cases of primary perception and simple apprehension.

How can we further describe the actual function of complex apprehensions? We may say that such reaction systems serve as simple orientation reactions. While performing such activities the individual orients and places himself in desirable or necessary contacts with the objects and situations to which he must adapt himself. Complex apprehension reactions therefore bring the individual into the proper relationship to things in order to perform adequate responses to them. Because these activities are associated with performance responses, if only in a tenuous manner, they merit the designation of only partially orientative as compared with the comprehension reactions, for example.

Comprehension

Perceptual reactions of this type are completely dissociated from any performance or effective reaction. In many ways they may be considered as the most complex of all the distinctly perceptual activities. In this class we may place the activities of seeing, hearing, and so forth, which need not be further connected with any succeeding effective activity with respect to the objects seen or heard. We might indicate here that the entire behavior segments may be looked upon as looking or hearing activities, in other words, as merely non-effective behavior. In these cases the final reactions may be considered to be merely such activity of the person as operates in the service of the seeing or hearing. For example, in perceiving a picture we may consider the seeing act as followed by merely the continuance of standing in front of it or perhaps turning the head in order to hear better. From an ordinary every day standpoint we might say that the individual

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is merely looking at or contemplating a landscape in the sense that from the same standpoint he is considered as very inactive.

Comprehension reactions represent then, the least performative of all the perceptual activities. When such activities are connected with performative actions of the person, as they very well may be, we must look upon the performative feature as constituting a new behavior segment over and above the perceptual behavior segment of comprehension. In this sense, however, the perceptual activity may belong to a very important and complex performative behavior situation. A good example of this type of behavior is the activity of the look-out on a vessel. His immediate task is merely to look and discern any difference from the present clear condition of the ocean path. As such his action is passive. But should some change occur requiring more active performance the latter would be the direct result of the passive seeing, but this new activity would constitute a new behavior segment. In this connection it is well to observe that as a matter of fact it is this type of perceptual activity which is connected with complicated knowing and other implicit actions; that is to say, the comprehension type of perceptual activity operates very frequently in combination with the activities of evaluating, judging and inferring, which actions are based upon the comprehension of objects and situations.

Perception in Development and Use

An important distinction has insinuated itself into our description of perceptual behavior which must be made more explicit since it sums up and throws into relief the essential facts of this type of phenomena. This distinction we may refer to as the difference between the development and the use of perceptual processes. As the terms imply, perception in development connotes the fact of building up and organizing perceptual behavior segments, while perception in use refers to the operation of those behavior segments after they are organized. We shall have occasion to point out that these two processes are not entirely different activities but are in fact very closely interrelated actions of the organism. The differentiation made indicates the extremely complex and constantly varying character of the perceptual reactions and points to the mechanism of elaboration of such activities. For above all, perceptual activities, in common with other psychological phenomena, are genetic and developmental in character. For the present we must attempt as thorough-going an analysis as we can of these two activities.

In general, perception in development constitutes the organization of behavior patterns; so that some phases of them (perceptual responses) operate as precurrent to others (final reactions) and function as conditions or controls of later activities. As we have already observed, this process may consist of the division and amplification of a single effective and overt reaction system into a

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final effective reaction system and a precurrent semi-implicit reaction system. The further developments of perception consist in the organization of numerous cross-overs between specific precurrent reaction systems and particular final reaction systems. To illustrate, not only must the person develop and organize the reaction of jumping when he visually perceives the ball coming toward him, but he must likewise connect up that jumping with an auditory perceptual action. In other words, he must connect up the jumping reaction systems not only with the precurrent reaction systems involving primarily visual receptors, sensory nerve apparatus, etc., but also with reaction systems involving auditory or other features. In similar fashion the individual must organize the different sets of final reactions in association with the same general type of precurrent actions. Thus visual perception of an object may be associated with a jumping, shouting, or other reaction system.

Just how these organizations or associations are brought about may be understood from the observation of the ordinary processes of habit formation and the conditioning of reflexes. Excellently is the entire situation under discussion exemplified by the story of the discharged veteran who had the auditory (verbal) object "attention" so closely associated with a particular organization of auditory perceptual precurrent actions and a final consummatory response that he lost the pie he was carrying when a practical joker uttered the command. Such organization of precurrent and consummatory reaction systems may of course be brought about either intentionally or during one's casual contacts with surrounding objects and conditions.

The essential feature of perception in use involves in its simpler form, as we have seen already, the fact that, once the organization of precurrent and final factors of the behavior pattern with the stimulus situation is effected, the former will operate when the latter appears or is presented to the individual. In more complicated situations perception in use means that a particular reaction system or pattern can be put into operation by some phase or feature of the stimulus object. This means that my running away from a dangerous object may be conditioned by either a visual or auditory perceptual precurrent reaction system because both are connected with the running, both combinations representing behavior segment organizations.

Precisely which form of perceptual action will operate at any particular moment will depend upon the more striking attention-claiming character of the object or upon the availability of a particular stimulus medium. The former situation is illustrated by the condition of whether the sounds made by the dangerous object as it comes toward me is more efficacious in claiming my attention, or whether the visual factor is. The second situation is illustrated by

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the condition of whether the atmospheric and light conditions are such that either the light or sound medium is more effective. In many cases, of course, the question of what sort of precurrent perceptual reaction system operates is a mere accident of the person's position and special orientation with respect to the stimulus object.

Our discussion of perception in development and in use has been confined mainly to the simpler functional forms. When we take into consideration also the more complicated types, and especially those in which the consummatory feature is not a performance action at all, there are many more types of behavior segment organization possible.

Another very important point in perception development and use is the fact that because of the many contacts that a person has with some objects, and the consequent development of many forms of precurrent perceptual reaction systems, many of them may be aroused to action at the same time through a single contact with the object which ordinarily results in the arousal of only a single particular form of precurrent response. Thus the visual contact with ice may terminate in the simultaneous arousal of a complex system of coldness, smoothness and hardness meanings. To a very considerable extent the effective adaptation of the person to his surroundings depends upon the complexity of the meanings aroused by a single contact with a particular object, since the variety and rapidity of final action is contingent upon such a complex arousal of precurrent perceptual actions.

As we have already suggested perception in development and in use are not two distinct operations, but rather two mutually interrelated processes. Since the perceptual activities are constantly developing we have in practically every new operation of a perceptual reaction system a more complex association of the component action elements with the stimulating situation. If we consider the perceptual reaction as the use of meanings stimulated by direct contact with objects we find that the distinction between the development of perception and its use really comes to the question of the amount of direct simulation which is required to elicit the response. Perception in development requires a relatively larger series of direct contacts to effect an equally complex response than is true in the case of perception in use, for in the latter instance the meaning attaches to an incipient reaction pattern. We repeat, the development of perception is a process of so associating acts that only a minimun number of receptors may be necessary to effect the appropriate response. If we remember that this development never ceases, provided that we have occasion to react to the given stimulating object, then it is clear that perception in use is merely the condition of responding on the basis of a previously acquired reaction system, pending its modification by the present contact with the object in question.

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Genesis and Morphological Character of Specific Perceptual Reaction Systems

We come to the problem of investigating the specific morphological character of a perceptual reaction system. In this investigation we must attempt to analyze the specific organization of factors in the perceptual behavior unit. As we shall see, this problem connects up very intimately with the problem of the specific genesis of any particular reaction system. In other words, just what the morphological character of a perceptual reaction system will be like, depends upon the development of that behavior unit during the contact of the individual with the object to which that behavior unit is a response. We will now turn to the genesis of perceptual reaction systems.

In the first place, we might observe that most frequently the perceptual reaction system consists of a vestigial behavior remnant of an original performance contact with a particular object or situation. In our candle illustration we have seen that the visual perception of the candle consists of a split-off vestige of an original seeing-touching reaction. In this illustration the origin of the behavior vestige constituting the perceptual reaction system is very clearly defined. In other cases the origin of the reaction system is not so definitely traced but nevertheless is a smaller or larger remnant of an original more performative reaction to the correlated stimulus object. Logically this vestigial origin of perceptual reaction systems seems to follow from the fact that they are always only partially implicit and therefore have to be derived from some more overt behavior segment.

Because we can trace out in our candle illustration the precise origin of the semi-implicit perceptual reaction system we can appreciate its particular morphological nature and how such morphological organization came to possess the cognitive function it exercises in the behavior segment. In the case of the candle we find that the perceptual behavior segment is localized as a head-segment reaction system, involving the retinal receptor, the optic pathway, the optical cortex, the eye musculature, etc., etc. In our various perceptual reaction systems we find of course that the precise factors of the behavior unit may involve what we ordinarily call a larger number of features of the organism's behavior mechanisms. Thus, for example, in our illustration the reaction system may include besides the head segment some phases of the original hand or finger extension mechanisms.[1] What we describe as happening in this particular situation we may generalize as happening in every type of perceptual reaction system, whether it be visual, auditory, or some other sort, whether it include a larger degree of implicitness or whether it is not far from its original performative nature.

[1] We might be reminded here that in all cases, of course, the whole organism is operating but the question refers to the localization of some particular action mechanism.

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In every case of perceptual reaction system origin, the specific factors involved depend in the final analysis upon the fact that we have on the stimulus side objects and conditions possessing very definite properties, such as colors, textures, relations, etc., and on the response side an organism developed with a particular kind of structure, so that specific correlation between the qualities of objects and particular behavior mechanisms of the person may be drawn up. Thus colors, sounds, tastes, hardnesses, etc., can be coördinated with specific receptor systems. For example, the retinæ (rods and cones) are normally sensitive to light reflected by colored surfaces of objects and the cochlea (organ of Corti) to air vibrations which emanate from sounding bodies. Similarly, of course, the particular qualities correlated with the receptors will have to be correlated with specific sensory and motor neural functions, and with central neural functions, etc., etc., in each case.

This particular matter of specific structural and quality correlation may be described on some hypothesis concerning the evolutionary development of the organism in its particular environmental surroundings. In general we have here the problem of describing the interactional mechanics of natural things, at least one of which is a psychological organism developed and organized in the manner we have suggested. We might add that whenever we have such a complex situation as we have previously described, namely, one in which the perceptual contact with an object results in a series of meaning reactions, in that case also our same principle operates. The intimate details of that situation can be equally well understood by consulting the reactional biography of the individual with respect to the activities under discussion.

In addition to being in some sense a vestige or part of a previous performative reaction system, a perceptual reaction system may also be a transposed or substituted precurrent factor from some other behavior segment. Thus a perceptual reaction system belonging to some specific original behavior segment may become the corresponding precurrent response to some other final reaction system. This latter final reaction system we may assume was not acquired by the person while in contact with the stimulus object corresponding to the perceptive reaction. In such a case we always discover some common elements in the stimuli objects belonging to the final and to the transposed perceptual actions.

We may illustrate this type of substitution origin of perceptual reaction systems by the reading reactions to letters and words which may be altered or partially removed. Such an origin of perceptual reaction systems we may refer to as an analogous or secondary origin.

Still another form of secondary or analogous perceptual origin is that in which the perceptual reaction system developed in another though similar situation is transferred to a new behavior segment

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on the basis of similarities. In this new segment the perceptual reaction system operates without a direct and immediate derivation from any original peformance situation. This fact may be illustrated by performing a perceptual action to one twin derived from the other. In all such situations when the similarities are not correctly gauged the result proves to be misreaction.[1] Naturally enough such a substitution of perceptual response is only a step removed from the secondary occurrence of a perceptual reaction upon the basis of one's own previous contact with an object.

As might be expected, the most fertile, if not the exclusive field for the development of secondary and analogous perceptual reaction systems, is that in which the final or consummatory factor is not a performative act. In general, it is only in the more complex situations that secondary perceptual development is possible. Accordingly, if we can name one type of situation which is the most fertile for both the development and operation of analogous precurrent perceptual reactions it must be the field of verbal conduct. Here there is a constant substitution in one behavior context of perceptual reactions developed in another stimulational behavior context.

Simple and Complex Perceptual Behavior Segments

From our study of perception it is evident that perceptual reactions not only constitute a large part of every person's total activities but that they differ immensely in specific form and function. Some notion of the great range of perceptual behavior may be gleaned from a division of them into simple and complex reactions. This division has to do primarily with the amount of reference or meaning function of the specific reaction systems. Of course incidentally it refers to other factors, such as type of object constituting the stimulus, and morphological character of the specific reaction system.

Simple Perceptual Behavior Segments

Within the range of the simple perceptual reactions we may consider two types, (1) the not yet complexly developed perceptions and (2) those that always remain simple. As we shall later see perceptual reaction systems may become elaborate and developed in the number of references to things, so that there is an ascending scale of complexity of such behavior units. Before there has been any development such reaction systems are simple and the behavior in which they operate is not very far removed from mere differential conduct. Such activities however are only temporarily simple and do not fall into the province of our present discussion.

The second type of simple reactions are those activities which have few references since they are responses to very simple stimuli and in general function in simple behavior situations. Not only are such reactions comparatively simple but they serve only to determine some immediate further reaction. Among the behavior

[1] See below, p. 280.

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situations in which such reactions operate we may enumerate those in which the person reacts to simple natural objects, to simple conditions of oneself, and other things. Clearly, the simpler perceptual reactions do not go above simple apprehension in functional form.

Within the division of simple perceptual reactions we may further distinguish those in which the perceptual action is always isolable from the rest of the behavior segment and those in which this is only sometimes possible, and perhaps just as frequently not at all. The last type naturally is the simplest of all and can be illustrated by the perceptual acts with which we distinguish and adapt ourselves to the conditions of our own organism, such as hunger, nausea, thirst, etc. In these activities there is no very definite distinction between the precurrent and final activities. In fact one can scarcely distinguish between the reaction and medium, or even the reaction and the stimulus,—especially since in so many cases the stimulus itself is the reaction of the individual of a simpler sort, as in the case of hunger, thirst, nausea, etc.

In the isolable simple perceptual reactions one can very definitely differentiate all of the factors. There is no confusion of the stimulus and its medium, or of stimulus and response, or even of the precurrent and final phases of the behavior pattern. Examples of such isolable perceptual activities are those in which the so-called distance receptors operate, namely, hearing, seeing, etc.

Complex Perceptual Behavior Segments

In complex perceptual reactions we have very much more complicated stimuli conditions and objects. Also the reference functions are always very intricate. Many different references or meanings are served by or operate within a complex perceptual reaction system. The entire general situation becomes clear when we say that we can perform complex perceptual reactions to stimuli which may be called beautiful, fitting, industrious, gaudy, reprehensive, etc. In other words, we are not limited in our perceptual reactions to respond only to simple objects. The most complex things, relations, and actions, as well as events and tangible circumstances may be the stimuli for perceptual reactions. What is always requisite is the ability of the person to be in actual contact with the thing or condition. To illustrate such complex reactions, consider the perception of some beautiful object. Here undoubtedly the specific perceptual function is not one which is aroused immediately upon the presentation of the stimulus object, but one which comprises numerous references to it. Thus we see in a beautiful object various symmetries, gradations of forms and textures, harmonies of color, so many different references in fact that any attempt to isolate them logically has so far always met with practical failure.

So much for the complex perceptual reactions to things. We may now turn to the complex perception of actions and especially

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of persons. In responding to the actions of other persons we perceive the significance of those activities, the meanings of which through thousands of our own past experiences we have come to appreciate. Thus, we can see them as honest, sincere, careful, gay, sad, clever, appreciative, friendly, etc. The specific stimuli for these perceptual responses are probably the facial and other gestures of persons, and particular movements of eyes, hands, trunk, legs, etc.

Among the more striking relational stimuli for complex perceptions we may instance the consonances and harmonies and their opposites existing between musical or sound objects with which we are in contact. This illustration suggests strongly that whereas ordinarily it is the visual objects which appear as the more common stimuli for complex perceptual responses, any other type with which the person can get into contact may also serve in this capacity. It is only necessary to add here that the complex perceptual behavior that we have been indicating constitutes responses that are primarily precurrent to ideational, and affective reactions. However, in some of the cases of complex perception the final or consummatory phase of the behavior pattern may be effective and performative in character. Most carefully must we guard against the error of mistaking the precurrent perceptual responses for the ideational, affective or other final actions which follow. There is much danger in confusing these complex perceptual reaction systems with judging, feeling, or other responses following them, or in inadvertently making them into the complete behavior segments of which they are really only parts.

Special Characteristics of Perceptual Behavior

A close definition of the nature and operation of perceptual behavior requires pointing out that besides the characteristics which such activities possess in common with other types of behavior, they involve a number of special characteristics which distinguish them from all other types of action. Accordingly, we will discuss two characteristics belonging to perceptual reactions alone, first, their relational and interpretative character, and secondly, their modal nature which is not exclusively a feature of perceptual responses.

Relational Character

Observations upon the perceptual interaction with things convince us that not only are all perceptual reactions not merely responses to specific qualities, but also that they are not confined to isolated objects. They are more than either of these descriptions indicate; they comprise responses to a complete object in its entire setting. We might generalize this fact by saying that we always perceive situations and not just isolated things. Our conduct, of course, is conditioned accordingly. Thus a chair which originally would be responded to by being sat in, will not call out such a response when it is occupied by some object or when there are individuals present before whom it is impolite to make such a

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response. In every such case the meaning of the object will depend upon the contextually related objects or settings of the stimuli.

When the chair by itself is reacted to we respond to a unified object, and not to simple elements (back, seat, legs, etc.,); that is to say, we react to an object to-be-sat-in, and not to isolated fragments which require to be somehow connected. This relational character of perception is excellently illustrated by our responses in which words and not letters are the stimulating objects, and further in which the words are directly and inseparably attached to other words. James points out with his characteristic vividness the unnatural aspect which a word takes when looked at in protracted isolation. "It stares at him from the paper like a glass eye with no speculation in it. Its body is indeed there, but its soul is fled."

That we can immediately appreciate a complex situation apparently comprising many diverse elements is owing to this relational character of perception. Therefore, in looking at a landscape the objects all seem to be in their proper places; distances are correctly located and the lights and shadows properly distributed. A total situation is the customary object of our reactions and is thus the stimulus to a unified primary response or simple apprehension. The meaning of the total situation can be readily and completely confounded by placing ourselves in a position incapacitating us for response such as looking at the landscape with our head upside down. Much the same effect is produced by looking at an inverted painting. In such situations what happens is that the series of integrated reaction systems are thrown out of their customary harmonic organization and must be reorganized before the object can be correctly perceived. Experiments on space perception have shown that by practice disorganized response systems can readily be reintegrated.[1]

The difference in the responses to objects when they appear in different contextual relations illustrates the extremely subtle interaction between the stimulating object and the reacting person, and also shows the operation of perception as an adjustmental reaction to surrounding objects. Pliableness of the individual in this sense constitutes an important factor of general intelligence and exemplifies the law of integrated modifications of reaction systems mentioned above.

While the relational characteristic of perceptual responses is owing relatively more to the stimulational conditions of the activity, that is, we respond perceptually to an object on the basis of its relation to other objects and conditions, the interpretative character of perceptual reactions, on the other hand, refers more to the response side. An individual's behavior equipment and his intimate reactional biography directly condition the operation of his

[1] Cf. Stratton, *Psychol. Rev.*, 1897, 4, 341–360, 464–481.

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perceptual behavior. It is an observable fact that the reaction systems which the individual has developed in his constant contact with objects, play a large part in any present reaction. In a genuine way such reaction patterns constitute the individual at the moment. Since, as we have indicated, these response patterns have been developed in the individual's previous experience, every perceptual reaction may be thought of as an interpretative function. In effect, this means that the person will respond to objects much as he has been accustomed to do under previous conditions of contact with similar objects. It is this fact which gives origin to the idea that perception is a kind of habit. Being equipped with a response system to react to stimulating objects is fundamental as a condition of every recognition behavior.

The element of novelty comes into a response situation precisely at the point at which the person is unable to offer a complete response to the present stimulating object. Since the meaning of the object is not fully comprehended the person can respond in a way which is only a partial reproduction of a previous form of response. The lack of complete recognition means that the person is not supplied with a reaction system to respond immediately to the object in question. In such a case the pressing need for a response to the object results in an incipient trial-and-error process ending in a clear-cut appreciation of its meaning and a consequent thinking reaction.

The interpretative function of perceptual reactions is observable in many instances of daily occurrence. In the case of reading and speaking we find that there is a minimum of contact with the stimulating material (objects), but the response is none the less effective. In listening to a familiar voice, or familiar written material, we can easily demonstrate to ourselves that our response patterns are aroused by no considerable amount of excitation. No doubt the explanation for this lies in the individual's possession of reaction systems organized for particular forms of situations so that any prominent feature of the latter will set off the reaction patterns. It is here that we find the bases for the incorrect or unexpected responses commonly called illusions. For the same reason a person with a limited experience will be ready upon fewer occasions to respond to objects and in those instances will be slower to make the reaction. It has been aptly said,[1] that "the artist sees (reacts to) details while to other eyes there is a vague and confused mass; the naturalist sees an animal where the ordinary eye sees only a form." That the child reacts to objects in monotonously similar ways is true because it has been impossible for him to build up many reaction systems. And so for the child the character of the pony and what can be done with it are the same as in the case of the dog, with only a variation in size. The classical illustra-

[1] Lewes, *The Problems of Life and Mind*, 3rd series, p. 107.

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tion of the observable facts in this case is found in the name response (big dog) which the child makes to the pony, or (hair-sash) to a hair ribbon.

Modal Character

Perceptual reactions may be looked upon as knowledge reactions of a very elementary sort, since such reaction systems are partially implicit activities. But on the other hand, such reactions operate so rapidly, so subtly, and so mechanically that the question arises then as to what are the modal characteristics of such behavior. What is the status of the person's intimacy with his stimulating circumstances and surroundings? The answer appears to be that in the great variety and specific activities of the perceptual type all the different modes are represented. We may consider some of the perceptual activities as automatistic in character. This seems to be the case with primary perception actions. Others are subreactionalistic in nature. A rough connection may be established here between the subreactionalistic perceptual acts and those we consider as examples of simple apprehension. At the highest peak, of course, are those complicated perceptual responses to æsthetic and cultural situations which may at the same time be considered as personalistic responses. So far may such activities be considered as personalistic that we may think of the person as deliberately planning and enjoying his perceptual activities. Naturally in such situations it would always be perception in use rather than perception in development.

The Elaboration of the Perceptual Functions

The constant development of the perceptual responses serves as one of the individual's important means for acquiring a growing mastery over his environment. As the reactions to an object multiply, that is, as the number of responses which it calls out increases, the object takes on more and more meaning functions. It is owing to this augmenting elaboration of the perceptual response systems, by means of the addition of meaning factors, that the organism is enabled to make its way with greater facility through the maze of its surrounding objects. This facility is further increased by the fact that such perceptual elaboration makes it possible for the person to adapt himself to many situations without invoking a definite problem of adaptation. Because of the absence of such a specific problem, and the consequent exclusion of a thought function, the simple forms of the perceptual reaction allow for an immediate response to objects.

As a hypothetical illustration of the growth of the perceptual responses we might consider the reactions of a child to a typewriter. Allowing for a definite behavior equipment already acquired, the machine may be at first merely a thing which can produce a series of sounds when the keys are pressed. The machine, then, as soon as it is seen, has merely the sound-making meaning in the child's immediate response. With a more extended acquaintance with the machine the child learns that it can stimulate

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different and additional responses, and it thus has a different meaning when perceived. Finally, the machine takes on the complete set of meanings which are derived from all the responses the child can make to it. The point is, that what sort of perceptual reaction an object will call out at any time, or what it will mean, will depend upon the sum total of the person's contacts with the object in question. The perceptions of persons grow continually, and the growth depends upon the addition of new features to the response patterns and of completely new patterns of response.

The development of perceptions by the growth of responses is well illustrated when we are at the point of substituting one object for another in the face of an immediate need. Thus, a chair becomes a barricade, a step ladder, or typewriter table. As a consequence of the person's being forced to make new and unusual responses to objects, the latter become endowed with a range of new meanings. In the above illustration we also observe the active relating function as it occurs on the perceptual level. The similarity between objects is of course a fundamental causative factor in the perception building activity since otherwise the possible reactions to objects would be at such variance as not to admit of any correlation.

The entire problem of perceptual elaboration can be effectively summed up by pointing out that the perceptual reaction system may operate to refer to a progressively larger number of objects and conditions on the basis of an increasing number of contacts of the person with those objects and conditions. At any particular time the perceptual reaction system carries with it all manner of references to past contacts with stimuli objects and conditions by way of determining and conditioning the later reaction systems in the behavior pattern of which it is a part. At any particular moment, then, the referential function of the perceptual reaction systems constitutes a record of the person's previous experiences, excluding, of course, those functions that have been developed but which for some reason no longer operate. It is through this progressive development of referential functions that the person develops functional control over his surroundings. The more one sees in an object the more valuable or at least varied are one's final reactions to that object.

Stimuli Situations of Perceptual Behavior Segments

Clearly it is impossible to have treated the problems of perceptual action without mentioning at least implicitly the conditions on the stimulational side of such behavior segments. We may now consider some of the important stimulational conditions in a more explicit manner, to a certain extent summarizing the stimulational facts of perceptual behavior.

So far as the stimuli objects of perception are concerned we might forthwith indicate that any sort of object, action, condition,

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situation, event, or circumstance with which the person can be actually in contact in some way comprises the thing reacted to in perceptual conduct. Such things or conditions may be located in the individual's environing surroundings or within the body wall of the organism. As we have already pointed out the former type of stimulational situation is implied in the more definite and distinct forms of perceptual activity. Perceptions of one's own organic states or elementary reflexes constitute conditions which are not readily isolable.

A very important consideration in the study of the stimulational features of perceptual reaction systems is the isolation and description of the specific kinds of stimulational functions discoverable in such behavior segments. The problem here concerns the different kinds of stimulational functions found in the person's various contacts with the objects to which he reacts perceptually. In attempting to draw up such a set of specific stimulational functions we find, first, that a total and complete object can possess various stimulational functions on the basis of an individual's previous contacts with it. Here we have the situation of the object taking on a meaning function or a series of such functions in some previous contacts with the person so that it later conditions his behavior. In another type of situation we discover that it is not the whole object which serves to stimulate the individual, but only some quality of it which calls out a reaction to some other particular quality of the same object or to all of its other qualities, that is to say, to the object as a whole. In this case the individual must have developed a whole series of specific actions in previous contacts with the object. Just which reaction will be called out at a particular time will depend upon the context features of the object in a particular situation.

In the fact that our perceptual responses may be reactions to particular qualities of objects, as well as to whole objects, are revealed some difficulties which psychologists have had with the problem of perception. These difficulties have arisen in this way. In the ordinary genesis of perceptual activity in the infant we find that at first he is merely in visual contact, let us say, with an object (orange).[1] His early reactions to that object constitute merely responses to an orange sphere. Later on with more contact with that object the perceptual responses are elaborated so that the individual may react to a sweet, soft, smooth, edible thing while he is merely in visual contact with it. This fact has been misinterpreted to mean that an orange (fruit) consists of an additive organization of these qualities. This notion as a consequence gives rise to the statement that in the early stages the infant does

[1] We assume here that the activity is beyond the stage of differential reaction and is a genuine perceptual situation.

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not perceive an orange but only a color.[1] Clearly what happens here is that the individual is in contact with an orange, but only in sight contact (visual) with it. Later on he comes into larger and larger contacts with the same object with the result that the perceptual reactions become elaborated. This means to say that whereas in the earliest period the natural object orange had for the individual only a very limited stimulational function, namely, the stimulus of calling out a color-shape response, in the later stages the same object acquires through the individual's acquisition of reaction systems many and more complicated stimulational functions.

Besides things and qualities possessing perceptual stimulational functions we find that still another type of such stimulational function is that in which some relation in which a thing is placed will serve to arouse a reaction to that same thing in another relation. This is exactly like the case of one quality of an object standing for the other qualities in the immediately present object; only in the former instance it is a relation and not a quality which serves the stimulational function. In all of these cases it must be very strictly insisted upon that the individual is reacting to an object or thing with which he is directly in contact, for such is the essential fact in perception. We have here, as we have pointed out, a partially implicit action in the sense that some one or many qualities to which we are now responding is not in immediate contact with the individual, but this condition must be very definitely distinguished from the more independent knowledge activities in which the reaction is performed to an object which is not present at all but which is substituted for by some other object. In such a case the object immediately present serves to call out a reaction suitable to the object with which the person is not now in contact. We need only add here that the same points that we have been enumerating for objects hold for conditions and situations.

Varieties of Perceptual Behavior Situations

Although our main exposition of perceptual action appeared to refer more to the perception of objects than other things, still we made adequate allowance for those other forms of action. Now we must reinforce the impression that those other forms of perceptual activity are just as important and necessary for the adequate contact of the organism with its stimuli surroundings. In many cases this fact is obvious, for in order to adapt ourselves to our surrounding objects we must respond to their spatial relations and arrangement, for example, as well as to their qualities or properties. In every case, of course, we must react to an actual situation, which means in most instances that we respond to objects in particular places at particular times and under various specific conditions. The same thing may be said for the temporal ar-

[1] This is the basis for the fallacious traditional belief in "sensations" which are organized into "percepts."

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rangement of objects, their rhythm and movements, etc. Since we may have situations in which the reaction is exclusively or primarily to one of such phases we may consider them each as a different variety of perceptual behavior situations.

Perception of Space

Our problem here is to indicate how we build up the reactions constituting the sensing and appreciating of space relations and how such meanings later operate in the person's actual adaptations to space. In general, our problem is to describe the means whereby the individual learns to appreciate the size, shape, location, and distance or depth of things. The latter space qualities refer to the appreciation of the third dimension of objects, or their solidity.

The cue for the particular study of space perceptual reactions is given us in the fact that the development and operation of such actions are directly conditioned by the space conditions of the person and his own reactions. It is in the actual spatial relations between persons and things, in the movements toward and away from objects, and in manipulating them, that the person develops responses to the distance between things, to the locations of objects, and to their length and breadth. In the operation of space reactions it is the objects in space which serve as stimuli to space conditions, since such reactions are always built up in connection with objects. Also actual space relations and conditions serve as stimuli here, as well as the responses of the person. The latter operate especially in the building up of the space reactions of appreciation and comprehension.

Spatial reactions of all sorts are built up and operate upon the basis of the individual's various forms of contact with stimuli objects and conditions, visual, tactual, auditory, olfactory, and other types of contacts with spatial stimuli. For the most part in building up spatial perceptions a number of different contacts operate, but this is not absolutely essential. In the later operation of space perception responses one or fewer actual contacts are sufficient. A few illustrations of the manner in which spatial reactions are built up and operate are supplied in the following paragraphs.

Localization responses are built up through both immediate (tactual, kinæsthetic) and mediate (visual and auditory) contacts with things. There is no question that, in spite of the apparent predominance of the mediate contacts for the appreciation of spatial relations, the other type of contact is also important. Of the long distance contacts the auditory experiences are by far the least important of any that operate at all. This fact is readily demonstrated by the attempts to locate the position of objects through sound. An outstanding observation is that when we hear a sound in the median plane of the body, especially if it is a pure tone, we cannot tell by hearing alone whether it is in front, behind, or above us. Among the factors of auditory experiences that serve to acquaint us with the directions of objects are (1) the relative in-

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tensity of the sound in each ear, (2) the intensity of the sound itself, and (3) the tone quality or timbre of the sound.

The appreciation of position through visual contacts includes differences in objects resulting from their acting upon different parts of the retina. Position responses are greatly affected by variations in the visual quality which objects display when seen from different angles. Also the position meaning of objects depends in great part upon the character of the eye movements which are necessary to get the objects into the field of clear vision. Not only the eye movements but those of other parts of the head are of incalculable importance in the various responses to stimuli.

Some of the most important factors in the building up of position responses are the tactual and kinæsthetic contacts which the person makes with various objects in heterogeneous distribution in the surroundings. The appreciation of the relative location of objects depends a great deal upon the movements necessary to make in order to turn to this or that object, and upon the cutaneous differences of quality of the variously placed objects.

The development and use of meanings of distance and depth involve usually mediate contacts of various sorts in combination with movements toward or away from objects. The person's movements in a given direction, during which series of objects are touched, may, however, result in the appreciation of distance, although no mediate contacts (visual, for example) are made. Thus the movements among different objects in the direction up-down, forward-backward, and side to side, result in the development of the meaning of tri-dimensional space. Likewise, the disparity with which the two eyes see the same object may result in the appreciation of depth without definite movements of the rest of the organism.

In the study of space reactions two conditions must be guarded against carefully in order to obtain accurate information concerning the development and operation of such behavior. In the first place, in space perceptual reactions the settings of stimuli are of exceedingly great importance, probably more so than in most other perceptual situations. Also, in this connection the activities of the acting person himself as stimuli settings cannot be over-emphasized.

In the second place, in studying space perception we must be very careful not to confuse immediate reactions to space conditions of all sorts with knowledge and other responses more elaborate and complex than the immediate contacts with space stimuli which constitute perceptual space reactions. Very frequently descriptions of space perception consist of analyses of space conditions which involve factors logically analyzable out of space phenomena, but which have little if anything to do with actual responses to space stimuli.

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Perception of time

The necessity of reacting to objects singly or to several objects in either a successive or simultaneous time order, indicates the problem of the appreciation or perception of time intervals and time relations. Time reactions are extremely important features in practically all of our various adaptations. Even the skill with which one plays tennis, for example, depends in great part upon the expertness with which one has learned to make time responses.

The appreciation of time or time responses is greatly subject to the rate of movement of objects. This rate refers both to the change of location of objects and their appearance and disappearance. In the first case we find developing particularly the meaning of duration, while the latter situation results in the appreciation of intervals. The duration meaning refers to length of time in which events happen, while interval refers to the frequency with which happenings occur. An interval marks the rate of beginnings or endings of events. The more happenings within the limits of a given situation the longer the duration, while the more beginnings or endings of such situations the shorter the interval.

In spite of the difficulties of experimentally investigating time perception there are data available which illuminate the subject considerably. It has been determined that time intervals can be differently appreciated when varying stimuli are employed. When the interval is marked by two taps which are to be heard it can be appreciated if the taps are only .002 second apart. When visual stimuli are employed they cannot be appreciated when less than .044 second apart. When a combination of sight and hearing stimuli is used the smallest appreciable interval is given as 0.16 second.

Observations on the appreciation of duration indicate that there exists only a very small range of time lengths which can be appreciated as a single duration. This range extends from 550 to 1800 thousands of a second; under 550 are said to be very indistinctly appreciated, more as rhythmic groups than real time, while the durations above 1800 seem too long to be reacted to as a single period. The primary consideration in such observations is the determination of the period marked by two single happenings as limits. The occurrence of several events means of course a series of reactions and it is impossible to comprehend even a short series in one duration. About four seconds is the limit usually placed upon the duration which can be appreciated as one period. Probably periods above four seconds are not directly perceived as passing and so are really recalled or remembered durations. Up to four seconds events are experienced as in a primary memory span; that is to say, events are comprehended in a single time without reference to other times. This single time period is frequently referred to as the "specious present."

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Influences Upon Time Perception

It is impossible to overestimate the influence of the periodic physiological functions on time reactions. Particularly do physiological periods influence the appreciation of time when there are no specific external events occurring. There is no doubt a very close connection between these periodic functions and the capacity one has to awaken at any particular hour without the use of any external aid.

Another type of influence upon time reactions are the interests and occupations of the individual. This influence of what may be considered as extraneous conditions upon our time reactions is well illustrated by the apparent lengthening or shortening of time when we are impatiently awaiting some expected person or event or feverishly hastening through some belated task. These extraneous influences condition us to perform time reactions, which are entirely uncorrelated with the temporal periods indicated by the clock or other objective measurements.

The Perception of Movement

Since the stimulating objects are always in relative motion and very frequently in some sort of rhythmic order, the responses to objects must include some appreciation of this movement. In fact almost every reaction is a movement response as well as an *object* response. The reaction pattern implies such a distribution and arrangement of its component functions as the exigencies of the stimulating circumstances dictate.

The movement factors of response are excellently illustrated by the activity of an automobile driver who is following other machines through a maze of crowded thoroughfares. The driver develops the meaning of multiplicity of stimuli-cues which cause him to modify his movements and actions. These movement responses necessitate the acquisition of many tentative and expectancy responses; that is to say, in some given situations the individual must put himself into an attitude of readiness and expectancy to meet all possible emergencies.

The movement reactions derive their meanings primarily from the changes in the person's relations with respect to location and position of objects. These movements are then immediately correlated with visually and tactually experienced objects. Of especial importance in the movement reactions are the eye movements and the general head segments. Of no less importance are the many after-images which afford a direct appreciation of the change in the kind of object or in its relative position to other objects. The presence of more than one object in the visual field is also an essential factor in the direct appreciation of movement.

Perception of Rhythm

The rhythmic significance of events is made meaningful to the individual by the grouping activities which the person must make in order to respond to numerous objects in a single time. This necessity is not entirely brought about by external compulsion, that is, by the numerous presence of stimulating objects which force a

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reaction, but is partially owing to the periodically functioning character of the physiological activities of the individual.

Perception of Conditions and Relations

The person is constantly in contact with conditions and relations of all sorts; so that he builds up these specific forms of meaning responses in precisely the same way that he does to objects of all types. Here, as in all complicated forms of perception, the contacts are primarily visual, but they may also be auditory, tactile, and of other sorts. It is very important to notice that although ordinarily it is the condition or relation of an object which is perceived, still it is not absolutely essential that this should occur. Probably because in our actual situations we may not be able to separate conditions and relations from objects, our reactions to such conditions and relations are directed generally toward the object rather than toward the conditions and relations themselves.

Perception of Processes and Events

In these types of activities we have very important modes of complex perceptual conduct. When the processes and events are located externally to the organism they are mainly in visual contact with the individual. But, if they are situated within the organism the contacts may be thermal, and a variety of organic sorts. Under events we include of course all types of acts and movements of objects and individuals. Excellent examples are the facial expressions and gestures which form a noticeable factor in perceptions conected with communicative speech.

Perception of Qualities

Obviously the qualities of things constitute the coördinate phases of the person's stimulational surroundings along with movement, time, space, events and processes, etc. The general principles of the perceptual responses to such things are all the same, much as the specific reactions may differ enormously in detail.

Perception of Words

Since language reactions constitute some of the most important and most prevalent of the actions of persons, the perception of words is a very essential part of perceptual activities. In the perception of words, we have of course a distinctive type of perceptual activity differing markedly from most others. First, we might point out that the perception of words belongs to behavior segments in which the final reactions are implicit activities. That is to say, the perception of a word is preliminary to a mere reference to objects, events, or persons, a reference which may or may not be connected with a further performative activity. Naturally, perception of words involves primarily auditory and visual contacts with written or spoken objects or other acts (gestural) of another person. The principle of development of such perceptions is of course exactly as in other cases. The individual is in contact with the perceptual object or act at the same time that he is in contact with other objects or events. In this manner he develops a referential function to the correlated objects with which he is in contact through the verbal stimuli.

A striking difference between the development of the perception

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of words and other stimuli surroundings is that to a great extent the development of word perception constitutes a definite stimulational procedure on the part of some other person. Usually the parents or nurses of infants definitely contrive the building up by the latter of particular meaning reactions to word stimuli.

Perceptual Misreactions

It is a common observation that perceptual reactions do not function always in an expected or desirably adaptational manner. The reactions miss fire, so to speak, and we observe that the wrong response has been made to a definite stimulational situation. In a genuine way we might say the person has misinterpreted the meaning of the stimulating object.

Errors of response may be conditioned both by the stimulating and responding factors of an act. Thus, for example, when we call to a stranger whom we mistake for a friend walking ahead of us the error of response arises from the fact that our stimulus object possesses one or several properties in common with the stimulus object which really does coördinate with our response. On the other hand, when we persist in reading "Language of the Academy" for "Lagrange of the Academy" because we are expecting some statement concerning language we are clearly misreacting because of an undue influence of the response or equipmental factor.

In many cases we can also observe the combined influences of both factors in the act. This situation is illustrated by behavior in which the stimulating object possesses some ambiguous elements. Such error of perception is familiar in the plane diagrams which are reacted to as solids of reversible perspective. Since, however, either the response or stimulus phase of an act is frequently more important as an influencing factor of the total behavior, a convenient form for the classification of perceptual errors suggests itself. This classification naturally will contain three divisions.

Misreactions of a Primarily Stimulational Type

Among the response errors primarily conditioned by the stimulating circumstances we may trace the unusual response to a stimulational factor which is different from the one operating in another case. For the purpose of our exposition we shall neglect the fact, which in actual behavior cannot be neglected, that in any particular case several factors may be operative. These prominent factors in the causation of unexpected responses are: (a) the rearrangement of an object in its ordinary context, (b) the influence of a complete or partial removal of the object from its context, and (c) the apparent present location of an object in a situation in which it does not usually belong.

The so-called Aristotle's illusion illustrates the first type. When we cross two figures and roll a pencil between them it will seem double. Here the stimulating situation, that is, a contact with two objects, which usually calls out a definite type of reaction, does so now although the present situation is so altered as to be the oc-

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casion for a different kind of reaction. As is true in all other cases of perception these erroneous or unexpected responses occur regardless of the specific form of contact with objects. The stereoscope illustrates the first type of mis-reactions in visual contacts. We see a solid object in the stereoscope although we are looking at a flat one, because as in the case of the actual perception of such an object, there is a disparity between the objects seen with the two eyes. Various illusions of movement occur. We are all familiar with the circumstance of how the objects we see through the window of our moving car glide in the opposite direction to the way the car is going, and seem to do the same thing when we are not moving. Again there are many mis-responses caused by a rearrangement of the stimulating conditions which result in an appreciation of a contrasting object. Thus, when a circle is placed in the center of a larger circle it will appear smaller than when surrounded by circles smaller than it is.

The second type of unexpected responses is based upon the principle that a given reaction brought about by an object in a certain context may also be initiated when the object is removed from its usual context. The series of flat objects which, by means of shading, or cast shadows, are reacted to as though they were not on the page exemplify the second type of stimulational basis for incorrect responses. A striking example of this is the face of a portrait, which, following the observer about the room, seems to be taken out of its place in a flat projection.

A salient illustration of the present location of an object in which it does not belong is the series of objects definitely placed in a landscape although the environing situation is entirely different. This is the complementary phase of the second type of situation we have discussed and displays the relativity of these reactions. The various forms of the Müller-Lyer illusion illustrate well the occasion for an incorrect reaction because the object does not seem to be in a place where apparently it ought to be. Illusions of area, of direction, as well as of length exemplify the principle under discussion. Among the many specific factors in the incorrect responses of the primarily stimulational type are variations from the ordinary conditions in the matter of eye movements, and light conditions.

Incorrect Responses of a Primarily Reactional Type

When we turn to the incorrect responses primarily owing to the unexpected arousal of a reaction pattern we can isolate two general forms. The occurrence of a reaction when there is insufficient warrant for it, we might consider as being caused by some form of expectancy which means that a definite reaction pattern is more prone than others to function with the barest kind of provocation. This expectancy may be explained on the basis of a very frequent functioning of the particular reaction system, such as is illustrative in the case of a physician who tends to perceive a certain change in

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appearance as a particular symptom of illness. Such expectancy may be referred to as an interest of a general or a particular sort. Another condition of this expectancy is the fact of having recently responded in a particular way which makes it easier for this particular response to function again. The main principle, then, of the irregular reactions under discussion is that in some way a response system is set off when there seems to be no adequate basis for it. There are innumerable illustrations of this class of irregular reaction involving all sorts of sensory contacts.

Among the most vivid of these mis-reactions are the visual errors frequently referred to as the proof-reader's illusion. James reports that once while waiting for a "Mount Auburn" car to take him to his home he read that name upon a car upon which was really named "North Avenue." Most of our reading really goes on in this way. The less reaction systems one has the more accurate will be the reading of the printed material, provided there are reaction patterns enough. It is a familiar fact that children having limited experience follow the actual printed page more faithfully than a person of more experience.

The frequency of this class of incorrect response has suggested the necessity for a criterion of the reality of certain experiences. Since the responses are aroused by other than the usual stimulating objects there is frequently an uncertainty as to the genuineness of an event. Thus James was uncertain after an escape of gas from the furnace whether the smell which persisted was real or imaginary. As a matter of fact the response of the original gas was later induced by a pair of India rubber shoes. As James points out, smell contacts with objects are extremely subject to the questionable situation mentioned. "When we have paid the faithless plumber for pretending to mend our drains, the intellect inhibits the nose from perceiving the same unaltered odor, until perhaps several days go by." In the case of pressure contacts we read the anecdote of the person who after being shown by Sir Humphry Davy the metal he had just discovered, remarked, "Bless me, how heavy it is."

It is probably needless to discuss further the third class of unexpected responses since we have already pointed out that in such acts both the stimulating circumstances and the reaction equipment of the person contribute to the production of the result. Since the primary factor in any unusual act is an extremely relative matter we must classify all those acts under this heading which show no decided prominence of either the stimulus or the response as causative factors. Some forms of hallucination undoubtedly illustrate this type of perceptual misreaction. But certainly there are many other forms of hallucination. A distinct type comprises reactions in which the coöperative factors are the reactional conditions on the one hand and the ordinary setting of a given stimulus

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object. In such misreactions the person, through his intentional or expectational zeal, reacts to the setting of a thing as though he were in contact with the object itself. These later forms of hallucination must be distinguished from the purely implicit misreactions in which no stimulus object is present at all but in which the implicit misreactions are stimulated by some substitute stimulus not related to the present action or even the substituted-for stimulus.

Conditions Influencing the Development and Operation of Perception

So complicated a reactional process as perception is naturally subject to many influences upon its development and operation. Some of these influences are concerned with the intrinsic processes constituting the perceptual actions while others are more or less extraneous, although intimately related to perceptual processes. The entire point in this connection is that in the various perceptual contacts of the individual with stimuli objects surrounding him, there are numerous conditions influencing the way his perceptual reactions are built up and how they operate in later contacts with objects. Still further we might survey the conditions which prevent the building up of certain perceptual reactions at all. Again we might indicate that some of these conditions influence the individual directly in his perceptual reactions, while others have a less direct effect. Included among the latter are influences upon perceptual activities brought about through various conditions of attention or inattention. In many cases the operation of a perceptual reaction fails to occur because of the lack of an attention response to the stimulus object. In all of these instances we assume that the stimulus object or possible stimulus object or condition is present, and the problem is whether perceptual reaction systems will be built up or whether they will operate after having been built up. We may classify these different conditioning influences under the following series of headings.

(1) The Conditions of the Person

So far as building up perceptual reaction systems is concerned we find that particular individuals will fail to develop perceptual reaction systems because of some defect or abnormality. Therefore the necessary contact with the object will be precluded. In detail, such conditions of the organism may consist of the lack of some end-organ or the use of some muscle, or an injury to some end-organ or other reactional phase of the individual. A very good illustration here is the color-blind person who is unable to develop proper visual perceptual reactions to colored objects. Turning to the operation of perceptual reaction systems after they are built up, we might indicate that certain conditions of the individual in the form of injuries may prevent the expected perceptual reaction from occurring. In general we might point out that such conditions merely amount to the reduction of the stimulational function of the objects constituting the stimuli for the perceptual reaction.

A prominent condition of the person influencing his perceptual reactions, which might be considered as not involving any

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anomalous or abnormal factor, is fatigue. Such a general functional incapacity of an individual may result in his failure to respond properly to stimuli objects. In other words he may perform all sorts of erroneous reactions, or less capable responses to objects, such as the neglect of details and a general failure to respond to the complicated features of an object or condition.

(2) The Influence of Training Upon Perception

One would expect from our study of the elaboration of perceptual reactions to things, that the constant contact of individuals with the same stimuli objects would result in an improvement of the perceptual reactions to them. This improvement may be considered to consist of a gradual perfection of such activities on the basis of their slight elaborations and improvements. Thus, through the frequent contacts of a perceptual sort with a particular object, especially if such contacts are important or necessary for certain purposes, the individual becomes more and more adapted to the elementary details of that object. Conversely, the cessation of one's contact with objects tends to reduce the functional adequacy of perceptual responses to them. When one has not recently been in perceptual contact with an object the reaction to it will be much less capable than it would have been under other circumstances.

To illustrate the influences of training conditions upon perceptual reactions we might refer to the developing excellency with which a mechanic handles objects to which he must constantly respond in a perceptual manner. Similarly, we find the influence of training upon all types of perceptual activity. The beginning student of zoölogy is unable to perceive in any adequate way the microscopic organism which with practice he will be able to discern in all its details. In every day parlance the individual does not see what he is looking at until he knows what to look for. What applies to the whole activity applies equally to all of its details. Other illustrations of training influence upon the operation of perceptual activities, are the increased facility with which the trained nurse is able to read the thermometer, or the young medical student is able to react to the sounds, which he is supposed to discern through the use of the stethoscope. In more common everyday situations such influence is evident in the rapidity and accuracy with which one learns to read in general, or to read some particular material.

(3) Influence of Personality Equipment upon Perceptual Reactions

An important influence upon both the development and operation of perceptual reaction is the individual's behavior equipment. For instance, the possession of certain reaction systems of a particular type, and the way they have been employed, definitely conditions the development and operation of perceptual reactions. Thus an individual's carelessness of action or the intelligence with which he responds play their part in influencing his perceptual development and operation.

To illustrate, let us consider first the influence of the intelligent activities of an individual upon his perceptual reactions. At once

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we observe that the intelligent individual, the person who has considerable behavior equipment and who uses it accurately and effectively, will be more liable than others to build up perceptual behavior equipment with respect to particular objects and situations. Thus the intelligent person when the need arises, will look around and discover more new methods of getting his perceptual contact with things than would the unintelligent individual.

The same may be said for the other ways in which persons respond to their surroundings. For instance, the more knowledge one has concerning particular objects the more likely one will build up perceptual activities to them. Knowing that very few snakes are poisonous, one is freer to build up adequate perceptual reactions to the anatomical and physiological details of such animals as well as to perceive those details when they are present. The same situation prevails with respect to the attitudes, beliefs, and other behavior equipment of the person. Disbelieving in the probable presence of some feature of an object or person, one is much less likely to build up perceptual reactions in this connection, or to be able to use such reactions when they do form a part of his behavior equipment. Similarly, if one has a favorable prepossession concerning a person's features, it is not so probable that one will perceive the blemishes which that person actually does have.

(4) Influences on Perception of Simultaneously Occurring Reactions

Very prominent in their conditioning of perceptual reactions are the affective responses which influence both the development and operation of the former. The way one perceives an object or situation is very much conditioned by the affective reaction which that object also calls out. When a person arouses in another individual some disagreeable feeling while being perceived, the perception of that person may be more effective or less effective as the result. That is to say, the details of the object may be perceived more effectively or they may be slighted. In most cases the effect upon the perceptual activity may be observed through the later overt reactions which follow. For example, a person may report that he cannot say what an animal was like because it was too horrible to look at.

The influences of the simultaneously occurring affective actions upon perception may be stimulated by the object directly or by some of its qualities. Thus an object too small, too large, or too intense will call out some sort of affective reaction which may modify the perceptual contact with that object. In other cases the affective action is called out only indirectly by the perceived stimulus object because of some type of association through similarity or resemblance of the present object to some other. But this affective reaction, which is really a response to some other object than the one now perceived, may, however, influence a perception of the present object. Thus the perception of a marine landscape may be conditioned by an effective reaction which is the response

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to some past ocean experience, the latter being initiated by the present picture as a substitute stimulus.

In still other cases the affective reactions influencing the perceptual behavior may be the result of the setting of the presently perceived object. Accordingly, the food with which I am in visual contact will be differently perceived if the shop is clean and orderly than if unclean, disorderly conditions prevail. Similarly, a neat package influences a different perception of its contents than is otherwise the case.

In discussing the influence of affective reactions upon perceptual responses we must observe that some types of perception are, on the whole, more influenced than others, whereas in other cases the differences in the affective influence depend entirely upon the relative conditions of both the affective and perceptual factors. Æsthetic perception illustrates excellently the most extreme influences of affective reactions upon perception. This condition prevails both because the æsthetic object is much vaguer than almost any other sort, and also because the æsthetic object, more than most kinds, calls out simultaneous affective conduct.

Leaving the affective influence on perceptions we will now consider another type of conditioning reaction to perceptual activity, namely wants and desires. These responses are called out in the individual by the same objects and conditions which constitute also the stimuli for the perceptual reactions under discussion, or there may be other objects calling out want and desire reactions which merely influence the perceptual responses to still other objects. Such reactions condition the development as well as the operation of perceptual activities. In the former case the wants and desires influencing the kinds of contacts with objects result in the development of new meanings in those objects and their corresponding perceptual responses. Thus the stimulus object calling out a reaction to some situation which must be changed or overcome, initiates a reaction prompting the individual to examine tools and other necessary objects, with the result that new perceptual responses are built up to them. A very striking illustration of this type of situation is the case of the person who, under stress of some necessity such as a fire which requires that he quickly get out of a high window, builds up a ladder meaning for a chair or other piece of furniture which can be used for such a purpose. Later the chair may be perceived as something to climb upon as well as to sit upon. It is through the operation of such concurrently performed reactions that the individual develops meaning responses to objects which are entirely different from their natural properties or ordinary usages. Naturally such a process results in an extension of their properties in various ways.

In similar fashion we find that such concurrently performed reactions influence what particular type of meaning or perceptual

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responses will operate when the individual has built up a series of meaning reactions to particular objects. That the concurrently performed reactions condition the operation of perceptual responses in various ways is revealed by the misreactions which they tend to bring about. Thus for example, the person who is extremely desirous of seeing some one in whom he is interested, may, while he is watching the passengers come into a railway station, see his friend in a number of the passengers each of whom may bear only a slight resemblance to the sought-for friend.

(5) Influence of the Context of Things upon the Perception of Them

Distinct as an influence upon the perception of things is the context or setting of those things. This point has been very definitely treated in our study of the perceptual mis-reactions, but in our present discussion we want to stress the influences which do not result in very definite abnormalities of response but merely in modifications of the perceptual reaction to things. Consider the different perceptual responses one performs upon hearing a shrill whistle at midnight as compared to hearing it some time during the day. Possibly the most striking influences of context upon stimulating objects are found in the cases of color context. Our reactions to light objects when placed upon dark backgrounds are very different from the responses called out by the same objects when in another setting. Similarly, modifications in our perceptual reactions to colored objects, when surrounded by other colored objects in harmonious or disharmonious combinations, illustrate the same point. Again, time intervals connected with interesting and important events are perceived very differently from the same time intervals not so contextually related. To a certain extent we might consider that we have here a problem of combination stimuli. That is to say, we might look upon the present situation as demonstrating the appreciation of combination stimuli rather than isolated single stimuli. We may conclude, then, that objects which singly call out particular kinds of perceptual responses, when placed in juxtaposition, constitute different stimuli and consequently call out different reactions.

It remains only to add here that any kind of object or situation which can serve as a stimulus in any case may serve as a contextual influence upon the perceptual response to some other object or situation. These objects and conditions may be related in all sorts of combinations; so that an object may be the context of a condition as well as some condition being the context of an object.

Perception and Knowledge

Since clearly perceptual responses constitute knowledge reactions of an elementary form it might be profitable to point out briefly the similarities and dissimilarities between these two kinds of activities. The first and most fundamental distinction is that knowledge responses are entirely implicit in character while perceptual reactions are only partially so. We have seen how in perceptual activity part of the original object may stand for some

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other part of the whole, but in the case of knowledge behavior the object to which the reaction is made is entirely absent and is substituted for by some other object. Another way to state this distinction is to point out that perceptual reactions are responses to objects with which the individual is immediately in contact, while in the case of knowledge activities the person is not at all in immediate contact with the things to which he is reacting. This statement does not exclude, of course, the fact that a person when stimulated by an object which is immediately present may be prompted to respond to that object as it has appeared to him in some other entirely different situation.

This differentiation between the two types of activity makes it possible for us to avoid a confusion between them. For example, we can very easily divide the issue between those who believe that perception involves an elementary form of inference and those who do not. It is a distinctly different sort of activity when we infer or evaluate some object or condition, since such activities involve implicit responses to qualities and conditions with which the individual is not at all in contact. Now in the case of perception, as we have seen, the person is always in partial contact with the object in the sense that he is in direct contact with some feature of the perceived object or condition.

The distinction between perception and knowledge is well illustrated by considering reactions to space. In these perceptual responses we have direct movements or the reactions to actual space conditions with which we are in contact, whereas in the case of knowledge we either react to such space indirectly through the use of symbols, words, or through other forms of implicit action. No better can this situation be illustrated than by considering the entirely different types of behavior performed when we are reaching for something located at a distance from us and when we study geometry.

Granting that perception and knowledge constitute two entirely different sorts of reactions we do not intend this statement to mean that they are not as a matter of fact very closely connected in actual behavior situations. The fact of the matter is that no knowledge reactions are possible without the occurrence of perceptual activity. It is to be expected then, that the two kinds of actions are inseparably connected. Thus every thoroughly implicit activity must of necessity be connected with a perceptual response to the substitute stimulus. Furthermore, we might point out that a less important connection of perceptual and knowledge reactions is found in all cases of complicated behavior in which as a matter of course we have a large number of particular perceptual and more definite implicit reactions operating in close combinations. Consider the case of looking at a picture or other æsthetic object. Obviously in such a situation we are performing

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many particular perceptual, judging, evaluating, and discriminating reactions in a variety of complex coördinations. Finally, we might suggest once more that when we are examining some complicated object the influence of our knowledge of it is constantly being exerted upon our perception of the same.

Perception and Language Reactions

In practically all complicated perceptual reactions we usually find the total behavior situation encompassing some sort of language activity. This linguistic behavior may be considered in many cases as supplementary to the actual perceiving action, in the sense that some of the features of a complex response to an object (of which part is the actual specific contact with it) are supplied by or consist of a language reaction. This connection constitutes the most intimate relation between language and perceptual conduct.

A less intimate relationship between language and perception is the situation in which the language action constitutes the final response in a perceptual behavior segment. That is to say, the action which follows the special perceptual reaction system and which is conditioned and colored by the latter may be a language activity. A very good example of this sort of situation is the name reaction which follows upon the perception of some object. It is essential now to notice that in this second case there is a very distinct differentiation between the specific perceptual reaction system and the name or verbal response, although in the first case the two may be considered as really phases of a single perceptual activity. Howsoever different the naming reaction may be from the intrinsic perceptual reaction system, we still find that such a naming activity constitutes a distinct measure of the efficiency and the actual type of perceptual action. In other words, the question whether one has really perceived some object effectively may be determined by a reference to the ability of the individual to name the particular object or situation in question.

Perception and Recognition

As a final feature of our study of perceptual activities we must consider the problem of recognition. The question here is whether perceptual activities constitute the psychological processes of recognition. Upon the surface, at least, it appears that perceptual responses do comprise what is ordinarily called recognition. But this is really not the case. Certainly the elementary forms of perception are far from being recognitive in character. In these responses we find merely the operation of reactions coördinated with stimuli of particular sorts; so that the responses when they occur appear to be especially appropriate. This appropriateness of responses to particular stimuli cannot be misinterpreted as recognitive behavior, especially in view of the fact that this condition prevails very definitely in the most elementary differential reactions. Again, the mere reference of any perception in use to the

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previous behavior condition in which it was developed cannot be considered as constituting the operation of recognitive responses. For this feature of psychological conduct involves only the most elementary facts of habit formation which are far from being complicated phenomena of recognition.

More positively may we distinguish between perceptual and recognitive activity by pointing out that whereas recognition responses constitute distinct implicit behavior, perceptual reactions, even of the most complex types, namely comprehension responses, are never more than partially implicit in character. As contrasted with perceptual responses which are always reactions to phases or parts of objects which are indispensably present, recognitive responses refer to conditions and qualities of things and events which are at present not represented at all but which are merely substituted for.

But if perceptual reactions are not themselves recognitive responses do such actions involve recognition? Without doubt we may convince ourselves that at least the complex forms of perceptual responses may be very intimately related to specific forms of recognition behavior segments. Certainly it is true that whenever we perform recognition reactions the total behavior segment must involve besides the essentially recognitive reaction system, some form of perceptual response. It is probably true also that very frequently the occurrence of the more complicated perceptual reactions, the comprehension responses for example, involves the correlated operation of recognition reactions.

In order better to appreciate the relationship between perception and recognition activities we might pause to consider briefly the character of recognition. In general recognition involves an implicit response to some object, person, or condition to which this response refers, with the additional feature that the person himself or his reaction constitutes either an auxiliary stimulus in addition to the referent, or a setting for the referent. In this description we want to stress the essential and intimate operation of the individual in any activity which is properly called recognitive action. The possibility of the person being a part of the stimulus or stimulus setting we regard as the essential difference between recognitive and ordinary cognitive behavior. In ordinary cognitive conduct we find no such stress upon the intimate participation of the individual in the response activity. In recognitive action, on the contrary, not only is the person who performs the action definitely aware of the character of the stimulus object or situation, but his present reaction to that object has a very definite reference to his previous contacts with it. The degrees of recognition depend therefore upon the clarity and definiteness with which the person can at present refer to the details of his

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previous contact with the same stimulus object which provokes recognitive action.

It follows from our discussion of recognition and its relation to perceptual activities that only those perceptual responses which are at least reactionalistic in mode can be associated with recognitive responses.

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Current literature on perception remains strongly steeped in the Berkelian tradition. Perception is still described essentially as an organization of qualities to form an object. It is in this sense that the statement is made that a child does not perceive an orange but merely senses qualities which only at a later time are organized into percepts. Aside from the addition of some physiological and anatomical details concerning end organs and nerves, this type of statement is precisely as the good Bishop of Cloyne left it. In the act of perceiving we are presumed to create an object or otherwise make it exist. In the study of perception we see how the metaphysics, which psychologists retain in their province on the basis of the rationalization that they do not have anything to do with philosophy, makes serious trouble for them.

Obviously, any creative description is very far from the actual facts of perceptual activities. But worse, this view not only does not describe what actually happens when we perceive something, but it undoubtedly constitutes a misinterpretation of actual facts. At least two of these facts we may name. In the first place, such a view misinterprets the fact that in the infant's first contacts with things, the perceiving reactions consist of very simple responses, and that later with more contacts with objects the perceptual responses become more elaborate. For example, the first contact with an object may be a simple visual reaction, whereas later the visual quality of the thing (orange, for example), serves to arouse responses also to olfactory, gustatory, and other qualities that it has and to which the individual has built up reaction systems.

Another fact that is misinterpreted is that an infant's early, exclusively visual or auditory distance contacts with objects involve only reactions to simple qualities or partial phases of things. By transformation this fact is made the basis for the belief in simple qualities (sensations) which are organized into complex things. What this belief amounts to is really that the colors, tastes, etc., of things are mental or psychic qualities instead of being what they actually are, namely, phases of objects which may or may not become known or otherwise reacted to. This belief also negates the fact that all an individual has to do about qualities in the simplest perceptual behavior is to perform elementary discrimination responses to things with which he happens to come into contact.

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Very instructive is the manner in which this doctrine of creative perception connects up with the neuronic theory. At least some of those who accept the doctrine assume that, whereas the elementary sensation or quality reactions are performed first by a particular part of the cortex [for example where the projection fibres from eye or ear end, (sensory area)] the perceptual reactions proper are performed by the cortex through the operation of nerve currents coming from the "sensory area" to some adjacent area over association fibres. Here one can readily see how genuine facts borrowed from analyses of physiological and anatomical mechanisms are employed to support the creative doctrine, although these facts do not constitute the actual perceptual reaction of the person.

In striking contrast to all such creative doctrines of perception the viewpoint expressed in the present treatise is that perceptual activity, in common with every other case of psychological action, constitutes an interaction between the total organism or person and objects existing with all of their qualities, whether or not these qualities can all be reacted to or not.

In detail, this viewpoint is a negation of the belief that the organism can function in parts or that the operation of the cortex or any part of it is correlated with qualities of any sort. While obviously accepting the fact that in a seeing act the end organ, afferent pathway, and cortical area are all involved and constitute phases of the reaction system (cf. Chapter II) we cannot assume that any receptor or any cortical area is an organ for reacting to some particular quality or total thing. Clearly, the operation of the organism in any of its activities of responding to things cannot constitute a process of organizing qualities to make objects.

We consider it an essential proposition for any psychological work based upon a sound philosophical background (methodology) that objects or events which constitute stimuli for perceptual or other reactions must be considered as existing with all of their properties and qualities, entirely irrespective of whether they are reacted to or not. None of these qualities of the object or the object as a whole, depends upon our reaction to them. Here we should assert that psychology in common with every other science must take an absolutely common sense view of this situation. This proposition we consider as binding, no matter what sort of qualities we speak of, their origin, length of existence, etc. In other words, suppose we consider our perceptual reactions to a blue object. It does not matter whether we are speaking of a blue pigment, a blue sky, the blue of the rainbow, or the blue of a prism spectrum; in all cases each of these qualities and the objects in which they inhere are absolutely independent of any reaction that is made to them. Similarly, when we experiment upon some colored object, and by gradually modifying light conditions reduce

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the blueness of the thing we are observing, at every particular point in the experiment we are dealing with a definite independently existing color quality. The investigation of the character of objects which can serve as stimuli is distinctly the work of the physicist, but it is certain that unless the psychologist takes the proper attitude toward the fact of the object's independent existence, he will involve himself in great difficulty. We cannot better illustrate the situation involved here than by pointing out that to no inconsiderable degree the difficulties of the psychologist with perceptual data are owing to his acceptance of facts concerning the analysis of color phenomena as though they were metaphysical propositions. In plainer words, when the psychologist starts with the fact of colorless light rays and assumes these to be stimuli for color, then the creational conception is immediately born. Here it must not be overlooked that the physicist is making perfectly necessary and true propositions concerning his analysis of color phenomena, but when we accept those interpretative abstractions as actual data we inevitably land upon the rocks. The psychologist, we submit, must start with just such a situation as the physicist starts with, namely with color facts, and not with the interpretative results of the physicists. The latter are emphatically not data for the psychologist.

Another comment provides a further perspectival background for our work. Clearly, in the individual's various contacts with things, he may develop objects which never have existed in nature. These may possess entirely new qualities, which never would have existed but for the manipulative activities of persons. In such cases we must never allow ourselves to think of these new objects as anything but transformations of other qualities and things to constitute new ones. In no sense may we think of the new qualities as projections from the mind of the individual. Such a comment probably appears unnecessary, but as a matter of fact it is just such confusions that we find in great number in the literature on the psychology of perception. This is no different from confusing the fact that we may be ignorant of certain qualities and objects, with the notion that the object does not possess those qualities.

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CHAPTER X

IMPLICIT ACTION AS RESPONSES TO ABSENT STIMULI OBJECTS

The Problem of Implicit Behavior

Among the enormous number of reactions which human beings daily perform with respect to their surroundings we find a large percentage which do not operate directly upon objects or events. Among such reactions of mediate contact with stimuli objects we discover some of the most intricate and complex activities that persons perform. Furthermore, the mediate activities comprise types of action differing both in morphological organization and in mode of operation. Some of these responses are mediate because the reaction is completed with the occurrence of modifications and changes in the person's own organism. Such is the case in feeling behavior.[1] Other mediate reactions are such because the individual responds to things indirectly, as in speaking about or discussing a thing or person standing before him.

What is probably the most unique form of mediate activity is the type we name in the present chapter implicit responses. These are mediate because the object reacted to is in fact absent and is consequently only responded to through a substitute stimulus object. While such reactions are no less actual psychological responses the person can not of course produce any immediate effect upon a stimulating object, such as an actual change in it, breaking or tearing it, or even the less performative act of merely looking at or listening to some thing or person. These reactions are the opposite of overt behavior in which the person is in partial or complete contact with the stimuli.

The implicit activities in which the original stimuli objects are entirely absent may be considered as one main form of such activities. Another form is that in which the stimuli objects are present and may be reacted to perceptually. But in addition the person may react to a feature of the object with which he cannot be in immediate contact. For example, he may respond perceptually to a house but only implicitly to its interior as long as he cannot enter it. The significant fact to be noticed here is that among the several stimulational features that objects may have, some of them call out direct reactions of the overt sort while others

[1] See below, Chapter XII.

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serve to substitute for other objects.[1] Accordingly an essential point here is that some entirely different thing must substitute for the object implicitly reacted to.[2]

This feature of the substitution stimulus constitutes the essential fact about the implicit form of mediate response. It is the possibility of an object's being substituted for that makes probable a large range of activities which otherwise could not occur. In this connection the point may be stressed that such mediate activities are normal or usual types of action. They are not odd or peculiar in any sense. Many conditions in our surroundings call for just such mediate behavior. Moreover it is only such activities that can operate in certain behavior circumstances, for example when we need to react to past events or to future conditions. As a record of fact probably most of our very complex activities include or involve a large number of such implicit responses.

The character of implicit action is considerably illuminated by the consideration that such activities may sometimes constitute substitute or replacement actions. For instance, a person may perceive a certain machine and be able to make a number of reactions to it, but at the time be lacking the capacity to name it or appreciate its use. In not a few instances such an inability to perform a specific response may be owing to the failure of the person even to build up the required reaction system. In consequence, he may replace the missing overt action by some implicit response. He may think about the object or speak of it. Such a substituted implicit act might be what under other circumstances we would consider as an actual overt response. In other words, the substitutive response might be an act such as clenching one's fists, which would be a direct response, for instance, to the insulting remark of a person, although in this instance it is merely mediate or implicit action substituted for the overt act of striking the person, etc. In any case it must be observed, however, that the implicit action may be a part of a segment of behavior of which the final or consummatory reaction consists of some actual and perhaps highly implicit change produced in some object. Such is the case when we plan (implicit reaction) to attack the enemy at a certain time or place.

As a replacement action the implicit response may be more or less like the replaced activity. This is true when the replaced act is a conventionalized response, as a language reaction. On the

[1] This substitutional function is of course essentially a problem of the association of stimuli. Cf. Chap. XI.

[2] Here we find a crucial criterion for the distinction between perceptual or semi-implicit action, and full fledged implicit responses. In the latter case a completely different thing must serve as a stimulus, whereas in the former case we must always have the adjustment stimulus object in partial contact with the reacting individual.

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other hand, the implicit response is much less like the original when the latter is a specialized act for a particular circumstance. In general, we might consider that all implicit behavior replacements of concrete overt responses resemble less the overt acts substituted for, than when the replaced overt acts are themselves capable of replacing actions. As a matter of fact, one of the most common forms of implicit reactions is a language response, and since it not only can substitute for overt reactions but also be substituted for, we find a close resemblance between the replaced and the replacing action.

The importance of implicit responses is strikingly evident when we realize that of such actions is constituted most of our behavior ordinarily referred to as thinking and remembering. Again, when we consider that implicit activity is really a process of performing actions implicitly before any overt or effective operations begin (that is to say, before purchasing an automobile overtly we can purchase one implicitly) it is evident that implicit activities comprise a very important type of human behavior.[1] Or, in planning some work, one goes over the details necessary to be carried out long before any overt operation is attempted. The general who plans a campaign must transport and manœuver his troops, issue food and supplies, fight battles, effect retreats and in general foresee the results of all such activity. All this he must do before he issues a single actual order. The same general description holds for the work of an architect who is planning a building or an engineer who is designing a bridge.

Aside from planning ahead by means of implicit behavior, we may now add that without such implicit conduct we could not go back in our experience and make use of the results of our past actions in order to profit by them in present situations. Such resurrections from our past reactions play a most important rôle in the reflective processes which precede the performance of a voluntary action, namely, the anticipatory consideration of ways and means that precede the final action in a segment of voluntary behavior.

Equally important are implicit reactions in making possible the development of those complex responses which depend upon the delaying of a final reaction. This delay is a feature of all thought and voluntary conduct. Of course, the implicit reactions are not the only kinds which fill the gaps between stimuli and responses. Overt responses of all sorts also function in this capacity. The implicit reactions constitute, however, the most effective kind of action for filling in such behavior gaps, since the ease with which they operate as well as their detachedness, permit them to function

[1] Without doubt the elaborate performance of implicit actions constitutes a difference between human and infrahuman minds.

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in more complex situations than those requiring longer delays.

As a final indication of the significance of implicit reactions we wish to point out that they operate in the extension of the meaning functions developed by the perceptual contacts with objects. In fact, implicit responses serve as mechanisms for detaching meaning reactions from the original stimulus-response situations in which they were developed. Thus by means of these implicit response systems we can manipulate and integrate the meanings of objects by using them as anticipatory reactions to particular final adjustments. It appears evident then that implicit behavior constitutes either a small or large phase of almost every complex human activity.

The Nature and Operation of Implicit Behavior

Emphatically, implicit reactions are no less definite responses to stimuli than are overt reactions. Although they do not constitute reactions which seem to bring about immediate effects in the surroundings they nevertheless do constitute phases of behavior segments which are without doubt accomplishments of the greatest moment. Implicit reactions constitute, therefore, integral components of elaborate and significant segments of behavior.

Keeping in mind the fundamental principle of implicit reaction, namely, that they operate when the original stimulus responsible for their development and operation is not present, we can understand how in the different circumstances in which they function the person essentially repeats in some form a previously developed mode of activity. In a genuine sense implicit reactions are reoccurring reaction systems aroused by some substitution of the original stimulus. Obviously, the implicit reaction can only be morphologically in some cases a partial or diminished form of response, as for instance the rehearsal of our reactions to the enemy after the conflict is over.

Although some implicit responses may be looked upon as only a reliving of some previous reaction, they are not completely lacking in vividness. It is common knowledge how stirred up one can become when reminded of some wrong or difficulty which in the past it has been one's misfortune to experience. Much the same may be said for the definiteness of implicit reactions. They are not necessarily vague nor dimly appreciated. On the contrary, implicit responses are the factors of our most deliberate and fully appreciated conduct.

In general, then, we must look upon implicit reactions as morphologically and functionally continuous with our overt responses.[1] To emphasize this continuity means to consider implicit reactions

[1] To justify the insistence upon this continuity we need only recall that it is probably this type of behavior that has been the basis for the belief in "mental states" and "ideas" different from physical or material happenings, and from "motor" actions.

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just as definite as those occurring when the original stimulus object is present. By way of reinforcing our conviction concerning the continuity of reactions we might recall that every perceptual reaction system is a partially detached or implicit reaction. In plainer words, every perceptual phase of a segment of behavior is a revival of a differential response to qualities and conditions of objects, not at the moment in actual contact with the organism. The main point, then, is that a differential reaction system or pattern of response, which was acquired in the original contact with the object in question, is upon a second or later contact with the same object put into operation in the same way or in a slightly modified form. Now when the object which originally caused the reaction to be built up is absent, the differential reaction system can still be put into operation by a substitution object. But the fact must be insisted upon that implicit response systems contain precisely the same component factors as any overt reaction system. This fact is plainly manifest when we remember that the implicit response is directly or indirectly an actual derivation from an overt action.

Furthermore, since many of our implicitly operating reaction systems, no matter how closely they resemble the original acts, are substitutive reactions, we are not surprised that it is possible for them to become symbolic. That an implicit reaction to a substitutional stimulus can be very unlike or entirely different from the overt act which would ordinarily be called out by the original object, is traceable directly to the fact that every implicit reaction is already in some sense a representative or symbolizing activity. Whenever we respond to an object not present, be it in a dream, revery, thinking, or planning of whatever sort, then we are symbolizing or representing the object or situation constituting the original stimulus to our behavior. Now although there is no limit to the degree in which the implicit response varies from the original reaction, still there are definite determining conditions making for the specific symbolization of objects by particular reaction systems. These determining conditions are for the most part contained in the original environmental setting of the object which is being reacted to. Just why my implicit reactions to the city of Washington should invariably involve a symbol of fatigue is no doubt explained by the fact that my first contact with that city included an enervating round of continuous sightseeing. As every one knows the implicit reaction systems of thinking processes appear in most cases as entirely unlike anything that we should expect to be connected with the original stimulating situation. No further illustration of the peculiarities of symbolized implicit behavior is necessary than a reference to the facts of individual imagery differences.

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The Place of Implicit Responses in Segments of Behavior

Manifestly, implicit responses are commonly precurrent and anticipatory reaction systems. Less frequently they are final phases of segments of behavior. To illustrate their precurrent character we may cite the following situation. Some thing or a sign, for instance, may serve as the stimulus to arouse an implicit response concerning some absent person, an act we ordinarily refer to as remembering. Such an act of recollection may be the direct intermediary between the stimulus and the act of telephoning the person in question. The act of telephoning constitutes the final adjustment in this particular segment of behavior, and obviously could not occur without the mediation of the implicit reaction. These implicit responses serve, therefore, to make it possible for an individual to respond to objects and persons not in direct contact with him. As our example has illustrated, the implicit reaction is brought into operation by means of a stimulus object which substitutes for the original person to whom the final adjustment is made. Let us note that the criterion as to the appropriateness as well as to the completeness and efficiency of the reaction is always a practical one and is determined from the observation of what the person actually does in any given case.

In what manner implicit responses determine the following overt acts may be judged from a simple illustration. In aiming a gun the implicit reaction may be the more or less exact reproduction of an act previously performed under similar circumstances. In other cases when the final adjustment of a segment of behavior is less definite the preceding implicit act will be correspondingly indefinite. Not infrequently is the preceding implicit act the incipient operation of a final adjustment. Illustrative of such a situation is the partial pronouncing of a name which we are attempting to recall. Just before we are actually able to enunciate the word we appear to be able to utter it partially.

The source of the efficiency of implicit reactions lies in the freedom they allow the person in adjusting to his surrounding conditions. Such reactions being detached from the original stimulating circumstances in which they developed, give the individual the alternative of responding or not in any given case. That is to say, he can always inhibit the final movement of the reaction in question. Obviously it is only because the implicit response starts off a behavior segment but does not complete it that the problem can be raised as to the operation of the final adjustment. It is this operation of precurrent implicit reaction systems which differentiates volitional activities from reflex acts. In the latter form of responses only simple overt acts can operate in contact with primary stimuli. The operation of the precurrent implicit reactions in volitional and similar situations does not involve any

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special problem since such acts are fairly immediate responses to stimuli conditions.

The elaborate foresight involved in complex voluntary and general thought actions may consist of the process of acting over many different acts similar to the one now at hand and comparing the results with a view to judging the best thing to do under the present circumstances. The actual operation of these implicit reactions is facilitated by the use of maps, drawings, designs and other forms of specifications. These objects serve both as stimuli to call forth implicit reactions and to manipulate them in accordance with the general stimulation of the total problematic situation.

It goes without saying, of course, that any enterprise of considerable proportions can only be carried out piece-meal. Therefore whatever implicit action is involved will be distributed through a large series of behavior segments.

We will turn now to a discussion of implicit reactions as final adjustments. As such, implicit responses do not operate in segments of behavior which actually constitute practical conduct on the part of the acting person. On the contrary, behavior segments featuring implicit responses as final adjustments are usually referred to as day dreaming. In such actions the person may relive specific events in which he has participated or pass in review before himself all sorts of persons and things. Frequently it happens that the very intense operation of such consummatory or final implicit reactions is responsible for the person's confusion of some inconsequential situation with one of a more serious import. The ground is especially prepared for such confusion either by the peculiarity of the surroundings, such as when one is suddenly transplanted to a new environment, or when the condition of the person himself is abnormal.

Since the behavior segment derives its essential character and name from the type of its final or consummatory reaction system we may point out that in our last paragraph we have been describing not only implicit reaction systems but implicit behavior segments. We might go on to point out, then, that it is such behavior segments which constitute the unusual activity we call hallucinations. In these instances we find the individual adapting himself not on the basis of what actually is present in the form of stimuli surroundings but on the basis of implicit reactions which may have been derived in the individual's reactional biography from entirely different situations.

Implicit behavior segments operate as the bases for fears, worries, and anxieties of all sorts that have reference to non-existent economic difficulties or persecutions of various kinds. In more ordinary situations this type of implicit action makes of the in-

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dividual a rather sensitive, apprehensive, and shrinking personality, whereas in more unusual circumstances these types of activities constitute delusions of persecution and grandeur of all sorts.

Still other situations in which implicit behavior segments operate are those in which individuals build up for themselves different surroundings than they actually have. This is the basis for the actions of the poet or the dreamer who spiritualizes or materializes certain conditions which are not agreeable to him or which he prefers to look upon as different than they actually are. Here also we find the basis for the activity of the theorist and scientist who reconstruct natural phenomena into terms of their principles of development and operation, and who finally are thus enabled to move beyond the immediate occurrences constituting the substitute stimuli for the constructive thing or condition. Here we might instance the activity of the mathematician who can conceive of himself approaching continuities beyond the farthest limits of human imagination with respect to the construction of the cosmos.

Finally we will refer to the somewhat abnormal individuals who in terms of implicit behavior construct for themselves a personalistic universe in order to escape from conditions which appear to them difficult and impossible of adjustment. Such individuals create for themselves conditions of living which have nothing in common with the actual realities of life and thus unfit themselves for adaptation to the ever present severities of their concrete circumstances.

The Genesis and Evolution of Implicit Actions

Our description of the nature of implicit reactions indicates that they must develop in some way from the person's overt adjustments to specific stimuli objects. In every case of implicit conduct we may say that the response concerned reverts to some original immediate contact of the reacting person with the adjustment stimulus to which it constitutes a reaction. This derivation from an original contact with things need not be direct but may be decidedly indirect; so that some given implicit activity may have been derived in a very roundabout way. The circumlocutory type of implicit action is excellently illustrated by abstract references to particular individual experiences which one has never had. Thus deaf individuals can contrive implicit reactions to musical stimuli and blind persons may build up imagery to visual objects with which they have never been in visual contact.

So far as the most direct implicit responses are concerned we discover that they are merely original activities detached from their ordinary stimuli objects and connected with substitute stimuli objects. We may think of this detachment process as lifting out of a reaction from its ordinary stimulus-response situation. By virtue of this detaching mechanism, the implicit reaction not only can depart from the original form of the reaction system, but

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it can also become considerably increased in complexity. Such detached meaning reactions with the freedom of functioning allowed them by the fact that they can be aroused by substitution stimuli, are consequently highly effective as anticipatory responses in various rôles. The fact of being aroused by substitution stimuli paves the way for an extended series of possible connections of objects with implicit reactions. The latter in turn later condition the elaborate operation of our complex adjustments.

Now the problem arises as to just how a reaction system or response pattern can be detached from a situation in which it was first acquired. We have here really two problems. Not only must we account for the detaching of the reaction system, but we must also describe the mechanism by which such detached reaction systems are later put into operation by some substitute for the original stimulating circumstances. Naturally enough these are reciprocal problems and the solutions are closely intertwined.

In general, the possibility of detaching reactions from their original settings goes back to the elementary fact that human persons from the psychological standpoint are organizations of response systems. Now when these reaction systems are built up to specific objects the responses may operate even when the original objects responsible for their existence are absent. That the operation of a reaction system can occur without the instrumentality of the original stimulus is accounted for by some common factor in the present and past stimuli situations. And so the infant may proceed to suck anything although it may only very remotely resemble a nipple. In more complex situations the common element responsible for a given reaction may be the setting of a stimulus and not any quality of it. Illustrations of the latter situation are the mistaken reactions resulting when we respond to a stranger in a way that we have accustomed ourselves to react to a friend who usually is found in the place the stranger now occupies.

Again, a person is stimulated by wants, organic necessities, and desires, to reinstate some reaction system previously built up under entirely other auspices. A hunger reaction may stimulate us to reach for and perform other incipient reactions to food objects, although no food objects are to be found in the vicinity. To a certain extent also, we might consider that the process of detaching reactions from the original stimulating circumstances in which they occur is merely a process of continuing an action once the original stimulus for it has passed. As an example we might refer to the tense organic straining and reverberation of the person who virtually is unable to stop running or rowing for some time after the actual contest is over.

We may conclude, then, that in the first instance the different mechanisms for detaching reactions from their original settings

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involve in some sense a re-arousal or a functional continuance of a reaction system. When the re-arousal occurs we can trace the stimulus back (1) to some object or condition other than, but previously connected with, the original stimulus object, or (2) to some present reaction system. What this associated response is depends upon the specific experiences of the person. Plainly, it is extremely important for the process of detaching reactions from their original stimulus-response situations that there be some similarity and resemblance between the various objects and situations concerned. Because of this they can substitute for each other as stimuli.

The detachment from stimuli objects which we find in implicit conduct is still better clarified by the consideration that any activity involving perception is already a detached reaction. In perceptual behavior the individual although reacting to the whole object is in immediate contact only with some part or quality of it. In this sense the implicit reaction of the most detached sort offers us no new principle over the perceptual behavior situation. In other words, when we consider the operation of image responses we find nothing especially different from the original situation of seeing an object. Implicit reactions, therefore, constitute only more elaborate detachments than the sensing activity.

Once this detachment has begun it may develop in various ways. The reaction may become reduced in morphological content until it bears little or no resemblance to the original response to the object. It maintains only so much of the original response as to constitute a reference to the original stimulus object. Later during the course of the individual's development such remnants of his responses to stimuli may become organized into some symbolic representation response to the original stimulus. In still other cases the detached reaction may become morphologically more complicated than the original response to the adjustment stimulus. The discussion of these different forms of implicit reactions constitutes the content of the next section.

Varieties of Implicit Reaction

Implicit reaction systems naturally cover a wide range of detached responses. Now as a matter of fact, all such responses may be roughly grouped between two limiting classes, which we will name representative and substitutive. By a representative implicit reaction we mean one similar to a reaction performed upon a previous occasion while in contact with a stimulus object and now operating without the stimulational arousal by that object. Thus the representative implicit reaction is a direct vestige of a previous reaction situation, and consequently is morphologically a fairly performative response in the sense that it partially or incipiently repeats a former response. Such representative reaction systems, therefore, are not so widely detached from the

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original stimulating situation as are substitutive implicit responses. We may consider as examples of the representative meaning reactions all of the imagery responses that the person performs as well as activities involving the elaborate operation of external skeletal muscles.

At the opposite pole from these representative reactions stand the substitutive responses. The latter do not in any sense resemble the original reactions to the objects for which they substitute. They may be totally symbolic. So difficult is it sometimes to observe substitutive implicit responses that their operation in many cases is frankly inferred. The fact is that the symbolic reaction may involve an act of the person of which he himself has no notion. In the literature of psychology substitution or symbolic reactions are denominated concepts or thoughts. So distantly removed are the substitutive responses from the original conditions to which the person is adjusting himself, that the stimulus to thought action is a total situation or problem. Now the detailed facts of the stimulating situation are supplied to the person by drawings, writings, or verbal stimuli which serve as substitute stimuli for the general problem. The last named may be looked upon as the directing or adjustment stimuli.

Between the fully representative and the substitutive reactions we find interpolated the language responses which constitute a most efficient form of detached reaction. The marvellous effectiveness of verbal reactions in determining behavior lies in the fact that they are not only completely apparent morphologically, but also that they represent some of the most facile of all our actions, and at the same time are capable of infinite modification. In consequence, verbal responses are among the most satisfactory substitutes for all sorts of objects and acts. Finally, language reactions constitute so pervasive a form of human activity, that they connect with and bring to the surface the deep seated conceptual responses. Thus, the conceptual responses for example, are most serviceable for reactional purposes when they are associated with language acts. This fact is evident when we consider that ideas are simple concepts, which, because of their attachment to verbal reactions, serve to induce responses in oneself and others.

Upon the basis of this dual classification of implicit reactions we may develop a summary of a number of types of such responses that may constitute for us a fairly expanded illustration of this type of behavior. Our specific illustrative types will fall into two divisions, namely, those described on a functional plan, and those described upon the basis of their structural character as psychological responses. Of these implicit action types we may isolate and characterize seven different forms.

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Repetitive Implicit Responses

Under this classification we put implicit reactions which are in all respects similar to activities previously performed in direct contact with the original stimulus object. In this case however, the activity is repeated without the presence of the original object. The reactions then may be exact duplicates of the original reaction systems. This repetition of activity may go on both on the level of apparent and explicit responses and on the level of inapparent activities. A very clear example of this repetition of activity on the level of apparent responses is the case in which the individual acts out an event or repeats in his facial gestures the expression of a person who is being named, or otherwise referred to. In experiments conducted to test the capacity of people to judge or name what were presumed to be feeling expressions, several reported that they must repeat the expression or seem to repeat it before being able to name the presented expression. In other well known cases, an experience or event must be acted out in some form before we can name it.

On the level of inapparent responses we find a very definite implicit repetition of our activity in the case of day dreaming or in the performance of extreme remorse reactions. In these cases the individual may repeat in more or less exact fashion the original responses which he developed and performed while in direct contact with the original object.

In general the energy with which our repetitive implicit reactions operate depends upon our capacity to relive the original situation. And so the warmth with which one sympathizes with another person who suffers some tragic experience is dependent upon the fact whether the sympathizer has himself played a part in a similar event, and is consequently able to relive it—to imagine it better. Here we find the psychological basis for the emphasis which the employer places upon experience as a qualification for employment. For having previously made reactions to a type of situation, one is then better equipped to react implicitly to the same or similar situation, and thus one is more resourceful in the present circumstances.

Incipient Implicit Reactions

Many of our detached responses consist of the partial performance of some original action. The implicit response may begin to repeat an original, direct activity but it will not be carried out completely. A very good illustration of this situation is the incipient pronunciation of a name that one cannot well pronounce because of the absence of an adequate stimulus for the arousal of the complete response. Another illustration is the response of writing carelessly ahead while we are composing a letter so that the material written is not a reaction to any immediately present stimulus. In both of these cases we must avoid confusing the illustrations with truncated responses performed in direct contact with the corresponding stimuli. The inability to pronounce the

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name in the absence of a stimulus is a different thing from stuttering because of an interference with the verbal response.

Vestigial Implicit Responses

Another type of implicit reaction comprises responses which constitute essentially parts of actions left over from previous performances. These activities are genuinely vestigial and are called out by objects substituting for stimuli objects which elicited the original complete responses. Of this type of vestigial implicit action we may distinguish two very different forms. The first of these we will call images or image reactions and the second vestigial movement responses.

Images

Image responses constitute vestigial remnants of primarily perceptual reaction systems. They are reaction systems remaining over from former perceptual responses to things. Accordingly, images have specific characteristics occasioned by their derivation from particular perceptual contact with specific objects. The fundamental vestigial character of images is that the person acts as though he were again in direct contact with the objects and their qualities to which he previously performed direct, perceptual responses. So vivid at times is such imagery that one may appear to see, hear, or smell things, etc., or even to be in a certain place, and actually speak and otherwise react to persons, when as a matter of fact one is at a great distance from both the persons and places which are now being implicitly responded to.

The uncanny similarity of the apparent presence of qualities of things is explained by the fact that much of the quality materials are verbally supplied and verbally stimulated. Image reactions accordingly may be looked upon as vividly and partially repeated reaction systems or patterns of response to some specific situation, plus the speech reactions descriptive of the objects and events reacted to. In many cases the nature of the image depends upon its verbal purveyance, in the sense that the reported qualities of imaged things are supplied by the person himself. This fact is clearly demonstrated when we attempt to imagine an object which we have looked at some time ago or perhaps have never actually seen. The infidelity of testimony illuminates the possibilities of adding materials to past objects and events.

To be entirely specific at this point, we must indicate that much of our image experience is really a verbal self-analysis of how we respond to an absent object. Thus, contrary to popular conception, the most intense imagery reactions are those in which the person repeats verbally the scene he has just witnessed or has otherwise taken a part in. Consider the young lawyer just returned from his first important legal argument, or the lover, rehearsing to himself as auditor, the scene just preceding the capitulation of the adored one. The amount and intensity of the imagery depends upon the impressiveness and intensity of the original situation and the degree of the person's immediate

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temporal detachment from the original situation. Obviously the lack of vividness of an event is a direct function of the time intervening between the secondary and the primary actions.

Just how this apparent presence of qualities in the actual absence of objects is possible may be well determined upon the consideration of the original perceptual responses. In those actions only part of the qualities of objects are present though many or all of them are reacted to. In such cases the person can, if called upon to do so, supply the names and other descriptions of those qualities. Here the whole series of qualities are subtly and imperceptibly supplied in the person's introspection concerning his vestigial implicit reactions.

Besides the fact that qualities are verbally supplied by the reacting person we have a very important source of the apparent presence of qualities of things in the subtle actions of the person which constitute exact counterparts of various phases of the original responses. Here we have a number of the actual component activities of seeing, hearing, and other actions. It is because of such activities as these that the inevitable immediate and even infallible references to actual qualities of things find a place in vestigial implicit responses.

Vestigial Movement Responses

From original non-perceptual responses which for the most part are final reactions we also derive vestigial responses of various sorts. These responses serve in much the same capacities as the imagery reactions. Anyone attempting to recall what happens when deeply suffering from the pangs of remorse, or writhing under the lash of insult or the sting of disappointing dejectment, will have no trouble in appreciating the definite vestigial activity of the person. It is impossible to overlook the shuddering of the entire individual, the palpitation of the heart, the activity of the salivary, lachrymal, and other glandular processes which take place, when we remember or think about some distressing or very pleasant experience. Above all, we must bear in mind always that we are attempting to describe the behavior of a tense superactive organism, and not the products of a cold, logical analysis. What happens when any of our imagery experiences become blunted, as is practically always the case with the passing of time, is that the pulsation and quavering of the organism have subsided.

Because the imagery reactions are so easily performed and occur so much more readily and quickly than the explicit type of response, and moreover because the former are so subtle and representative, they serve as the most capable and efficient of meaning reactions. Indeed, even though the older psychologists did not fully recognize the character of imagery, they hit upon images as the exclusive type of meaning responses. Just how efficient

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these implicit reactions are, may be gathered from the consideration of a thought or a planning segment of behavior, in which the compelling stimulating circumstances induce a very intricate interplay of implicit reactions. Such responses serve on the whole as backward references to important events in the life of the person and besides enable him to anticipate future possibilities of actions. Of course, in any serious problematic situation the person will combine such implicit responses as we have attempted to describe with explicit handling of maps, statistical tables, drawings, slide-rule, books, and other such instruments of complex human behavior acts. We hasten to add that by considering the actual complex of implicit and overt reactions constituting a planning behavior, we gain insight into the actual continuity of such actions.

Organizational Implicit Action

Among the large number of implicit acts are those which have no resemblance whatever to original contacts with stimuli but which may, however, hark back to such original actions in a very essential and important manner. Actions of this type may serve to integrate previous responses in a totality, so that past activities can now be made use of for present purposes and in the absence of the original stimuli situations. This class of implicit behavior we name conceptual activity. Concepts are reaction systems which operate when it is necessary for us to make immediate use of large segments of our past experiences in a rapid and effective way. The mechanism for this activity is as follows. Some problem presents itself to us, the construction of a bridge, let us say. It is necessary for us to correlate this problem with other problems of a similar sort in order to make plans for the new structure or to draw up an estimate of cost. In terms of the old work, old conditions of all sorts, we must project and create the new object or condition. For this purpose we have a stock of concepts or ideas representing our past experience of a particular sort, which now conditions the actions of making plans, submitting estimates, and directing the actual bridge construction.

Conceptional action is therefore referential and organizational activity derived from previous behavior situations, for a concept is a standardized and definite implicit response which substitutes for and sums up the person's experiences in a form useful for present purposes. Plainly, the capacity to develop concepts depends upon verbal aids, since only through such symbolic means can we build up meaning functions such as concepts are. Not only are language functions necessary for the development of concepts or standardized meaning reactions, but the use of them depends very closely upon word responses. It is through words (spoken, written, or printed) that concepts are primarily stimulated to action. Hence, we may look upon a treatise as an exten-

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sion of the person's implicit reactions to things. In other words, by means of a treatise we are enabled to sum up and record our past experience.

Incidentally there is brought to our attention the distinction between different types of concepts, namely, those standard implicit reactions summing up our own experience, and those concepts derived from our indirect contact with things, from reading and hearing of bridges built, for instance. Obviously, the largest number by far of our more important concepts originates in the indirect way, although it is an essential factor in the development of a concept that the person must have had some personal experience with the facts or conditions represented. The degree to which we are unable to grasp a concept or have one communicated to us is a direct function of our lack of experience with the facts and conditions represented. When we have had no actual contact with a certain object or condition we can have no concept of it, and therefore we can only have verbal substitutes. Every teacher, it is almost safe to say, has met with persons who function as students entirely on the verbal level, or almost so.

In considering the differences between a scientific concept and one developed in everyday life we cannot overlook the deliberate operations which the scientist performs upon the materials with which he deals. We might look upon this deliberative activity as in part a direct manipulation of materials and apparatus and in part an implicit handling of these materials with direct reference to previous experience of the same sort. All of this activity is performed with the constant aid, and by means of, communicative language activity, both stimulative and responsive.

In a sense, a conceptual act is a self-stimulating reaction to further implicit behavior; so that a thinking activity which is essentially a manipulation of concepts is a continuous activity of the person with respect to some object or condition. When the conceptual reaction becomes so standardized and identified with a term or name that it may serve as a common stimulus to various persons, then we may call it an idea. The intimate connection between the concept and the communicative language form makes the concept a definite object of scientific technique, just as is a piece of apparatus. It is absolutely essential for the functioning of ideas that they be embodied in language forms (names) and it is true, as a matter of fact, that such ideas are indistinguishable from the expressive language which serves as their media. Thus, language appears as an indispensable tool for both the operation and the expression of thinking.

Combinative Implicit Reactions

Some of our detached modes of behavior operate to combine various types of previous activities into new and distinctive behavior modes. On the one hand, such combinative activities may be considered as resulting in the manipulation of stimuli objects

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and the consequent deduction of a new intangible stimulus, or they may be looked upon as creating or resulting in a new form of behavior. In the latter case the new type of action may be considered as an original mode of thinking, some form of intellectual attitude or the development of an aspiration or ideal of some type. Here as in other cases the possibility of bringing about the combination or the new result is a consequence of the detaching character of these reactions, so that various types of things and actions can serve as substitute stimuli to bring about this final result.

Fanciful Implicit Reactions

Another form of detached behavior is that of indulging in the sheer functioning of implicit activity (day dreaming) disconnected from any intimate contact with objects. In consequence such behavior is freed from any sort of responsibility or impulsion because of the character of the stimuli situations. These modes of detached activity may be positive, as when the individual directs the procession of responses as a consequence of the freedom allowed him by the absence of the original stimuli objects. On the other hand, such activity may be considered as passive, in the sense that once the process of indirect action has commenced the individual does not interfere with its continuation.

The more positive forms of fanciful implicit action may result in the individual's building up particular situations whch are agreeable to him or perhaps positively necessary in order to overcome intolerable conditions. In this sense the results of such activity may constitute compensations for actual evils of a variety of types. The more passive forms may serve no positive function other than being indulged in by the individual as a means of amusement and play with no further end of any description.

Referential Implicit Action

As a final type of implicit action we may consider the activities that are definitely apparent to the observer, and which serve as a reference and a substitute for modes of behavior that cannot occur, or which the individual does not wish to do, or dare not do for some reason. Or again, such activities may be employed to substitute for actions by inducing somebody else to perform the work. Clearly the most obvious form of referential action is verbal activity.

The development and functioning of verbal responses indicate most excellently the referential character of implicit actions. For words are to a great extent pointers and symbols for things and events whether for the vocalizing person or some other. In the development of the use of words in infancy especially, we observe the referential function of such action. The use of words begins as a mere manifestation of need. The infant requires something which it cannot itself reach and in consequence it substitutes a verbal (originally merely vocal) response by way of referring to the need or to the object.

The mechanism for the operation of the reference function of

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words develops as follows. Whenever the infant cannot accomplish something itself and develops the capacity to substitute for this action a verbal response which serves as a stimulus for some other person to complete or carry out the action, then the verbal response very definitely takes on a referential function.

The use of words as referential responses constitutes a large but not exclusive function of language. Many of our language activities consist precisely of vague or definite references to things, conditions, events, or persons. In this sense, words or language reactions constitute detached responses to objects made possible by the operation of substitute stimuli.

The Observation of Implicit Reactions

That the study of implicit reactions presents us with no different problem than the observation and description of overt acts is manifest from our previous discussion. Especially is this true when we consider that many implicit responses are apparent and visible and on the whole exactly like performative responses in morphological character. Now when implicit actions are morphologically performative and apparent they are definitely open to the direct observation of the student of behavior. Otherwise they are in many cases frankly inferred. But this inference is or can be very definitely and accurately arrived at because of the other acts connected with the inapparent implicit actions. In still other cases implicit responses can be known to observers through their explication and expression in verbal terms.

Planning, reasoning, and other forms of prolonged precurrent reactions appear to be personal and private activity of the person until the actions are made explicit and apparent in some form. Even here we must distinguish between the comparatively simple reactions, such as attitudes toward those with whom we are in contact, and the larger planning and thinking acts, since in the former we can by careful study learn much concerning even the most inapparent implicit responses. By very diligently observing a person under various stimulating conditions we can understand and predict what kind of implicit reactions he is performing. The plausibility of this view comes to the surface when we consider that the difficulty in knowing just what sort of reactions a person is implicitly performing is owing entirely to the fact that the original stimuli are absent. When the person is very well known to us we can, however, reconstruct for ourselves the contacts which he has had with his surroundings, and thus study his implicit behavior. Just why a person plans to enter some profession or business may involve innumerable and widely distributed original contacts with surrounding conditions; still, in no case need we be entirely without some information concerning another person's implicit behavior. The point we are trying to make is excellently illustrated by the well appreciated fact that when we know a person intimately we can anticipate and predict what his views will

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be and what he will say concerning particular political or professional matters. Contrariwise, the subtle implicit actions of strangers are frequently unknowable to us. What strangers plan or intend passes our understanding. Probably in this fact is found the basis for the justifiable belief that we are usually suspicious and afraid of those who are unlike us in conduct.

On the whole the problem of observing and knowing when and how the individual performs implicit behavior depends upon our acquaintance with his previous conditions of stimulation and mode of response to those stimuli. Consequently when we are able to know what objects are substitutable for other objects for some given person then we may confidently draw conclusions concerning his implicit behavior. At any rate the study of implicit responses involves us in no greater complexities than the study of correspondingly complex overt behavior. The interesting as well as important fact here, is that the two kinds of reactions (implicit and overt) constitute complementary and continuous modes of behavior.

The Character of the Stimuli for Implicit Reactions

The fact that the stimuli for implicit reactions are substitution objects for the things actually reacted to, raises the question as to precisely what such substitution stimuli are like and how they function in actual situations.

In the most important situations in which implicit reactions operate, namely, in thought activities and voluntary behavior, the actual stimulus is a problem of some sort, whether an actual piece of construction, the building of a ship, the formation and maintenance of a business, government, or any other enterprise, or some abstract accomplishment in the way of a mathematical or scientific problem, for instance the formation of some hypothesis, or the solution of a complex equation. In these circumstances the substitution stimulus, which we might also call the efficient stimulus, is some kind of writing or sign. In each of the cases such substitution stimuli are highly symbolic of the original situation reacted to. This is, of course, what we should expect from an examination of the situation involved.

In less intricate cases of implicit reaction, such as the recollection of an engagement, or in mere day dreaming, the adequate stimulus may be any sort of concrete object that can call out implicit reaction. A house may prompt us to react to some person or thing toward which we have planned an action some time ago. A picture in an advertisement will send us scurrying to procure some article we have inexcusably neglected to purchase for several days or weeks past. In this type of situation the sign or written symbol may also serve as the efficient stimulus, but as a rule it is the more concrete object which is the arouser to action. Where the written word or sign is the efficient stimulus it is usually a direct meaning of the object or person to which the reaction is made.

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In many of the simpler situations we find as additional stimuli to the concrete substitution objects a series of reactions both implicit and overt. In dreaming we can trace out the stimulus as a continuation of the implicit responses begun during the working period of the day. In this instance the last member of the series of implicit actions constitutes the dreaming behavior. In such a case the adequate stimulus which originally starts off the train of reactions may be some concrete object or some implicit or overt reaction. If the adequate stimulus is some implicit reaction then it will be put into action by some object more remote from the implicit activity than is usually the case.

Reactions of a more complicated sort may also serve as substitute stimuli for implicit behavior. For example in the implicit responses operating in thinking reactions of all sorts, we find that a great deal of stimuli function is rooted in implicit behavior, verbal reactions, and other complex responses. In this way the complex reactions of an individual serve the stimulational function which otherwise would be served by various sorts of objects, drawings, printings, etc.

Very prominent among the excitants of activity both implicit and overt are the interoceptive reflexes which stimulate much of our behavior. In a large number of cases when we cannot discover the stimulus which has started us on some train of thought we might with some care trace back the series of responses to some interoceptive reflex. Of course, the reflexes must in turn be traced back to some object or condition in the person's surroundings, but the important point is that such a reflex act, when aroused, may become the stimulus for a new series of actions different from any that have previously occurred. While all the reactions of a person may belong to a continuous series of segments of behavior we can analyze the beginnings and the ongoing of groups of activities which represent specific adaptations of the person to definite surrounding conditions.

The analysis of the different types of stimuli arousing implicit reactions should not blind us to the fact that in practically all cases several or all of the stimuli varieties serve in common to stimulate behavior. The plausibility of this view requires no additional support beyond reference to the fact of the extreme complexity of much of our implicit conduct, a fact which correlates precisely with the seriousness of our behavior problems and the intricacy of our social surroundings.

Individual Differences in Implicit Behavior

Although the fact that different individuals respond differently in their implicit behavior is not a unique fact, still there is a greater difference between the individual differences in the implicit type of situation than in others. In the first place, the ways in which individuals differ in their behavior is indefinitely

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more varied in the case of implicit reactions, and in the second place, there are more profound instance and type variations.

All this is clearly understandable on the basis of two principles: (1) the general principle of each person having built up different response systems will result in his responding differently in his implicit behavior; and (2) since implicit responses are performed without the presence of the original stimuli they can be indefinitely varied and modified.

So through the various types of experiences which people have, they learn to respond in certain cases primarily with particular kinds of imagery. Some people there are who emphasize visual implicit reactions while others react more frequently with auditory or motion imagery. The latter kind of implicit reaction is usually more intimately related than are the other types to direct overt responses.

Among the most peculiar of individual differences are the synæsthesial reactions in which responses to stimuli are conditioned by some form of implicit behavior. Thus reactions to tone are connected with implicit color responses; that is, each characteristic tone has connected with it a particular color. For example, some persons report that higher tones are connected with bright colors while responses to lower tones are attached to darker colors. It must be remembered that each specific tone has its specific color or shade, although not all tones may be thus connected with an implicit color reaction. With other persons, the names of the months and days of the week, and even letters of the alphabet, are connected with implicit color responses. Another type of implicit conditioning reaction is the visual placing of numbers on forms of various descriptions.[1]

Morphological Types of Implicit Reactions

Since implicit behavior is primarily of a functional type, in the sense that its main feature is its relationship to adaptational stimuli, it can be of any morphological form. Not only can they be movements and images but also affective reaction systems so far as their morphological organization is concerned. In other words, feeling responses with their primarily visceral, glandular character may just as well be implicit activity as any other type of reaction operating in the absence of their adjustment stimuli. Whatever the specific morphological form of the feeling reaction systems may be, these activities not only can operate when aroused by substitute stimuli, but any morphological type of implicit action can serve in any implicit functional capacity.

[1] Galton, F. *Inquiries into Human Faculty and its Development*, contains a series of number forms of various types, and other valuable material on implicit behavior.

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CHAPTER XI

ASSOCIATION AS A FUNDAMENTAL TYPE OF PSYCHOLOGICAL ACTIVITY

The Problem and Nature of Association

In its largest aspects the problem of association is the determination of the nature of the orientation of the psychological organism in its surroundings and the means whereby this orientation is achieved. In other words, the problem of association is the discovery of the conditions for the various interrelationships between the organism and its environmental complexities.

In detail, psychological association refers to the effects which specific objects and particular groupings of objects have upon persons in eliciting from them responses of various sorts, and furthermore, the association problem involves the discovery of the effects upon the organism of the various changes in the relationship between objects. Now consider what this means when we add that psychological association carries over to the interrelationships of persons in social situations. Here we must take account not only of the intricate orientation of persons in exceedingly complex surroundings, but moreover, we must observe that various individuals are mutually influencing each other in the course of such adaptations; so that while changing behavior to adapt themselves to each other they at the same time provide new stimuli for the further modification of the other person's behavior, which in turn creates for the individual in question newer necessities for adaptation and orientation.

Precisely how important a psychological phenomenon association really is may be readily gathered from the fact that if we include its elementary forms it is indubitably a *conditio sine qua non* of psychological activity. For the essential point about psychological phenomena is the intimate association of a specific response with a particular stimulus. When the organism has acquired responses sufficient to connect it with a large number of surrounding objects, then we consider it as oriented in those surroundings, since it will then be able to perform behavior serviceable to itself in the given situation. In more complex situations, that is to say, when responses must be prepared for before their actual operation, and when the response must be delayed and in consequence aroused by substitution stimuli,[1] then we must also

[1] As in meaning reactions.

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have our surrounding objects and events themselves so related as to form interconnected stimuli.

We repeat, that only on the condition that the objects or events of the person's surroundings are orderly and systematically connected can he develop intelligent and rational behavior. For intelligent behavior implies a final directness, certainty, and efficiency of responses which are impossible without a definite interrelationship of the various stimuli with other stimuli, and with the person. Let us therefore at the outset observe that we mean to depart from the older tradition of modern psychology and look upon psychological association, not as a condition of happenings entirely within the individual himself, as the historical term association of ideas implies, but rather as a series of phenomena involving always the reactions of the person in specific relationships to surrounding stimuli, both things and persons. Not in the slightest does this mean that we entertain the idea of excluding from associational phenomena the connections between the individual's reactions. To do this would mean to pass over an extremely important series of psychological happenings. How far we are from committing such an error may be judged from the fact that we do not even exclude from the forms of psychological association the connections between stimuli-objects themselves. When we accept the hypothesis that association means the reactional orientation of the individual we thereby make room for all forms of associational connection.

But we hear the strident voice of objection saying, "All this you have written represents association almost entirely as a condition of psychological behavior, an essential condition perhaps, but still a condition merely, whereas by common consent psychological phenomena are constituted of responses to stimuli." Especially pointed appears this protest when directed toward our inclusion among associational data of the relationship between objects, for it practically amounts to a destructive criticism of our theory. And yet an examination of the facts in the case renders this objection innoxious. To this examination we shall now proceed.

And first, we propose to suggest that although psychological association must always involve a prominent element of purely physical relationship between objects, relationships which indeed greatly influence psychological behavior, still such physical conditions do not become psychological data except through the influence they have upon reacting organisms. It is only because an object and its connection with other objects are coördinated with the responses of persons that they become of interest to the psychologist. This means to say that from a psychological standpoint it is because the proximity of and similarity between reactions are induced in the person by the proximity and similar-

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ity between objects, that the latter are admitted into the psychological domain. Now let us see what is the net result that we have reached.

Briefly, we have arrived at this conclusion, that, although we cannot exclude physical connections between objects from the domain of psychological association, their inclusion among the data of psychology is only justified because such objects and their association are the stimuli for specific forms of reactions. When we generalize over the question whether a physical object is or is not a psychological datum we must declare that the question depends entirely upon the functional condition of such physical objects, or in plainer words, depends upon whether they are or are not operating to arouse an organism to action. When a physical object induces a reaction in the organism, that object obviously becomes a datum for psychology and we call that object a stimulus.

Nor is the situation any different in the case of connections between reactions even when the reactions are ideas in spite of the frequency with which they have historically been considered the sole elements of association. Let us be absolutely clear in our contention at this point. Since nothing other than a response to a stimulus may be considered as a psychological fact we cannot admit the mere connections between reactions as psychological data any more than the mere connections between physical objects. Reactional connections are not psychological facts unless they are responses to stimuli. Be it observed, however, that this does not mean that each unit of response or reaction system must necessarily be the response to a stimulus. On the contrary, the response member of a stimulus-response couple may consist of a group of reactions not one of which is a stimulus to another but all taken together constitute the response to whatever object or action of an object or person happens to be the stimulus.

We doubt much whether we need to protest, after our foregoing discussion, that our standpoint is whole-heartedly naturalistic, and that as scientific data we make no distinction between physical and psychological facts, tremendous as are, of course, the differences between the materials of the two domains of study. But it may not be superfluous to repeat that not because responses are organic activities are they data of psychology but rather because they are specific responses to particular stimuli. It is for this reason that we pointed out the similarity between responses and stimulating objects, a similarity which we may best state by observing that each is a reciprocal phase of a single psychological fact. Furthermore, if we agree that no more special psychological quality inheres in the response than in the stimulus we cannot possibly make the mistake that the reaction in an associational

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situation is anything but an actual adjustment of the organism. Frankly, what we have especially to guard against is the idea that an associational member must be some kind of inner process, the traditional mental state for example.

Was it not the overemphasis of the person's responses in the associational process which was responsible for the traditional view that association refers exclusively to ideas, whether considered as thought processes or as general terms for all psychological activities (awareness)? Very true it is that, at least in human behavior, exceedingly prominent associational activities involve primarily the implicit forms of action that usually go by the names of ideational and memorial behavior. All of the delayed reactions which constitute the foundation for all complex intellectual operations are made possible through the connections established between the reacting person and things, by means of similar and chains of dissimilar ideational reactions. We must not overlook the fact, however, that ideational connections consist of only one phase or form of association, a fact which we have already indicated by saying that association comprises a foundation both for the general orientation of the organism in its surroundings and for learning the most complex intelligent and rational responses.

One point more before concluding this section. We believe our discussion has shown that, while association may well be considered as involving conditions of behavior, association always turns out in the final analysis to be itself a definite form of action. This condition refers, as we have seen, both to connections between stimuli-objects and between reactions. Now we want to point out that psychological association may be considered as a reactional condition in another sense, namely, whenever we build up specific sorts of responses to particular stimuli, or in other words when we form associations, we invariably create a condition for the later operation of those associations when appropriate occasions arise. Obviously this condition of association which we are now discussing is unlimited in its comprehensiveness, involving indeed practically every one of our psychological reactions. We can no better state our point here than by saying that the fact of having formed associational connections means that we have prepared a condition for behavior which is nothing less than a latent associational reaction and which under appropriate circumstances becomes active. Accordingly, we might add that associational processes involve three phases of connections. The first phase is active, namely, the formation of the connections; phase two is latent and may be most appropriately called an associational condition, while the third phase is again active consisting of the actual operation of the formed associational connections.

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The Basic Roots of Associational Processes

Complex psychological association may be considered as rooted in and developed from at least two of the elementary properties of all psychological phenomena, namely, integration and differentiation of responses. Differentiation, involving as it does the organism's discrimination of objects and their qualities, and of the auspices under which the organism is in contact with its stimuli, is assumed to be a basis of the organism's development of its elaborate stimulus and response connections, especially when it is considered that all association involves the connection of some specific response with a particular stimulus object.

To what extent integrational processes function in the development of associational connections is well exemplified in the development of acts of skill, such as the organization of strokes in writing, of movements in dancing, and manual operations in handling complex machinery. Excellently are the integrative processes observed also in the acquisition of some of the speech behavior in infants. Beginning with words the infant integrates these into phrases and sentences. Language in infancy is all the better an illustration of the integrative processes because it shows the line at which integration develops into and merges with the larger and more complex process of association. For the infant (and for the adult also) language is only to a limited extent integrational, while for the most part it is definitely associational. The line of distinction between integration and association is placed at the point where a series of reaction systems merge into a larger reaction system. When acts are integrated into larger acts they lose their identity as separate acts, as in the case of the separate t-h and e strokes when they become the "the" reaction system. *Per contra* the association of reactions in a pattern of response,[1] does not involve at all any loss of identity on the part of the associated members.[2]

These integrational processes on the reaction side must be coordinate with a similar organizational situation on the side of the stimulus object. And so we find that parts of objects and both small and large series of distinct objects are connected up to serve unit stimuli functions. For example, just as the separate t-h-e

[1] Note that the terms reaction system and reaction pattern themselves indicate the differences between integration and association. For the former refers to a single unit of behavior of no matter what degree of complexity, while the latter refers to an organization of reaction systems. On the side of the stimulus be it noted also that the reaction system would most probably be stimulated by a single and simple stimulus, while the reaction pattern may be associated with a single complex or a group of stimuli.

[2] Is it necessary to point out that association and integrational processes may be temporally relative. That is to say, while we have considered integration as prior and more simple than association, this really depends upon the particular stage of development, since the reactions now being integrated may have previously been associationally connected.

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strokes are integrated into a single response, so must the three letters as they appear in the copy become united and thus perform a single stimulus function. Similarly, whole series of words come to take on a single stimulational function.

Upon these two functional foundations and possibly some others are built all the multifarious combinations of associational connections. It is hardly possible to place a limit upon the number and intricacy of associations which a complex organism develops in its multitudinous contacts with the surroundings; but always the character of the associations, which in any ultimate analysis must be brought down to concrete, memorial, manual or other sort of actual behavior, is determined by stimulus and response situations. Now since it is a fact that associations are intimately involved in every type and level of our behavior, it follows that there must be an enormous variety of association forms. In the following section we plan, therefore, to enumerate some of the outstanding types of associational connection.

What are Associated?

If psychological association means the connection and operation of responses to stimuli, then we are in immediate possession of a serviceable method for isolating the association data, namely, to specify the connections between responses, stimuli, and the settings of the stimuli.

For convenience, we plan to adopt the plan of calling simple any association of two or more behavior factors of not more than two varieties, while a connection involving more than two varieties of factors we will call complex. To illustrate, the connection of a stimulus and response, two stimuli, or two responses are simple associations, but when a stimulus, a response of one type, say an implicit reaction, and another type of response are joined together we will call the association complex. While it is certain that most of our reactions include the complex forms of association, we shall still find it very useful to make a list of the simple associations, even if they are finally found to be for the most part abstracted from complex associations.

Following our proposed plan we may arrange the simple associations into the following classes.

A. The Simple Associates.

1. Associations of stimuli and responses.
2. Associations of stimuli and stimuli.
3. Associations of settings and stimuli.
4. Associations of settings and reactions.
5. Associations of settings and settings.
6. Associations of reactions and reactions, analyzable into the following forms:
   - *a.* Association of two or more overt responses.
   - *b.* Association of two or more implicit responses.

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c. Association of two or more partially implicit responses.
d. Association of two or more partially overt responses.
e. Association of overt with implicit responses.
f. Association of implicit with partially overt responses.

Before arranging the complex responses we may first discuss the simpler associations.

1. The Association of Stimuli and Responses

One of the primary forms of association is the connection between stimuli and responses, since without doubt the fundamental psychological fact is the operation of a specific reaction system through stimulation by a particular stimulus. Such a segment of behavior is the basic fact in all orientation and learning adjustments of the psychological individual. Now it is possible to distinguish at least two classes of such associations on the basis of whether the association is primary or secondary. By a primary association we do not necessarily mean an association not acquired in the life of the individual, but one which although acquired has its basis in the person's structural character and in the adaptational history of the species of which the individual is a member. As examples of primary and secondary association we may take for the former the reflex behavior segments and for the latter conditioned reflexes and acquired reactions of all sorts. The association in the latter cases consists of the development of response systems for adaptation to specific objects and events.

Within the domain of stimulus-response association we may also distinguish between (1) the connection of stimuli with overt responses (this is illustrated by the reflex act), (2) associations of stimuli with implicit reactions, such as ideas and their arousing objects, and (3) connections of stimuli with partially overt and partially implicit reactions; this last situation is exemplified by the connection between a stimulus object and a perceptual response. Of course the two kinds of distinction are not mutually exclusive, and even in a single complex action we may find all of the kinds of associates mentioned.

2. The Association of Stimuli

Here we have merely to point out the fact that through the connection of objects, events, and conditions, with other objects, the individual is forced to connect and correlate his reactions to the end of achieving a greater control over his surroundings and of becoming more efficient in his adaptations. The primary process of psychological orientation is the organization of particular behavior combinations because of the interrelationship between objects and events. The general integration of behavior we might say is due to the necessity to adapt to many related objects in a given time. As an illustration of this situation we may take the case of typewriting, in which the various strokes or movements must be integrated in a definite form because of the connections

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between the stimuli, namely, the combinations of words and letters.

In the association of stimuli we may again distinguish between *primary* and *secondary* connections. In the former case the association between objects may be original and merely discovered by the person in his first contact with the stimuli in question, while in the latter case the stimuli are rearranged and brought into some new relation, in each instance of course modifying the behavior of the person. Another name for the primary form of association between stimuli is natural association, while the secondary connections may be called contrived association. Natural connections between stimuli may be illustrated by the relation of two or more houses, and let us observe that by natural we mean only that the connections between objects are formed without the knowledge, aid, and consent of the particular reacting individual. Contrived associations are (1) connection between a stream and a bridge, a person with another person (man and wife, parent and child), or a person and some object (occupational post or residence), and (2) all informational and physical objects connected by learning, creating, or through acts of skill.

Most emphatically must we suggest again that while no connection between objects constitutes a fact for psychology unless such a connection operates to effect some form of reaction in an organism, still that connection need not be known by the organism to be actually functioning. Very frequently such associations of stimuli are so subtle that the reacting person or observer does not know how connected objects or persons stimulate an individual to respond, nor why the stimulating objects or persons come to assume that office. In many cases, however, the basis of the substitution function is clear; it is found in the similarity or other resemblance between two persons or objects, in the frequency of their relation, and in other cases, merely by virtue of the recent connections between two persons, objects, or events.

To the writer it appears possible that the experimental problem of mediate association finds its solution in the fact that we have just discussed, namely, that we can be stimulated to action by objects or persons whose connections with other things we react to are unknown to us. Another form of stimuli association is the connection between objects serving as signs to call out responses to other things or persons which they signify. This type of association finds a large place in complex action of all sorts and especially in reasoning activities. As compared with the association of substituting stimuli the person reacting to a sign which signifies something else is always fully aware of the relationship between objects. The entire work of scientific and other forms of inferential behavior consists in great part in the development of an efficient capacity to respond to things and conditions when their representing signs

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appear. To illustrate this form of association let us assume that the high temperature of a patient may stimulate us to seek the means of discovering and controlling a toxic condition, or an increased rate of a chemical reaction makes us think of the relative capacities of given catalyzers.

3. The Association of Stimuli with their Settings

Very frequently specific forms of our actions become what they are because of an association existing between stimuli (whether objects, places or events) and objects, places, or events serving as the backgrounds or settings of those stimuli. Let us observe that the specificity of psychological reactions is due not only to the stimulus-object but also to that object in its setting or background, and observe further that it is because these factors are separated that the person is liable to perform an erroneous reaction to the misplaced stimulus. The dependence of a stimulus-object upon its setting is especially familiar in the case of contrasting colors or objects. Through the changes which are introduced in the medium of stimulation by colors placed in close proximity we are made to react to colors differently than when they have other backgrounds. Similarly we are prone to call a man tall or otherwise, because we respond differently to him when he is compared with a shorter person, than when he is likened to an individual taller than himself. Again, objects and events affect us differently when they have certain backgrounds than when they have others. How markedly divergent are our reactions to the same music when played by acknowledged musicians than when executed by unknown persons; again novels or other books of the greatest merit when written by women are by that very fact unreadable for some people.

As to the classification of the associations between stimulating objects and their settings we may, because of the similarity of these associations with the connections between stimuli-objects, call them by the same name. Thus we may speak of natural, original, conventional, or contrived connections between objects and their settings. Among such settings we may include the hygienic and other conditions of the person, as well as the individual's relative size and weight as compared with stimuli objects.

4. The Associations between Reactions and Settings

Not only are reactions connected with stimuli-objects, but they may be conjoined with the settings of such objects; so that the setting will serve as a secondary stimulus to elicit the response. We believe that the ordinary case of hallucination is a type of reaction induced in the person by the setting of a stimulus which in the normal course of events would have produced that response. We may readily grant that whenever the setting alone arouses a reaction we must look upon the setting as the stimulus in that situation, but we must in that case call the setting an auxiliary and not the adjustment stimulus. This is true even when no actual object can be the adjustment stimulus, as is the case in "seeing a ghost."

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5. The Association of Settings and Settings

At least from a logical standpoint we ought to include here the connections between settings and settings as a form of association. For if we agree that a stimulus-object may be misplaced then of course the stimulus object would be connected with two settings. As a consequence we must agree that the connection between the two settings has some influence in conditioning the behavior of the person. That different settings may be related, follows from the consideration that our reaction to a particular stimulus may be similar to our response to a different object merely because of the influence of a related setting; a government official may respond just as politely to an agent of an unfriendly power as to the representative of a friendly one, provided that in both cases there are present similar conditions which may merely be the diplomatic background. For our purposes here it is well to note that the same physical, social, or political conditions may constitute different settings for stimuli.

6. The Association of Responses

In many manual and skill acts we can determine the acquisition of these to consist primarily in the organization of interrelated overt reaction systems to form a definite pattern of response to some stimulating object or situation. Typewriting or swimming illustrates the connection between such overt reactions. We might add here that this type of association is equally well illustrated when the connected members are effective or not, and also when they are affective in form.

(b) Association of Two or More Implicit Reactions

Likewise series of implicit responses may be related to form a pattern response to stimuli, precisely as is the case with overt reactions. Indeed the association of implicit reactions was the first type of association noticed and studied, under the heading, of course, of ideas. In this as in the last paragraph it is necessary to observe that we intend to refer here only to the conjoining of responses and not the connection of responses with stimuli, for in many cases when we have series of responses operating the preceding reactions serve as stimuli to the following.

(c) The Association of Two or More Partially Implicit Reactions

The best example of such an association is the conjoining of verbal responses in conventional speech. Verbal responses here serve a double function. On the one hand, they are overt as immediate responses to the other person as stimulus, but on the other, they are responses to the absent things referred to. Again, when speaking of some object immediately present the verbal function of referring is easily distinguished from the direct verbal reaction to the thing. In both these situations our verbal reactions may be considered as partially implicit activities. Articulate speech of every variety may be considered as involving large series of conjoined partially implicit reactions.

Verbal responses in general constitute distinct features of associational mechanisms. For in the first place, as we have already seen, they fit into a number of different classifications as responses,

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and in the second place, they may constitute both the connected members of stimuli-response associations. It is the latter sort of associational connection which has attracted great attention in psychology: in general psychology as the experimental basis of free and controlled association, and in psychopathology as a phase of psychoanalysis.

(d) The Association of Overt with Partially Overt Reactions

Any perceptual behavior segment in which the specific perceptual reaction system (partially overt act) is connected with some particular overt response following it, is an example of this type of association. This connection is inseparable arising from the fact that the partially implicit reaction system is a vestige of some actual overt response which is in a sense replaced by the overt action following it in the behavior segment.

In this connection we might point out that no type of action is excluded from associational coupling. Reactions of any type of morphological organization and character or functional operation may be so connected. Specifically we may point out that this includes inapparent responses of all sorts as well as apparent.

(e) The Association of Overt and Implicit Actions

Thought and memory activities exemplify the connections between overt and implicit acts whenever the segment of behavior involves a definite change in some stimulating object, and this, we might add, occurs more frequently than not. In thought processes the implicit behavior may be so intimately related with overt byplay responses that we may truthfully say that pacing the floor, scratching the head, and other overt byplay responses are intrinsic factors in the thinking. Better illustrated is this type of association by the facts of planning as anticipatory responses for overt acts as bridge constructing, military campaigning or other types of overt responses.

(f) The Association of Implicit and Partially Overt Reactions

In every act of thought the implicit reactions involved are put into operation immediately or mediately by some substitution or associated object. Now the contact with such an object, constituting the immediately preliminary reaction to the thinking processes, is very frequently a perceptual or partially overt action. Our implicit responses are in great measure conditioned and modified by such connection with perceptual responses. In fact, it is the closer association of implicit responses with perceptual reactions which makes our diurnal thoughts and problem-solving different from day or night dreams.

B. The Complex Associations.

Possibly the most satisfactory description we can give of complex associations is to say that they constitute various organizations of the connections which we have already attempted to isolate. Thus every complex reaction consists of many interrelationships of stimuli, their settings, and all of the varieties of responses. The

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primary point here is that the particular modes of orientation and adaptation of the person to his surroundings are functions of numerous specific connections which the person makes during his development and growth, within the range of his surrounding stimuli. Thus for example, in every perceptual behavior segment the specific occurrence involves a connection between the partially implicit and overt responses, with the additional connection of all of these factors with implicit responses. In more complex acts such as planning, the situation is even more elaborate and complicated, and while these acts may involve many overt responses they are so named as to suggest primarily implicit activity because such responses play an unusually important part in the total behavior.

How Associations are Organized

Having enumerated various kinds of association, the problem arises as to what are the attendant circumstances under which these various connections are made. Not only is it clear that different conditions may be responsible for the formation of different associations, but it seems evident that any individual connection may involve a number of specifically different kinds of conditions.

Concerning all of the associations involved in our behavior taken *en masse* we may assert that two general methods of bringing the associated terms together may be isolated, (1) the casual connection of stimuli and responses, and (2) the deliberate connection of the associated terms. By casual association we mean any connection between stimuli and responses or other terms which is not planned or brought about in any purposive manner.[1] The various language responses illustrate both forms of association. We strive to make the child in its early infancy adopt definite, prescribed word responses as the names for objects and thus learn to communicate with others. For the most part, however, the child acquires specific language responses through the sheer casual stimulation by the sounds of other people.

Cutting across both of these modes of forming associations are the more specific conditions observed in the formation of connections. Thus a response may get connected with its stimulus because of frequently having been associated, or because of the great vividness of the conditions under which the associations are made. The conditions are operative whether it is a mannerism which is unwittingly acquired or whether the situation is the training of a child in school. Probably the different conditions can best be isolated by considering separately the six general kinds of association.

1. Stimuli and Responses

To consider first the connections between responses and stimuli we find that such connections are due in some form or other to some or all of the following conditions. (*a*) The necessity of the situation may force us to make particular movements in order to

[1] It is immaterial, of course, whether the deliberation is that of the acting person or someone else.

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prevent injury or to make any or an adequate adaptation to certain stimulating conditions. Older boys assume this principle when they throw the uninitiated youngster into deep water as a method of forcing him to learn how to swim. Such needs as we have suggested extend of course to social requirements and prohibitions as well as to physical necessities. (*b*) The frequency with which we perform a given response to a stimulus conditions the formation of a connection at all or the rapidity with which such an association is made. This condition applies more to routine and mechanical forms of responses. (*c*) In many cases an association is formed because of a recent contact with a stimulating object. This condition operates only in what we will later designate as temporary associations. At this point it is well to suggest that in many cases the sole warrant for asserting the presence or existence of certain associations lies in the fact that we can observe them to operate. The application of this fact receives its importance here in the consideration that an association may be formed and operate once only and never again. In such a case the condition of recency has its most plausible application.

(*d*) Another very strikingly contributory condition for the formation of associations is the vividness of the circumstances under which the reaction is made to the stimulus. Illustrative of this condition are the first acquisitions in school, the facts occurring in the presence of persons loved, feared, or respected and associations made in the presence of danger or distress, or under conditions of great happiness or importance to the person. (*e*) Associations involving rewards and punishments of various sorts are facilitated or hindered by these conditions in whatever form they occur. (*f*) And in many cases associations are developed as definite or indefinite means to ends. A prospective engineer acquires mathematical training as a basis for future use in his profession. Clear it is that the conditions overlap in many cases the motive for the formation of associations, but we allow in this separate division for many conditioning motives, as in the illustration of the engineering student. (*g*) Whether an act is pleasant or the opposite, determines in great measure whether and how soon given associations will be made. (*h*) As a last condition in influencing the connection of responses and stimuli we may name the motive of self-aggrandizement and self-satisfaction through the influence of which many associations are made and the acquisition of reactions facilitated.

2. Stimuli and Stimuli

(*a*) Exceedingly prominent as a condition for the association of stimuli is the similarity or other resemblance between things or persons. The resemblance then is a basis for the substitution of one object or person for another in a memory, thought, or imagination action. Possibly the resemblance may be owing to a partial

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identity of the stimuli such as the possession by each of a particular color or some similarly shaped common element. Illustrative of this type of connection is the case in which, upon observing an unknown person on the street we call out the name of a friend only to find that a single more or less pronounced resemblance was responsible for arousing in us what we may call a misplaced reaction. This elementary fact of association we may consider to lie at the basis of all highly developed forms of classification such as we find in the earlier stages of all science. To be more succinct, the complex classificatory behavior of science and its development into the activities of organizing phenomena has its roots in the concrete fact that we make the same or similar reactions to similar stimuli.

(*b*) Another very important condition for the association of stimuli is the existence between them of some definite form of relationship. Objects may be related in series of various description so that the appearance of one may serve to arouse responses associated with all or some of the other members of the series. Besides membership in series, objects and events may be related as causes and effects, antecedents and consequences. Personal relationships as father and son, husband and wife, brother and sister, etc., may be the condition for the reaction of the person to an absent stimulus when the associated stimulus is present. What we mean by insight into and knowledge of things and processes is the development of expectancies and predictional capacities for events when their related phenomena are present.

(*c*) Meriting separate discussion is the connection of things or events because of the fact that stimuli-objects impress themselves upon us as signs for a thing or event signified. Through the connection of objects as possible symbolic representations of one by another we acquire our capacities to use objects needed as instruments of adaptation to conditions, but which are not now within actual reach. Here we find one of the prominent bases for all the higher forms of intelligent behavior, for in the symbolic relations of things we already have an elaborate interconnection of actions with combinations of stimuli-objects.

(*d*) Just as in the case of the association of stimuli and responses so here we find also that the frequency of connection between two objects or persons is conducive to the operation of one as a substitution stimulus for the other, and in consequence enlarges the scope and increases the effectiveness of our action.

(*e*) Recency serves likewise in this situation to connect objects and events, although the condition is limited in its potency to bring about serviceable connection.

(*f*) And finally as a contributing condition to the organization of connections of stimuli we might add contiguity or the sheer and accidental connection between objects, events, or persons.

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3. Responses and Responses

(*a*) In the association of responses the frequency of connection is a very effective condition for the establishment of a relationship. This fact is illustrated by the rule of much practice for the acquisition of informational and skill responses. (*b*) Similarly recency operates as a condition for bringing together in more or less permanent form the members of a series of responses. When manual or verbal responses are in question then (*c*) rhythm is a patent factor in the formation of connections. (*d*) In the connection of verbal responses sound similarity is very important in many cases for the establishment of a connection which may resolve itself into actual rhythm. When we consider such associations as language responses we cannot overlook the great importance of (*e*) custom and usage in the formation of response connections as well as in their dissociation.

4. Stimuli and Settings

Significant as conditions for the establishment and continuation of these associations are (*a*) the sheer location of a stimulus object in its particular surroundings, and (*b*) the constancy of the location and connections between the stimulating factors.

5. Responses and Settings

This type of association would clearly be conditioned by the same factors as (1).

6. Settings and Settings

Whatever seems effective for (2) would appear to operate in this case also, although the connections here are not ever so clear cut or so permanent as in the case of the connections between stimuli and stimuli.

As a summary of this section we might suggest that our extensive though certainly not exhaustive, enumeration of the conditions surrounding the establishment of the various forms of association connections serves to emphasize the individual direction of such connections. We mean to stress the fact that each associative connection, whether fortuitous or designed, casual or deliberate, is a unique fact and in consequence is a member among innumerable classes of events. Definitely, we mean to deny that there is a law or series of laws which can be considered either as a general statement of what brings about association or as a limited series of particular conditions exclusively contributing to the formation of associational connections. As we view the matter there are as many laws of association, if we insist upon the use of the phrase, as there are actual connections of psychological facts. This way of looking at the data of association constitutes merely a suggestion of the original character of all psychological phenomena and especially of human reactions.

The Operation of Association Processes

Strictly speaking, the mechanism of association includes both (1) the processes of organizing connections between stimuli and acts, and (2) the operation of those reactions when formed. In fact, these two processes are simply reciprocal phases of a single mode of behavior, although for practical purposes they may be treated apart. In many cases, however, as we have already seen,

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the two processes are not readily observable, since the fact of having formed certain connections is evidenced only by the fact of using them, as in recalling a name, or in the performance of skilled acts as repairing a piece of apparatus.

While the simplest associational operations consist merely of the functioning of a reaction system or a pattern of such reaction systems when the connected stimulus appears, the most striking and effective are those mechanisms in which the reactions of the person are brought into play by indirect stimulation, that is to say, through the mediation of a substitution stimulus.

Typical functioning of the complex associational processes may be observed in memorial behavior, since our memory activities consist practically in the operation of reaction systems excited to action by means of substitution stimuli which were originally connected in some way with the object substituted for. Possibly this associational reaction may be even better observed in the study of language and reading reactions. In these forms of behavior, sounds or printed symbols serve as substitution stimuli to arouse overt or implicit reactions to whatever objects or persons are symbolized. Essentially the machinery of complex behavior is the interconnection between a given reaction of the person and two stimuli, one the original object to which the reaction is developed, called the adjustment stimulus, the other, any related object which can call out the reaction in question.

But here we may well pause and ask whether we are not unintentionally overdoing our argument concerning the prevalence and importance of association. Specifically, we may ask whether, in fact, an implicit action or idea can be associated either with an adjustment or a substitution stimulus. Our answer to the question is unequivocally affirmative and this answer we give because we believe ideational association is in essence a process of living over some past situation. It is a process of repeating in an implicit manner some previous action. Possibly this point is most effectively illustrated in the observation that the process of recall which may be either an overt or an implicit act is merely the operation of a postponed reaction. My recalling an engagement may involve the overt act of immediately walking toward a certain point stimulated by the visual perception of my memorandum book, or it may be merely an act of determining and planning to go there induced by the same stimulus. Possibly it is not inadvisable to interpret the postponed act at the time of its actual operation as a substituted act, especially if we keep in mind the difference between it and the replacement acts mentioned above. Whether the postponed act is overt or implicit the event consists of a delayed response made possible by the connection of reactions with stimuli.

We cannot better observe the operation of association than in the study of learning, for as a psychological process learning consists

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of the active connection of responses both overt and implicit, with specific stimuli. The overt responses may be manual or verbal, while the implicit reactions may involve any kind of indirect response to stimuli. When the responses are entirely indirect some actual contact between the person and his surroundings is maintained, of course, through perceptual activities. We assume the learning to be accomplished when the associations are so firmly established that whatever reaction systems are acquired will operate whenever their appropriate stimuli are presented. Now when a person in his various contacts with his surroundings has made many associations between his responses and stimuli we may truthfully speak of his capacities to do various things, for not only is he equipped to respond definitely and directly to particular stimuli, but also by virtue of having made a large number of associations, he is equipped to meet new situations, situations exactly like which he has never faced before, provided always, however, that conditions common to older circumstances are present. Learning and the capacities to which the process gives rise consist of the postponed operation of a reaction to a stimulus with which it has previously been connected.

For the most part it holds true that our intellectual and manual capacities depend directly upon the development of associations through actual contact with particular objects and conditions. Inventive skill, the ability to discern relationships in things, as well as expertness of judgment in given situations can all be readily traced back to frequent and constant association with the objects and events in which the person excels. In many cases what appears as a mysterious intuitive faculty can be shown to have its direct origin in such preoccupation with particular facts. Was not the discovery of the table of periodic relationships between chemical elements based upon such associational facts, and are not mathematical discoveries and the capacity to classify animals rooted in the same associational soil?

Digressing a moment we might point out that the study of association as a basic and universal form of behavior throws light upon the extremely important problem of psychological capacity. Note that by capacity we always refer to an action, although it may be a potential or possible action. Now a potential action in psychology is merely a postponed or delayed response, postponed we say because the action was really started when the original association between stimulus and response was formed. My capacity to multiply, to play the piano and to draw, affirms the fact that I have acquired such associational connections between responses and stimuli that now the presentation of stimuli elicits their characteristic responses. By the same token the acquisition of many definite responses to particular stimuli leads also to the formation of more general and formal phases of action, and so we acquire general drawing, mul-

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tiplying, and other capacities as well as the specific capacities to draw particular pictures or to multiply particular integers.

Observe then, that general capacities refer to such phases of actual behavior as are common to all particular acts of a certain type. When we have multiplied enough pairs of integers and composed enough particular musical forms, we can thereafter multiply new combinations of integers and compose other pieces, but neither of these new activities involves absolutely new factors; rather they comprise individual and common behavior elements which have previously been associated. The less specific aspects of behavior give us then only relatively general capacities. That our so-called capacities are significantly rooted in previously acquired associations we note from the fact that it is extremely difficult to modify the capacities we already possess, such as dispensing with or changing our "styles" in handwriting, literary, and musical composition and other ways of responding to stimuli. That all our capacities consist of associational connections is further indicated by the fact that we can change our styles only by training and in general finding new stimuli. Because the psychological data, at least of the human domain, involve so many and so wide a range of capacities and tendencies we may consider our present discussion as offering additional evidence for the universality and foundational character of the association processes.

The associational processes, however, do not only constitute the main operational machinery for intelligent behavior, but the number and variety of associational reactions acquired determine also the differing qualities of high grade acts. Thus, the difference between merely knowing and originating within the domain of intelligent behavior is determined by the different associational mechanisms involved. In informational and other knowing reactions the substituted stimuli are very similar to the original ones, while in originating acts the effectiveness of the behavior depends upon the quantity and differences of stimuli that make behavior substitutions possible.

Possibly not too redundant is it to repeat again that the operation of previously acquired associations not only constitutes the higher intelligent reactions but also the simpler intelligence acts and capacities as well as behavior not specifically designated as intelligent. Especially must we observe that our passions, diffuse feelings and other types of affective behavior operate as they do in specific instances and bring about conditions in the relations between persons and their surroundings precisely through the same sort of associational machinery as we find operating in the so-called motor and ideational reactions. Now since the operation of associations always involves some specific type of adjustmental response we propose to discuss the associational mechanisms in a few typical situations.

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1. The Mechanism of Association in Manual Skill

How well the expert designer can plan a bridge depends entirely upon the suggestions his original data offer for the specific development of suitable structures and the harmonization of cost, appearance, solidity, and usefulness in the total construction. The specific workings of these suggestions consist of the substitution of the present data such as kind and location of site, and the needs of the situation for types of structures already built, studied, or projected. At each point in the work stimuli in the form of unwritten or spoken instructions, drawings, maps, plans, and instruments serve as substitution stimuli for reactions to detailed features of the whole situation. To take a simpler case of skilled behavior, the particular difficulties in the mechanism of an automobile, for instance, suggest other difficulties in other situations, or ways in which the difficulties were overcome. In both cases of suggestion the substitution stimuli operate by calling out in the person implicit responses. Indeed, unless the present difficulties call out such reactions no act of skill is possible. The amount of skill possessed, that is, the number of successful operations, is an index to the number of associations previously made, excluding of course the associations being made at the time.

A similar operation of interconnected stimuli and responses providing the organism with orienting behavior is illustrated by animal reactions. A young pigeon making its first flight from the cote can be easily caught because it has not associated its reactions with specific surrounding objects and places of possible safety.[1]

2. The Mechanism of Association in Memory

In memorial behavior the associations operate in two main ways. (*a*) Through them projected reactions are possible in the sense that substitution stimuli are intentionally attached to acts for the purpose of postponing some work or other action. The substituted stimuli may be time, as when we agree to do something at a given point in the future. In this case we mark our calendar as the effective means of stimulation, or we may promise to speak to someone when we meet him. In this case we project an action into the future by means of words. Probably it is well to point out that here we have an action in which an indirect or implicit response occurs before the direct one, although in every case, of course, the direct association must have been previously made.

(*b*) The recalling of forgotten events or the performance of forgotten actions is brought about by almost any kind of object or situation provided it has previously been connected with the forgotten event or act. The appearance of a certain person may be the stimulus for the act of paying the arrears in dues to the club to which the person had introduced us. In this case the specific mechanism is not controlled by the person and the act is unintentionally delayed, perhaps to the chagrin of the reacting person.

[1] See Whitman, Orthogenetic Evolution in Pigeons, Vol. III.; "The Behavior of Pigeons," 1919, 157, edited by Carr.

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3. The Mechanism of Association in Imagination

In imagination reactions the associations between things serve as stimuli to suggest to the person associations between other things; so that the latter can be recombined and rearranged in various ways besides dissociated and reconnected with other things, persons, or events. In this type of reaction the fact of association or other relation between things serves as the effective stimulus to new forms of implicit behavior. Here as in other cases the efficiency of the person depends upon the number of previous associations actually formed; in other words the imaginal capacity depends upon the amount and degree of practice.

4. The Mechanism of Association in Thinking

Thinking acts, involving as they do intimate responses to problematic situations, exhibit a multiplicity of forms of associational operation. In the first place, the capacity of the thinker depends upon the number of solutional ideas suggested to him by any problematic situation. As in all other cases this suggestion is a function of the number of previous associations the person has already made with similar objects and conditions. How many associations are necessary may be readily estimated when we consider that each thought activity constitutes a unique behavior situation.

Throughout the entire series of complex association mechanisms there runs a common principle, namely, that such mechanisms enable the individual to perform a multiplicity of responses or at least suggest the possibility of multiple responses to a few or all of the immediately present objects or situations. This result is made possible as we have seen by the organization and reorganization of stimuli and responses.

The Modes of Psychological Association

Such a constant and pervasive phenomenon as association will exhibit a variety of forms in the various behavior circumstances of individuals. We have already met with some of these varying modes in our discussion so far, but for purposes of further explication and in spite of repetition we may enumerate the following association modes.

1. Primary and Secondary Association

In the stimulus-response connections we find reactions which are originally connected with certain stimuli as in the case of a bit of meat serving as the stimulus for the salivary reflex action. Now when this reflex is conditioned we assume that the responses are attached to some other form of stimulus as the sound of a bell or an odor. The first connection accordingly we will call primary, and any succeeding connection may be called secondary, tertiary, etc., to the limit of associational capacity. Naturally, this classification will have to be mainly confined to simple forms of response, for only in such forms of behavior can we definitely determine what are original stimuli. Further, only in such cases can we observe the appropriation by another or additional object of the rôle of an inciter to action. No doubt, exists, however, that this process of transconnection between stimuli and responses is a common occurrence in our most complex behavior.

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2. Temporary and Inseparable Association

Another mode of association refers to the relative permanence of the connections when formed. Probably most of these connections when made between stimuli and responses or between stimuli persist indefinitely, although some associations become dissolved in the course of a longer or shorter time. Every case of forgetting or the loss of skill of any sort involves the dissolution of some connection between associated members, whether responses or stimuli. Language connections exhibit many illustrations of inseparable associations which apparently should be dissolved. Thus sunrise and sunset persist as names for events which we know do not occur. Again, the expressions about the lack of brains or good brains survive in spite of intelligent information concerning psychological activity. Every person who is troubled about his own or some other person's bad habits knows the difficulties of disconnecting reaction associates.

3. Original and Formed Associations

Of the connections between responses some are original associations necessary for the occurrence of given adjustments to stimuli. As such we may mention the movements constituting the combinations of reflexes and the integrations of response factors in habits. Among the formed associations we may classify the organization of series of responses as nonsense syllables and various language connections, although in some cases of language reactions, notably where articles are inseparably connected with names as in the German language, we may consider such associations as original. The criteria we are using in this particular classification may be considered then to be (1) the degree of deliberateness with which the associations are formed when the individual forms them, and (2) the question whether the individual is responsible for the connection or whether the adjustments are socially dictated.

4. Logical and Conventional Association

A fairly broad and sweeping distinction can be made between logical connections existing between responses and stimuli, and those based upon pure convention. Most associations which we form through the direct influence of the stimuli-objects themselves illustrate the logical type of association. When we jump out of the path of an automobile we may justify speaking of such a response as a logical adjustment to the stimulus. Quite otherwise is it with another large mass of our responses. Attaching a sex name to a ship or gun is in no sense a logical association but merely customary. The domain of language is full of such illustrations of logical and conventional associations. This distinction is likewise illustrated in our responses to sound. We speak of high and low, hard and soft tones, when as a matter of fact the names or descriptions given to such sounds are arbitrary and in many cases illogical.

5. Direct and Indirect Association

As our last mode of association we may name the direct and indirect connections. As direct we may consider any immediate connection of associational members usually made possible by the

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fact that the person is in direct contact with the stimulating object when stimulus-response connections are formed. On the other hand, indirect associations are such as involve the intervention of a third factor when two members are associated. Direct associations are exemplified by the infant's development of a withdrawal reaction after being burnt in the candle flame, while the indirect association is exemplified by acquiring informational responses to a foreign country by means of a geographical atlas. Indirect language associations are illustrated by the names we give to objects because of a resemblance in appearance, use, or sound. Thus, we use the one word glasses alike for spectacles, binoculars, or drinking glasses. Possibly the largest number of our indirect associations involve language and informational responses, for all fixed figures of speech involve the indirect mode of association. When the indirect associations are not linguistic we find that in most cases they are formed because of the inaccessibility of the objects; so that the original contacts with them are brought about by reading of them or indirectly hearing about them.

Our discussion of these five modes of association offers conclusive evidence of the fragmentary character of the enumeration. Not only is it not practicable to enumerate all of the modes of association, but even in these five there is much overlapping. Again, it is not easy to hit upon a single criterion or even a few criteria upon which to base the enumeration. And so we have not attempted to distinguish between individual and social association, or between the formation, existence, and use of association. No less neglected here is the differentiation between the accidental or chance, and the more definitely determined associational connections. Just why an exhaustive inventory of all or most of the modes of association falls without the limits of wise undertakings, is found, we believe, in our reiterated remark that association as a psychological process is a universal factor in all psychological behavior.

Levels of Associative Formation

From the fundamental and pervasive nature of association we may readily infer that the connections between the organism and its stimuli, as also the organization of responses themselves, take place upon every conceivable level of activity. If we start with the earliest elementary forms of connection between stimuli and responses, such as constitute the basis of differential behavior and psychological activity in general, we may say that the lowest association level is found in the biological maturation of the organism. As a definite example of associative connection at this level we may proffer the case of reflex action, for we believe that the organization of response factors for the most part takes place during the intrauterine life of the person. Also, we might indicate, although this point is not wholly without ambiguity, that in the early weeks

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of postuterine development the connections between reflex acts and their stimuli take place.

To consider now associations formed during the individual's more active contacts with his surroundings we may note that many of them are developed without any intention of the person and in many cases without his knowledge. Illustrative of such situations are the cases of the infant who forms all sorts of reactional connections with the objects stimulating him besides acquiring many language responses through contact with persons who use that language. In both cases the infants may be said to have the associations made for them although they are by no means passive participants in the situations.

On the other hand, in active learning of all sorts associations are formed with the knowledge and consent of the person. At this level the individual is far more active in the organization of responses to stimuli or in the formation of connections between acts. When we learn to drive an automobile or operate any kind of new mechanism, or when we attempt to acquire any kind of book learning, we deliberately form associations for our own purposes.

Possibly the most complex and highest level in the formation of associations is the critical one of science. Here are developed the most definite forms of associations between the investigator and the objects which he studies. Because of the scientist's interest in the casual connection between things he must make abstract and very indirect associations. This point appears clearer from the observations of things or inferences from those observations. Many scientific associations are of course the symbolization of the connections which the scientist discovers to exist between objects and events in nature. But in equally as many cases the relations between things are so obscure and difficult to get hold of that a very indirect method of knowing them must be utilized.

General Conditions of Association

Besides the specific conditions for the formation and operation of association which our discussion has brought out, a number of general conditions determine the kind, number, and strength of connections which are formed.

Obviously, one of the most prominent of the general conditions must be the opportunity to form associations. In other words, the larger the number of contacts with objects the larger is the number of reactions we build up with which to adjust ourselves to them. Likewise the greater the variety of things and events which affect us, the greater will be the number and types of our associations. Practically speaking we must, in order to develop many and various associations, visit new surroundings or have them brought to us through descriptions. On the whole we mean to do justice here to the importance of the actual relationship of the natural objects in our surroundings as influences upon our associational behavior.

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An equally influential condition for the formation of associations consists in the social surroundings of the person. The customs of the groups in which one lives are potent determiners of the behavior development of the individual, prescribing as they do what one shall learn, as well as determining what we must and must not do.

For the operation of association much the same conditions prevail. The more objects we are in contact with which can serve as adjustment or substitution stimuli for responses previously acquired, the more likely is it that the responses will be elicited. And let us not neglect to consider the effect of the present attainment of the person upon his association formations. Skill and knowledge reactions depend for their development upon the present information and ability of the individual. We all know that the more information one has upon any subject the easier it is to acquire still more. Similarly, the acquisition of specific sorts of associations develops a line of less resistance for the further development of associations in that general direction; the ground is prepared for definite interests and urges to do certain things and to develop desired behavior connections. On the other hand, such acquisitions inhibit and interfere with the formation and operation of certain other associations. To possess particular prejudices means we will be prevented from indulging in certain activities and acquiring associations of specific sorts. The inhibitory effect of previously acquired associations even goes so far as to prevent us from performing actions which under the circumstances would be especially desirable or effective.

Of no slight importance for the formation and operation of associational connections is the general health condition of the person, including the factor of fatigue. These points, however, it is unnecessary to stress, since they are operative with equal force in all cases and in all phases of behavior.

Manifestly, a general condition for the development and use of associations is practice. Without practice the acquisition and fixing of skill and informational responses would be an impossibility, and certainly when associations are formed their use is greatly facilitated by constant and frequent exercise.

Finally, we have to consider the normality of an individual with respect to his associational reactions. If for any reason he is below par in his functional capacities he becomes disoriented, that is to say, his associations become dissolved and he loses contact with his surroundings. As a record of fact, the dissolution of association which we call disorientation is one of the most prominent symptoms of psychological disorder and disability. From the nature of association this is, of course, precisely what we would expect. In many cases, too, the disorientation may be owing to stimuli factors, with the consequence that it is entirely possi-

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ble that the disorientation or the lack of associative connections is itself the abormality. Hysterical blindness, deafness, etc., are dissociations of this type, although they are frequently connected with other untoward conditions of the person and are not the result entirely of overwhelming external circumstances.

Psychological Association and the Neuronic Theory

Throughout the history of psychology the subject of association has occupied a peculiar and important place in that domain. Not only did psychologists study association as actual facts of connection between responses but also the fact of connection was elevated into a general principle for the explanation of the existence and operation of the mind. In the present section our object is to consider the latest phase in the tradition just mentioned.

Briefly, the fact of association has been used to support the neuronic conception of psychology. The procedure was as follows. It was correctly assumed that association was a basic process to memorial, imaginational, thought, and other ideational (implicit behavior) activities. But instead of considering association, as well as all these other processes, as actual responses of persons to specific stimuli conditions, psychologists assumed that they were dealing with mental states, which needed to be connected with some tangible feature of the person who thinks, remembers, etc. The tangible correlate was presumed to be neurons and neuron combinations. For the most part during this development neural functions were looked upon as conditioning the interconnections and operation of the mental states. Just why we remember and think was accounted for on the basis of the operation of neural processes. In the earlier stages these were presumed to be pathways, and later synaptic connections and resistances, etc. This neural connection with association was accepted under the belief that enough neural combinations were possible to account for all associations of ideas.

Now we propose to deny that the connections between associational members are the manifestations or effects of connections between neurons or neural patterns. Further we might go in our disavowal and say that we positively cannot accept any sort of neural basis for association. In opposition to the neural theory a number of objections may be strongly urged.

In the first place, to assume a neural basis for association means to distort associational facts in two particulars. To begin with, the function and efficiency of the stimulating situations and objects are set aside and not given place or prominence in the description of associational facts. Besides preventing us from correctly describing association facts, such a procedure inevitably misleads us into limiting the number and varieties of association to accommodate the theory. It is not improbable that to the neural theory may be laid the charge of excluding from association types all the connections but those of ideas and sensations, even if these are

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considered as actual responses. On the basis of the neural theory, therefore, we have no place for connections between stimuli and responses or other associational types.

No less serious objection to the neural theory is the criticism that its upholders attempt to make some phase or a part of one of the members of an associated couple a causal condition of the connection. More and more widely recognized is it becoming that we must not look upon the neural phases of psychological action as anything but integral factors of a total reaction. Now it is plain enough that even when we are discussing associations between reaction couples we blunder by taking the neural components of one or both members as causing or conditioning factors. How much more culpable is it, then, when one or more members of the associated complex are stimulating objects or situations. Precisely how serious is this present criticism may be judged from the fact that when we maximize the importance of the neural factors in behavior we thereby submit the reactions to needless diremption, separating the neural activities from the many other components. And usually we follow up such descriptions by calling the neural mechanism an intervening process between the stimulus and the response, the response here being of course the remaining processes of the single adjustment act.

Further, from the standpoint of an organismic psychology, the neural theory of association stands condemned because it perpetuates the doctrine of autonomous mental states. Instead of allowing psychological phenomena to be described as definite concrete reactions of the individual to his surrounding stimuli, the neural assumption presupposes that psychology is dealing with mental or psychic states for the existence of which the nervous system provides a basis and for the organization and operation of which the nervous system constitutes the mechanism. Whether we accept or reject a psychology of mental states we still face the problem whether the process of association is confined to the connection of simple units of a complex mind or state of mind, or whether the process includes also the connections of responses with stimuli, an addition which may be expanded to include the general interconnection of persons with their surroundings. A crucial problem is here involved, affecting the very foundations of psychological science.

From the actual development of psychology we learn that the insistence upon a neural basis and mechanism for psychological association involves a very doubtful procedure, namely the attempted correlation of specific neural elements with particular ideas or other mental states. How manifestly erroneous such a procedure is, is readily indicated by the denial of every psychologist that he is really attempting such a correlation. No psychologist, it is safe to say, would care to admit that he means to

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connect an idea with a specific neural element; but is this not the inevitable implication of a neural theory? From the earliest correlation of neural and mental phenomena the aim of psychologists has been to make use of the neural apparatus to account for the organization and association of mental states; and how, we may ask, could this desired effect be brought about unless specific neurons were connected with specific mental states? Of a certainty this entire procedure is very vague and without the slightest shred of support from competent neurologists, and yet the aim of the psychologists, although denied by them, is indubitable.

What follows if the psychologist does not attempt an exact correlation between neural and mental elements? Simply this, that the nervous system is clearly neither a mechanism nor a basis for association or any other kind of psychological process. As we have more than once indicated, the neural theory not only does not help us at all in the interpretation of associational facts but it precludes our investigating the neural mechanisms themselves as integrant factors of complex reaction systems.

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Precisely as in the case of an earlier psychological period, associational processes today may be looked upon as fundamental and universal mechanisms for all psychological phenomena. But unlike the earlier period in which association was considered as having to do only with mental states, we must today consider it as referring to the organization of actual stimuli-response situations. Associational processes, then, we may conclude, constitute some of the basic facts in an objective and naturalistic psychology. We have attempted to point out that the specific reactions to stimuli such as learning, remembering, thinking, and the manipulations of skill are all the operations of connections between stimuli and responses. Also, psychological capacities of various sorts, besides specific responses, may be looked upon as the association of many responses and stimuli of some given type, all of which in their operation give the person a series of general competencies serviceable in his various adjustments.

Now just in this fact that we can find common ground in such apparently widely separated psychological positions as associationism and objective psychology, do we find support for the validity of our hypothesis that association is a fundamental basis for all behavior. Let us observe that after all the associationists may be considered as having magnified a single kind of associational process, namely, connections between implicit responses. Our study, however, has sufficiently indicated that from an objective standpoint we must, along with the response factor, include the stimulus phase of a behavior situation as an essential factor also, no matter how many reaction systems are associated in a pattern of response to form the reaction phase connected with the particular stimulus. Since associational processes are in the last analysis orientation processes connecting the organism with its various surroundings, we must include among the types of stimuli studied the objects, events, and persons which arouse the individual to action.

Associational processes we have found to include always two phases, one the organization of stimulus and response connections and the other the subsequent operation of the responses when the previously associated stimuli are presented. To a very slight degree then we might correlate the organizational phases of association with the simultaneous association and the operational aspects with successive associational phenomena.

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An historical study of association, which as a process has always received a large share of attention from students interested in psychological phenomena, indicates plainly the dividing line between the treatment of association as a description of actual facts and as a theory or explanation of all the other facts of psychology.

The earliest treatments of association were factual. In the dialogues of Plato (*Phædo,* 73–6) and in the writings of Aristotle (*De Anima* II, *De Memoria* I, II) we find actual association facts described as definite happenings in acts of remembering or recollecting. While no such terminology was then employed, the exposition may be readily translated into terms of stimuli and responses.

Association as a theory and explanation is a modern conception. With the rise of spiritualistic psychology the problem of association became extended. Hence the associational process was no longer looked upon as merely a fact of memory, but became regarded as a property of psychic elements, or as an explanatory principle to account for the succession and cohesion between states of mind. Thus, in either case the associational process became a universal condition for all psychological phenomena, even to the existence of a stable mind, and was subject, of course, to all the criticisms of which a thoroughgoing mentalistic psychology becomes the target.

As an explanatory principle association was developed primarily in the thought of British writers. Hobbes (*Leviathan* 1651, *Human Nature* 1650) used the conception of association to account for the succession of thoughts. With Berkeley (*Principles of Human Knowledge,* 1710, *Three Dialogues,* 1713) and Hume (*Treatise on Human Nature,* 1739, *Enquiry Concerning Human Nature,* 1748) association was made into an explanatory principle for the organization of the mental atoms presumed to constitute the mind.

From this period to that of the Mills (*Analysis of the Phenomena of the Human Mind,* 1829), Spencer (*Principles of Psychology,* 1855) and Bain, (*Senses and the Intellect,* 1855, *Emotions and the Will,* 1859) associationism comes to be a definite principle of an intellectualistic psychology. Warren (*A History of the Association Psychology,* 1921) presents an excellent summary of this whole movement. A similar development is found in Germany where Herbart (*Lehrbuch der Psychologie,* 1816) develops a system in which the human mind is thought of as an organization of perduring mental elements. This writer is responsible for developing an elaborate machinery of mechanics and dynamics to account for specific operations of those ideas and the mind in general.

Quite early in the development of associationism, Hartley (*Observations on Man,* etc., 1749) made an attempt to explain the con-

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nection between ideas by assuming that a correspondence exists between these ideas and the nervous system. In more recent times, very elaborate schemes have been developed to account for the connections between what are supposed to be mental states. The chapter on association in James' *Principles of Psychology* is an excellent illustration of this viewpoint. For the most part these schemes are designed merely to supply a concrete support for vague and elusive mental states. In many respects of course this aim is accomplished at the expense of fact and accuracy of description.

From the standpoint upon which this book is based the entire matter of association is a problem of describing definitely occurring phenomena, and these we must take to be the adaptations of the psychological individual. It is for this reason that we must consider not merely the connections between responses but also the associations of responses and stimuli as well as responses and settings. From this standpoint, then, association is the name for behavior facts. If association must be considered as a method of explaining something it may be used to account for nothing more than the adaptation and orientation of the person to his actual surroundings.

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CHAPTER XII

THE PRIMARY INTERNAL CHARACTER OF FEELING REACTIONS

1. The Nature of Feeling Responses

Feeling activities constitute distinct types of behavior segments in which the responses, even though they are clearly overt, do not effect any immediate change in the stimuli objects as in the case of all effective forms of activity. Only one exception is possible and that is when both the stimulus and the responding individual happen to be the same person. This, however, is clearly a peculiar and non-typical situation. In affective behavior then, the response or the action to the stimulus is not performed upon the stimulus but upon the acting person himself. In other words, the peculiar fact about feeling responses is that instead of the person producing some effect upon the stimulus object the person himself is affected. Emphatically, we are dealing with a genuine adaptational response, although the mode of adaptation is such that the active changes taking place are localized in the acting person or in his changes of posture or attitudes toward the stimulus, rather than in the stimuli objects or persons.

The description that we have given implies that a direct overt form of action is performed; that is to say, the stimulus object or adjustment stimulus is immediately present and not absent as in implicit behavior. Moreover, the affective reaction is not a delayed reaction which, after being initiated is not consummated until a later time, nor is it in any sense action which is inhibited or in some way prevented from occurring. Such notions are implied in the traditional idea that feelings involve a passive state of mind prior to a final and succeeding expression. Also affective responses do not constitute secondary or by-play actions which are attached to or accompany some other kind of action. On the contrary, the affective response is a direct reaction made to its own correlated stimulus. But this is not to deny, however, that very frequently affective behavior influences other actions as we will later have ample occasion to observe.

How can we further characterize the intimate nature of affective behavior? To formulate an effective identifying description we must refer to a few members of a large series of differing modes of affective action, each of which depends upon the specific character of its stimulation as well as upon the behavior history of the acting person.

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The simplest form of such an affective response consists primarily of an increase or a decrease in the person's general functioning. He may be merely retarded or accelerated in his activity or he may be said to react positively or attractively, negatively or aversely, to some object. This type of affection represents an apparently unlocalized and ineffective type of behavior which is visibly the farthest removed from producing changes in stimuli objects or persons. The latter simply start up a specialized type of behavior change in the partial or total activities of the person. Possibly this type of reaction can be illustrated by the response of well- or ill-being induced by a bright or dull day.

Another form of affective response displays a less marked passivity on the part of the person. This type differs from the kind just treated in that the person is more definitely directed toward the stimulus object; hence his action seems more definitely organized with respect to some particular stimulus. What is meant by the action being more definitely organized toward a stimulus? Merely this, that the reaction system more prominently involves a certain organ or series of organs of both the external skeletal or visceral forms. Such reactions are exemplified by the elementary anticipations or pleasures induced by seeing or smelling food.

Among the more complicated affective responses we may note those in which the person is made depressed or elated, either in his general behavior attitudes or in some specific action toward an object or person. In these cases the stimuli produce in the individual more decided and positive reactions, stirring him up more definitely and arousing or depressing him more acutely. In addition the person is more sensitive to the qualities of the stimuli in general and to their particular organization of details. A fairly good example of these reactions is offered us by simple æsthetic responses.

In still more complex situations the effect of the stimulation upon the person will be to increase or decrease his contact with certain things or to arouse his interest in the object or person to the end that he will put himself into a posture for further stimulation in order to be more and more affected, that is, pleased, aroused, depressed, or otherwise activated. So intense and complex may the response be that all actions, to other than the affective stimulus, may be inhibited while the person becomes more and more active, either aroused or depressed with respect to the stimulus object. In intense situations this direction of activity toward the affective stimulus may amount to a fairly total dissociation of the person. In different words, the individual may become manic or stuporic, depending upon whether the stimuli conditions are arousing or depressing But in no case does the affective response as such involve any actual modification or change in the stimulus object.

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Feeling reactions are characterized, then, primarily by the fact that even when they are most active and energy consuming they do not constitute operations upon the stimuli objects or persons. How is this situation possible? The answer to this question lies in the fact that the affective responses are actions in which the person is above all and essentially responding with internal mechanisms. It is for this reason that the traditional descriptions of affective phenomena have contained the term non-localizability. Now as a matter of fact the affective reactions as far as the reaction systems of the organism are concerned are always definitely localizable, for they represent actual responses of the person to their appropriate stimuli. These localizations cannot always of course, be observed by the unaffected onlooker. Howsoever "passive" and immediately ineffective feeling responses are, they are still genuine psychological responses and not merely organic states or organic tones. Feeling reactions consist of actually organized reaction systems. This warning need be made only with reference to the very simplest of our affective reactions since it is only those, consisting as they do mainly of visceral mechanisms, which superficially appear as merely conditions of the organism instead of actual direct responses. When we consider the more complicated affective reactions such as the passion responses[1] they cannot be described of course as other than specific organized reactions.

Finally we must point out that affective reactions must not be looked upon as indifferently induced by any kind of object. This error is founded upon the belief that feeling reactions are merely biological conditions instead of definite psychological reactions. Were affective responses indifferently aroused by various dissimilar objects they could not be considered as definite psychological phenomena. As a matter of fact affective responses are always aroused by specific stimuli, although we must admit that frequently we experience great difficulty in distinguishing from each other the details of different affective stimuli as well as their corresponding reactions. This condition, however, is exceedingly common in the domain of psychology.

Distinction of Feeling Responses from Emotional, Desire, and Pain Reactions

Because of the nature of feeling reactions, especially of the simpler and unlocalized type, they are very frequently confused with other types of reactions resembling them in some respect. It is essential, therefore, to distinguish affective reactions from the three kinds mentioned in the heading of this section, which more closely than other forms resemble affective responses.

Emotional and Affective Reactions

First let us distinguish feeling from emotional responses. In the history of psychology these two types have always been very much confused.[2] More especially has this been the case since the

[1] See classification below.

[2] And especially when the feeling reactions are intense, or when they lead to or condition some further action.

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emergence of biological conceptions in psychology. The basis for this confusion lies in the fact that emotions prominently involve organic or visceral reflexes and so emotional reactions apparently constitute a specific type of affective behavior. This resemblance which is of course genuine, is, however, merely a superficial one and its use as a basis for identifying two types of conduct is entirely unjustifiable. To identify feeling reactions with emotional responses because they both involve visceral reflexes is just as illegitimate as reducing to one type all the reactions that do not involve visceral mechanisms. Such procedure in both cases results in overlooking all the essential characters of the different types of action. And so as a matter of fact, when we study emotional and feeling reactions as specific behavior situations we find very definite differences between them. What are these differences?

Foremost is the fact, that in the emotional behavior segment there occurs a total disruption of the person, because a reaction system to some overwhelming stimulus fails to operate. Lacking the appropriate or customary reaction the resulting disturbance of the individual is followed or accompanied by the operation of many reflex responses of a visceral sort. But let us note that these reflex responses are replacement actions. They are the only type of behavior the person can perform under the peculiar conditions of the disruptive situation; but unlike feeling reactions they do not serve as appropriate responses to definitely correlated stimuli. These replacement reflex reactions we must look upon as really biological processes. The person's psychological personality is for a moment, at least, in abeyance. Quite otherwise is the case in actual feeling behavior. Here there is, as we have already indicated, a definite reaction system involved in each case, a reaction system as we have pointed out involving mainly visceral factors, but in each instance constituting a definitely organized mode of reaction.

Feeling and Desire Responses

Feeling and desire reactions are also frequently confused. The factual basis for this confusion in action seems to be one in which no effect is produced upon the stimulus object. Moreover, even when the object is attainable the desire behavior segment involves two distinct phases. The first phase is an implicit response in the form of an intellectual attitude, wish, or thought concerning an absent object which is substituted for by some other thing.[1] Or it may be an anticipation of possessing a present desirable object.

The second phase is the action of securing the object thus desired. The first phase is probably the more important of the two and should, if it properly bears the name desire, lend its name to the total behavior segment. The second action in the behavior

[1] The thing present but not possessed may of course be a substitute for the same thing possessed.

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segment is a result and consequent of the first. This statement we make upon the basis of the relative independence of the two actions, for the first may occur without the possibility even of the second transpiring, and in a great number of cases when the second and consequent action is possible it may be, and very frequently is, inhibited. Technically speaking, the first action is a percurrent response which calls out or is a necessary antecedent of the second reaction. Now if this description of desire is correct we find here an acceptable basis for distinguishing between desire and feeling reactions. The latter unlike desire responses are usually, if not exclusively, the final or completing overt reaction systems in the behavior segments in which they are found.

Additional plausibility is lent our distinction of feeling and desire reactions by the fact that whether responses are precurrent or final, as they would be if they were not connected with another final reaction, they are implicit activities and thus very distinctly different from the majority of feeling reactions.

Feeling responses are also wrongly identified with desire responses through the historic identification of desires with the so-called vegetative functions or appetites. Such identification of very different processes by the use of a common term is greatly to be deplored. For the so-called vegetative functions are clearly immediate visceral reflexes and do not involve the protracted and mediate form of directness toward some stimulus object that feeling responses do. The fact that desire reactions are frequently stimulated by visceral reflexes argues more for their difference from, rather than for their identity with, feeling behavior.

Another fact which makes possible the identification of feelings and desires is that in very many cases the thing or person desired is the sort which produces some affect in us. In other words, desire and feeling reactions are very frequently found to operate together. Possibly it is true that most of our desires are based upon or connected with some kind of feeling reaction.

Just how unsatisfactory this identification of the two types of behavior is we may judge from the fact that the desire reaction may be composed of entirely different components. The desire reaction proper, when it is not connected with a feeling response, which is frequently the case, may not involve any more internal visceral responses than are usually ascribed to non-feeling reactions. This would depend upon the kind of stimulus object desired. Of course when the stimulus object for the desire is unconnected with activities like eating, sex, or to be more general, do not involve intimate personal or organic conditions, then the reaction is entirely different and is composed of widely divergent elements. We must not overlook the fact that some desire reactions may be considered as practically completely intellectual in character and therefore essentially remote from feeling responses, although here

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again our intellectual reactions may be connected with feeling responses.

Feeling and Pain Reactions

Of the three types of reactions which are incorrectly related to feeling responses pain reactions are probably more frequently and more intimately identified with feeling activity than either of the other two. No doubt the basis for this situation is contained in the fact that while pain reactions in common with emotional and desire responses, simulate feeling responses in that they do not involve changes in their stimuli objects, pain reactions do uniquely involve definite modifications in the person's own condition.

This resemblance between feeling and pain reactions does not, however, in any sense overshadow the decided differences between them. We may point out at once that in general pain responses are definitely discriminative or perceptual in character, whereas feeling reactions are primarily immediately adaptational. In other words, pain reactions are precurrent and sometimes anticipatory of further final responses. In this sense pain reactions are passive activities just like any other sort of discriminative action, whether visual, auditory, or any other. All of these discriminative perceptual responses are passive and thus unproductive of direct changes in their stimuli, because, on account of their vestigial character they are partially implicit actions. On the other hand, however, when pain reactions do lead to further and more immediately adaptive reactions, that is to say, when their final responses are not inhibited, they bring about very definite changes in their stimuli objects and in this instance are sharply distinctive from feeling activity.

In considering the relation between pain and feeling reactions we must not be misled by the fact that in the case of pain some actual changes such as laceration of tissue takes place in the person. For this type of change is very different in at least two ways from the changes in feeling responses. In the first place, the changes in pain reactions constitute the kind of contact with the stimulus object which should bear the name of a medium rather than of a response; that is to say, the laceration or other modification of tissues constitutes the mode of stimulation rather than a feature of the response.

And in the second place, even the actual changes in the organism performing pain reactions may be located in the superficial anatomical and functional features of the organism and not in the deeper mechanism as is the case with the feeling reactions. Even the older psychologists have pointed out that in pain reactions there is a decided outwardly directed activity involving exteroceptive stimulation and specialized neural pathways as we find in the case of other perceptual behavior systems; and therefore they have contrasted pain with feeling activities. Moreover, the relative independence of visceral changes of even very exaggerated forms

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of pain responses argues for undoubted differences in the two kinds of activities.

As in the case of desire reactions the very close interrelations between pain and feeling responses argue for a distinction in type and function of response, since the fact that pain reactions are possibly always stimuli for feeling reactions indicates a very great difference between them.

An Analysis of Feeling Reaction Systems

As a means of achieving a further understanding of feeling or affective responses it is important to compare their reaction systems or their unit response factors, with those of non-effective behavior. Our plan is to indicate in which respects affective reaction systems are similar to and dissimilar from non-affective reaction systems irrespective of any specific differences between affective reaction systems themselves. Not because the latter differences are not exceedingly important and the inevitable results of stimulation by different stimuli objects and conditions do we neglect them, but rather because we find similar differences between the individual members of every type of behavior.

Of the twelve or more unit factors of a reaction system [1] most show marked differences when affective reactions are compared with non-affective reaction systems. It is these variations that we shall emphasize in the following brief survey of the unit factors of an affective reaction system.

(1) So far as the discrimination factor is concerned the feeling reaction system operates precisely like that of any behavior type. In other words, the total reaction or adjustment performed is differential with respect to the qualities of the object, the general nature of the total stimulus object, and its relationship to other things (its settings).

(2) Much the same statement may be made with respect to the attention factor of the affective reaction system, since, if we mean by attention the fact of the person changing his response from one stimulus to another, there would hardly be room for any greater difference between affective and non-affective reactions than there would be between any two particular responses in either the affective or non-affective class.

(3) When we consider the comparative affective factors in the different reaction systems we are impressed of course with the great difference between feeling and non-feeling reaction systems. In the latter, especially when they are definite non-feeling reaction systems, there is indicated only a very slight change in the visceral and other internal mechanisms of the acting person,[2] whereas in

[1] Cf. above, Chapter II.

[2] It must not be overlooked that every reaction system is itself a unit in a behavior pattern or situation, that is a unit in some total adjustment of the person, and therefore different reaction systems overlap. We must be understood therefore to be considering ideal or abstract reaction systems.

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affective reaction systems these changes are by far the most prominent features of the whole behavior situation.[1]

(4) Feeling reactions are naturally stimulated by objects and persons in precisely the same way as non-affective responses. In consequence, the receptor function of affective reaction systems or the modes of actual contact with stimuli objects are the same as in other types of behavior. The point to be observed is that just as in the case of other activity, so here the reacting person is primarily in visual or auditory contact with a stimulus object. The same similarity of contact with stimuli is found between affective and non-affective responses whether the stimuli objects or conditions are located within or without the organism.

(5) As we must expect from the general character of affective responses the specific reaction systems involve an overwhelmingly greater proportion of glandular functioning than is true of non-feeling responses. (6) Furthermore, it follows also that the sympathetic neural mechanisms will have an exceedingly large component share in the operation of such behavior mechanisms, whereas, in the non-affective response systems the somatic mechanisms are relatively more prominent. (7) In both the affective and non-affective reaction systems probably no difference in the functioning of the central neural factor can be observed. (8) Again, the muscular mechanisms will include a greater prominence by far of the unstriped muscles. Or to put the matter more plainly, the primary muscular action components in affective responses involve the visceral functions, although we should never make the mistake of assuming that the striped muscles are not at all involved in affective reaction systems. At this point we may be reminded again that the reaction system is merely an abstracted action of the organism. Probably the most important indication of the place of striped muscle mechanisms in affective response systems is found in the inclusion of facial grimaces and other facial movements so clearly observable as factors of at least the intense feeling responses. Moreover, who can overlook the large place that the vocal and other linguistic apparatus and functional mechanisms take in affective responses?[2]

Are There Precurrent Feeling Reactions?

In our description of feelings we have used as a basis affective reactions which constitute the final factor or act in a behavior segment. That is to say, we have considered only behavior segments which are considered as affective adaptations and which consequently carry the name of affective behavior segments. These segments are affective because no matter how many other

[1] The critical reader will observe of course that as a matter of fact the names feeling and non-feeling reaction systems are attached to these specific forms of action.

[2] Was it not the observation of the close connection between feelings and language which induced writers on language (Wundt for example) to find the origin of language in affective expressions?

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reaction systems they contain of a perceptual or other non-affective sort their chief function from the standpoint of description is affective. In such behavior segments the feeling factor definitely concludes the adjustment in question.

Now the problem arises whether affective reactions are always final responses or whether they can serve in other capacities in behavior segments. For example, cannot feeling reactions operate in the same manner as perceptual reactions, namely as precurrent responses to some other and final reaction? To this question we reply that feeling responses just as well as perceptual reactions can determine other responses in the same behavior segment. In other words, final reactions in behavior segments may be determined and conditioned by an affective precurrent response as well as by a knowledge or immediate manipulative action. It must be added, however, that in every case in which an affective response serves as a precurrent reaction it operates along with, and in addition to, a perceptual reaction.

We might illustrate the precurrent functioning of our affective behavior by pointing out that just as our refusal to buy a picture may be determined by our perceptual appreciation of its nature or character, so the final action of refusing to make the purchase may likewise depend upon our affective reaction to that picture. Whenever the final act of the behavior segment is conditioned by an affective reaction in addition to the perceptual reaction, that behavior segment is of course complicated and becomes more intricate than if the perceptual action alone determined the final response. But this complication, no doubt, represents a common situation in our behavior circumstances.

Not inappropriate is it to add here that besides the feeling reactions which we have called final and precurrent, affective reactions also occupy other positions in behavior segments in such a way that they must be called by a distinctive name. To such reactions we apply the term byplay responses. These byplay activities are incidental feeling reactions which are attached to behavior segments but which do not determine or condition a final response in the segment in which they are found; nor do they themselves constitute a final form of psychological adjustment; they merely operate along with other reactions, a condition made possible by their peculiar morphological character.

Are There Implicit Feeling Reactions?

Because feeling reactions always comprise decided changes in the person's behavior (a fact which is symbolized in the statement that feeling reactions are definitely overt in their morphological character) the problem arises as to whether affective responses can be implicit in their functioning.

On the other hand, just because feeling responses are actions upon or in the organism they can all the more operate without

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the presence of any original stimulus object, that is, they function through the stimulation of a substitute object. Now if we accept as our criterion of implicit action the operation of a given response to some definite object or person when that stimulus object is not present, then we are impressed with the fact that nothing is more common than the arousal of affective reactions by substitute stimuli.

How frequently do we observe a profound depressive affection produced in us by some person or object which substitutes for or is the symbol of some past sorrow or perhaps some grief or disgrace situation. Such a response is a typical implicit reaction. Or again, what is more common than to be pleased, or exhilarated by a letter, a friend, a garment or some other substitute stimulus for an adored person toward whom we have acquired affective or feeling responses? The range and complexity of implicit affective activity is revealed to us by the fact that to a considerable extent such behavior constitutes the psychological basis for religious, sex, and other fetishes. To consider the bare character and use of fetishes is to appreciate immediately the implicit character of the reactions to them.

We might make the passing observation that implicit feeling reactions simulate much more closely the original overt affective reactions than do the non-affective implicit actions resemble the original overt non-affective responses. Morphologically speaking, implicit feeling responses are always precisely like the original acts, but there may be a decided variation in intensity. We note, then, that implicit feeling reactions are never symbolized or symbolic in the sense that other types of implicit reactions may be; on the contrary, they are always incipient or vestigial. This latter fact, namely, that implicit affective reactions are very similar to the original overt responses, naturally bring about a very decided limitation in the range of possible connections of such reactions with stimuli, but it does not in any sense interfere with their occurring at all. In other words, we have a great deal of implicit affective behavior but none of it can ever be constructive in character. It can only be repetitive, that is, it is the repetition of previous reactions to stimuli but not the construction of new forms of responses to absent stimuli.

The existence of implicit affective responses solves the problem of affective memory. Often has the question been propounded as to whether we can have affective memory, since it was supposed that memory consisted of the operation of images which were presumed to be cognitive and symbolic. Now from the standpoint of this present objective description of affective reactions we see that we can very readily recall or act over previous affective behavior.

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How Many Kinds of Feelings Are There?

In the past history of psychology, when it was the tradition to make psychological facts consist of mental states called awareness of things, the whole series of affective reactions was reduced to a very small number. Most frequently it was two, pleasure and unpleasantness. Sometimes two other pairs were added, strain and relaxation, calm and excitement. Possibly we can discover two conditions governing the reduction of all kinds of feeling to so few kinds. One of them was that in the case of cognitive reactions the names of things were made into states of mind, and because there were so many different kinds of things to be aware of a great number of different states of cognitive mind were enumerated. Now having given the names of the qualities of things and of the things themselves to cognitive states it was presumed apparently they could not be further employed as affective terms.

The second basis for the view that there were only a few kinds of feeling responses lies in the fact that the psychology of feeling was developed mainly by ethical writers, who looked upon feelings as the springs of human action. The supreme categories employed by such writers were good and bad; consequently they attempted to find feeling qualities which could be correlated with this good and bad. These they found in pain and pleasure. When the psychologist took over this conception he of course did not connect pleasantness and unpleasantness with an ethical condition of goodness and badness but with a furtherance and hindrance situation within the life of the organism. That is to say, they connected pleasantness with the kind of situations furthering the life activity, and unpleasantness with opposite sorts of situations.[1]

From the standpoint of the actual observations of human behavior we find that as a matter of fact the names historically employed for feeling reactions such as calm, excitement, strain, pleasantness, unpleasantness, relaxation, etc., may be readily accepted as symbols for particular affective responses, as well as for types of affective reactions. No list, however, that is easily or quickly made can possibly exhaust the specifically different individual and class responses. That list must run way up into the thousands at least.

It is impossible to solve the problem of the number of kinds of feeling reactions that we perform unless we pay attention to at least a great many of the particular affective responses that we make to the great variety of stimuli arousing in us affective or feeling responses. Now the reactions induced by different stimuli conditions differ very materially in their morphological organiza-

[1] It is without doubt the internal or organic character of affective behavior which gave plausibility to the furtherance-hindrance view of the biological psychologists (Spencer, Bain, etc.) And because of the element of truth in this view it must not be summarily rejected.

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tion and specific psychological function. When we take the attitude that we are studying concrete facts of adaptations to specific objects and conditions we cannot for an instant be satisfied with any sort of limited list of affective activities.

Nor can the idea that there are only a very few kinds of affective processes be justified by asserting that although only a few distinct affective qualities exist, these can be mixed with cognitive and other processes to make a large list of complex feelings. For we submit that such an assertion involves merely a logical proposition and is not based upon a descriptive analysis of specific behavior or reaction facts. Our suggestion is that even the simplest affective behavior phenomena comprise a large number of individually and typically different actions.[1]

That the proposition to which we have just been objecting is purely logical and not descriptive is evident from the implication that these qualities are always direct opposites. Now the actual study of feeling activities in no sense supports the view that feeling responses all fall upon one or a few two-dimensional scales. An excellent argument against the logical view of the number of feeling types has always been contained in the problem which the upholders of that view had to face in the fact of mixed feelings.

If feelings are made into simple states which are absolutely opposites then logically it would appear that you could not have, say pleasant and unpleasant, or strain and relaxation in the same reaction. Such a logical conclusion of course clashes violently with the actual fact, for in our affective responses, at least sometimes we have a few or many different kinds of feeling. When we look upon feeling reactions as definite adaptation responses to stimuli there is no fact militating against the inclusion in one behavior segment of both pleasantness and unpleasantness, strain and relief, and other kinds of reaction usually considered as opposed. Moreover, many of our simple feeling responses, each of which involve only a single affective reaction system, are of such composite qualitative character that we may appropriately apply to them a number of supposedly opposite names. Certainly every one of our complex affective responses, say to social or æsthetic stimuli, are constituted of a number of different sorts of qualitative reactions. We might describe our responses to æsthetic objects as pleasant with respect to some feature, and unpleasant with respect to some other, calming in some ways, exciting in others, and so on throughout an extended list of affective behavior.

A great obstacle to psychological analysis and description is the poverty of language. This condition is magnified in the case of feeling behavior. Whether this language difficulty is the cause

[1] We assume in this discussion that we may be allowed to interpret the term mental state, employed in the assertion referred to, as meaning responses.

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of the intolerable affective classifications or whether it is the effect of them, we cannot be sure, but the fact remains that we do not have enough names to describe or to indicate the multiplex and multiform affective responses. In lieu of the impossibility of estimating even the probable number of distinct feeling reactions we might suggest a few word symbols which represent unmistakable simple affective responses and cannot possibly be classified under the heading of pleasantness or unpleasantness. Such names are elated, ravished, delighted, displeased, pleased, horrified, disgusted, disdainful, satisfied, unsatisfied, dissatisfied, longing, libidinous, apprehensive, uneasy, catatonic, anatonic, manic, mirthful, downcast, disturbed, vexed, flustered, contented, etc.

Simple and Complex Feeling Behavior Segments

Already we have indicated that we might look upon some of our affective behavior as comprising only single reaction systems, namely in the case in which a feeling reaction determines a final response in a non-affective or affective reaction segment. On the other hand, the affective response may itself constitute a behavior segment and so it may well be that the large number of qualitatively different feeling activities may indifferently comprise either simple reaction systems or behavior segments. In other words, the qualifying terms may apply to both the simpler and more complex behavior units. Now we want to point out that when the affective phenomena constitute behavior segments they may be classified into two different sorts, namely the simple and the complex.

By simple affective behavior segments we mean the type of behavior in which the stimulus situation is comparatively simple and the response is a correspondingly uninvolved action. The perception of the stimulus merely brings about in the person some sort of immediately final feeling response. Probably the main characteristic of such a reaction is that the response is more subtle than in the more complex behavior segment and approximates more closely to a condition or tone of the person. Consequently, in many cases, the response appears to the observer as a less definite adaptation to a particular object or situation.

The principle of division between the simple and complex behavior segments, let us observe, refers to the simplicity of the total segment and not to the final reaction system which gives the segment its affective character. The point may be made, therefore, that the final reaction system itself need not necessarily be simple but may on the contrary be very complex. Of course, no matter how complex the final reaction system is, the total behavior picture presented by the behavior segment in which this reaction system is found will be comparatively simple.

Complex affective behavior segments are characterized by the presence in them of one or more implicit or overt reaction systems in addition to the affective final reaction. In other words, the

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entire behavior segment is much more complicated owing to more involved stimuli conditions. Not only must the individual perceive the stimulus but he must also do more than merely react with internal mechanisms. In listening to music one may perform merely single behavior segments to the obvious harmonies and single melodies, but on the other hand, the definitive affective responses may be conditioned by an elaborate analytic and discriminative response to the intricate organization of the nuances constituting the musical stimuli.

Another way in which affective behavior segments are complicated and elaborated is by comprising many affective reaction systems in addition to the other precurrent responses found in the behavior segment. By this statement we do not mean to imply that some behavior segments as a matter of actual count contain only a simple affective reaction system. Rather we should be more disposed to think in terms of numbers of different kinds of specific feeling reaction systems.

Further to differentiate between the various types of affective reactions we might consider a number of particular classes under each of the general headings of simple and complex action. These classes are arbitrarily chosen for illustrative purposes and it might be observed that the illustrations of our simple affective behavior segments will indicate a greater prominence of the reaction side of the segment, while in the case of the complex behavior segment the illustrations will feature more prominently the stimuli conditions.

A. SIMPLE AFFECTIVE REACTION SYSTEMS

1. Expressive Behavior Systems

These are found in situations in which the individual's behavior becomes more intense. On the whole he has an arousing feeling response to some specific thing around him. Provided he has the coördinate reaction systems in his equipment, a sunset, a picture, or some person may arouse in him a reaction of heightened tension, of increased affective inclination or of a changed internal and external organic posture, as contrasted with some previous condition. We have purposely considered here the simplest type of affective response but we must stoutly assert that we are dealing with organized reactions to specific stimuli and not merely hygienic conditions of the person.

2. Depressive Behavior Segments

In these types of behavior situations the individual is reduced in tone or sensitivity to his surroundings. He does not feel as intensely as he did in some immediately previous condition or in some more remote prior situation. Particular situations such as accidents, the futility of our conduct, or some disappointment may induce in us an immediate withdrawing and slumping feeling. Likewise, ugly or disagreeable objects, or things with which we have

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had some previous unfortunate or undesirable contact arouse in us feelings of a cataphoric sort.

Each different stimulus situation, as we have so frequently repeated, calls out its own peculiar depressive affective response. In consequence, there are a great many of these depressive behavior segments. Especially important is this statement, for if we carefully heed its significance we may avoid serious errors of interpretation. In the first place, we will not overlook the fact that in each case of affective behavior we are dealing with a concrete response of the person to a stimulus. And in the second place, we may avoid the error of looking upon affective behavior as opposites. For as we have already indicated such a consideration means to look upon affective responses as logical or abstract conditions or kinds of reaction. And so, while it is true that we may arrange some types of our affective reactions in a two-dimensional scale, this must be considered as a classificatory scheme and not a descriptive procedure. From the point of view of our actual behavior it can hardly mean anything to put expressive reactions over against depressive responses as opposites.

3. Euphoric Behavior Segments

Quite different from the heightened or lowered tone of the individual's reaction to stimuli are those feeling situations in which the person's contact with stimuli of various sorts induce in him reactions described as well-being, reactions which place him at ease or in a condition of calm, and withdraw him from any kind of intensification or depression. A number of different responses involved in sex gratification admirably exemplify these reactions. The English words pleased, satisfied, contented, placid, surfeited, and serene may symbolize for us various reactions which can be placed in this class.

4. Cacophoric Behavior Segments

Here we have a type of reaction describable as a lack of calmness or satisfaction. The stimuli disturb the person and remove his tranquillity and serenity. Further descriptive terms would be displeased or unpleased, anxious, amazed, apprehensive, and others indicating disturbed relations between certain objects and the reacting person.

Despite the fact that the four kinds of affective responses we have just been describing may well be thought of as different each from the others, it is still true that in many cases a single affective behavior may better be described under two or more headings. Thus, some behavior segments may be elevating, depressing, and pleasant all at the same time. The exact description in every case depends of course directly upon the stimuli objects and conditions.

B. COMPLEX AFFECTIVE BEHAVIOR SEGMENTS

Not only are the behavior segments of the complex form more complicated because of the presence in them of more and different

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reaction systems, but also because the individual is in a more active contact with the stimuli objects. What is meant by being more in contact with stimuli we have already indicated in a former section. The responses in these cases are much more describable as adaptations to the stimuli, rather than as effects which the stimuli have produced upon the organism. It would naturally follow that the stimuli conditions in the complex affective behavior segments are correspondingly more definite and complicated things and situations. In general, we might say that such stimuli are found in more distinctly human situations constituting the milieu of our conduct.

For convenience of illustration we might suggest that such situations confirm what are conveniently referred to as the æsthetic, political, religious, social, sexual, economic, moral, and intellectual situations. To illustrate, religious stimuli may produce in us complex feeling reactions which may be named dependent, hopeless, hopeful, awed, sacred, and purified. Æsthetic situations induce reactions of admiration, ravishment, appreciation, transportation, etc. Moral and social stimuli are correlated with reactions of sympathy, antipathy, pity, while personal situations may induce love, hate, intolerance, or sympathy. Intellectual and practical situations produce reactions of satisfaction, accomplishment, completion and numerous others.

Once more must we be on our guard in the use of our crude and inadequate linguistic tools in psychological description. In the first place we should note that any name used for an affective reaction does not belong exclusively to a single one of the behavior situations we have mentioned, or to which we have made more general reference. Unfortunately because of the lack of practice in the analysis of affective responses and the symbolizing of them by words, we cannot be sure that any particular term may not refer to responses which are common to many kinds of situations, even non-affective ones. For example, the term disgust may be used to describe a feeling reaction either to intellectual or æsthetic stimuli. On the other hand, within the range of any one of these situations, say the moral, we will find a large series of reactions to which we apply the same term. Our main concern is to be sure that in each case we are not overlooking the fact of a specific form of response to some specific stimulus.

Again it is exceedingly important for us to make certain that each term we use does refer to some specific organized affective reaction to a stimulus and does not symbolize some sort of social conduct other than a feeling response. What we are describing or referring to now are exclusively feeling reactions and not other kinds of behavior which may be very closely attached, even inseparably associated with some feeling activity.

A further caution is not to confuse our specific affective re-

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sponses with large behavior situations which may involve all kinds of behavior segments along with non-psychological facts. For example, we must guard against confusing a particular complex affective behavior segment with, say, the behavior situation of purchasing a picture. In this response there are many affective reactions, but also many others which are distinctly non-affective in character. Again, there may be in such a situation innumerable facts which are not even psychological in character, for instance facts relating to economic values, or æsthetic importance of art objects, facts, that is to say, which are not directly involved in psychological action at all.

Degrees of Intensity of Feeling Responses

In all of our responses we may observe a variation in the intensity of action depending upon the degree of energy expended in their performance. That is to say, whenever we perform a specific response to a stimulus, the general hygienic and other conditions of the person may bring about a more or less intense contact with the stimulus object in question. Such modifications in the individual's physiological or biological status not only make him especially susceptible to certain stimuli but intensify or slacken his reactions. This is, of course, mainly observable in overt responses in which definite changes are produced in the object. This variation in the intensity with which any action is performed gives us in the case of affective responses a more striking picture of the behavior situation than is true in other kinds of activities. In fact to a certain extent when the same affective reaction system operates more or less intensively there is a superficial appearance of an entirely different kind of behavior picture. We might immediately suggest that this apparent variation is due to the fact that the total affective response is much more intimately related to the person's biological status than is true in other types of behavior.

Such variations in the intensity of operation of affective responses are made possible, then, by the intimate organic character of affective responses. But what are the specific stimuli conditions which bring about these results? Quickly we observe that such changes of intensity depend upon (1) the way the stimulus object is presented, (2) the nature and condition of the stimuli settings and, (3) the length of time that the person has had the affective response included as a part of his behavior equipment.

(1) If the same stimulus object which ordinarily calls out some particular affective reaction is presented suddenly or more gradually than is usually the case, the affective reaction constituting the response to that stimulus may be just so much more or less intense as to give on the whole a different behavior picture. Especially we must emphasize the point that the response, whether it is a simple action or an affective reaction pattern in a more complex situation, seems falsely to become a qualitatively different

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kind of activity, merely because of the greater or lesser intensity of the response. How many times has the young man preoccupied with business or other situations been accused by his beloved of not entertaining the same feeling toward her, whereas, in fact there has been no difference in the quality of his reaction but only in its intensity. Such extreme variations of behavior picture are unique in the case of affective responses.

(2) Depending upon the specific variations in the settings of stimulating objects the affective responses will be more or less intense in their operation. Here again, as in the previous case, an apparently different behavior picture is presented by the acting individual although in fact the activity is in its qualitative descriptions the same as in its customary operation. In general, we might indicate that in many cases an individual performing an affective reaction is much more sensitive to variations in the settings of objects than is true of the same individual while performing non-affective responses.

(3) The passage of time between the acquisition of some affective response to an object and the later successive performances of that reaction make a difference in the intensity of that affective response. Either the feeling reaction becomes more intense or less intense as the case may be. This phenomenon is very familiar to us under the heading of adaptation. It has long been known that our activities such as feeling behavior become adapted to situations so that the intensity becomes reduced. Now the other type of modification, namely, the increase in intensity of an affective response may also occur with the passage of time, during which the acting person has changed organically or physiologically with respect to the particular action mechanisms which operate in this behavior system.

In effect, we have been pointing out in this section that affective reactions involve two sorts of intensity. One of these types constitutes a genuine qualitative difference in the affective reaction system which displays to us a distinctly observable behavior picture but which does not constitute a different type of reaction system. We must consider that the stimuli for these somewhat qualitatively different responses are the same. On the other hand, we have a type of intensity difference which represents a quantitative variation in behavior; that is, it is merely done with more energy and seems to indicate no sharp difference in the behavior picture. This second type of intensity of variation is common to both affective and non-affective reactions.

The Stimuli for Affective Responses

Investigations of affective behavior indicate that the stimuli for such action must constitute an exceedingly large series of objects, situations, and conditions. The truth of this observation appears in the following considerations. In the first place, it is unquestionably true that because of their character affective phenomena

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constitute responses to a more varied array of stimuli than is the case with other types of reactions. For is it not true that whatever objects or conditions can serve as stimuli for other kinds of reactions can also be stimuli for affective responses?

In the second place, we must add that affective stimuli are far more numerous than the combined stimuli for several classes of reactions. For example, affective stimuli are more numerous than those for intellectual reactions, imagination responses, and all the activities of the person involving him in situations more or less detached from organically intimate behavior. It is a matter of common knowledge that most people less rarely perform thinking or problem solving reactions than feeling responses even to the same objects or situations. On the other hand, there are some objects which constitute stimuli peculiar to feeling reactions and do not at all serve to arouse other kinds of action.

Thirdly, because affective behavior segments can be both simple and complex the number of stimuli within a definite feeling domain must be larger than in a behavior domain in which no such division of activity is possible. All this means of course that the affective stimuli cover an exceedingly wide range of all the myriad objects and situations that prompt human beings to perform psychological conduct.

By way of enumerating some of the more prominent things serving as affective stimuli we will consider them according to their division into types.

(1) Objects as Affective Stimuli

Among the stimuli objects inducing affective responses we may suggest all types of things from the simplest natural objects to the most complex cultural objects, such as art works and social institutions. Furthermore, we find that certain qualities alone of both simple and complex objects can serve to arouse affective reactions. For example, the colors and tastes of fruits or flowers, as well as the whole object, may induce pleasant, unpleasant, or other kinds of feeling reactions. Similarly, the specific sounds in music may produce exciting, depressing, or other kinds of feeling reactions as well as the total musical effects. Again, the intensity and brightness of colors, as well as of tones may produce varying forms of feeling activity. The same thing is true of the size and intensity of things. Contrasts of objects and of their qualities, such as the colors and rhythms of all sorts in visual and auditory objects, are fertile sources of affective stimulation. The same may be said for the non-rhythmic changes in the appearance of things and the alternate presence and absence of objects, such as light flicker, etc.

Including persons under this type, we need hardly mention the many qualities such as colors of eyes, slenderness or otherwise of figure, etc., which induce in individuals specific feeling behavior. Here we are at once led to think of sex stimulation although we

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must not fail to observe that the latter is a unique and specific form of stimulation. Affective responses are differential with respect to numerous particular qualities and actions of persons aside from the specific sex activities. Almost infinite in number are the affective responses we perform to the human and cultural attributes of persons in their various capacities and interrelationships. Exceedingly prominent are our affective reactions to persons, reactions having as their stimuli the linguistic, religious, political, social, and intellectual traits of people, from different national groups or different strata of the same national groups.

An extremely interesting question arises here, namely, whether on the whole our most complex affective reactions are stimulated by complete objects such as a picture, a person, a statue, or a symphony; in other words, by some large æsthetic or non-æsthetic object, or whether the several qualities of complex objects can just as well individually be stimuli for complex feeling responses. Possibly there is no definitely fixed correlation but rather in some cases either the parts or wholes of objects can be the stimuli for either simple or complex feeling responses.

(2) Events as Stimuli

Events of all sorts constitute a very prominent source of stimuli for feeling activity. For the simple affective reactions we find as stimuli the various happenings to physical things, such as injury to a book, or loss of some minor possession. Simple affective reactions are also called out by events involving happenings to persons who are not connected in a personal way with the reacting individual. For instance, an accident involving a stranger will probably call out a simple feeling response on the part of the onlooker rather than a complex one. The more complex and intense affective reactions are usually made to incidents involving persons near to us or disliked by us and by the more complex affairs of national life, deaths, wars, strikes, famines, etc.

(3) Conditions as Stimuli

Whenever the person meets with a difficult or obstructing condition with respect to something that he wants to do, such as some unfavorable weather condition, then there is promptly induced in him some affective reaction. Or, on the other hand, the appearance of conditions favoring such activity, constitute stimuli for the operation of feeling behavior. In this connection we have already had occasion to refer to the general stimulating character of changes. Now we may point out that the length of time that some event endures may be considered as a stimulus condition for affective behavior. Thus when one is looking at a picture which disappears too soon, or stays too long, the result is an affective response of a unique sort.

Changes also in the individual's own condition are a common source of affective stimulation. Such changes may be direct in the form of hygienic modification or they may be indirect through the indulgence or non-indulgence in food, drink, poisons, or through

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being touched, tickled, perhaps injured, or pained (tissues modified).

(4) Actions as Affective Stimuli

One of the commonest sources of affective stimuli are the actions of the person himself or of some other. Any successful act may be a stimulus for a pleasant reaction perhaps, or a calming or exciting one, while unsuccessful action is of course accompanied by unpleasantness and other types of feeling responses. For instance, the successful or unsuccessful manipulation while solving a problem stimulates very decidedly a favorable or unfavorable feeling condition. The recalling of an unpleasant or pleasant situation that the person has participated in likewise produces such reactions, or the inability to remember what one wants to recall, for example, a name.

Especially important among the person's own actions which stimulate affective responses are the general implicit responses constituting the mediate adaptations to all sorts of objects and situations. Likewise, affective stimuli as prior affective reactions of the acting person himself are not at all negligible.

Among the more simple action stimuli we may name those induced by our own behavior, such as eating, dancing, conversing, or reflex action of a sexual or general visceral sort. Here we find a very common and pervasive source of affective stimuli.

Turning now to affective stimuli in the form of other person's behavior we find that the action of individuals intimately connected with us, or upon whom we are dependent in various ways, strikingly elicits our affective responses. Affective behavior of this type, we may add, simulates very closely affective responses to our own behavior. For instance, we are fearful for them when they do something harmful to themselves, or we become especially pleased when they perform action favorable to their own advantages and social estimation. Again, the actions which disgust us when unrelated individuals perform them do not produce in us such negative affective responses when performed by related persons, especially if such actions arouse no negative affective response when we perform them ourselves.

These suggestions concerning the stimuli for feeling reactions probably appear exceedingly fragmentary and incomplete. Our aim, however, is merely to emphasize the extreme importance of stimuli in affective conduct. While stimuli as components of behavior segments are always important, in the case of affective reactions especially, the specification of particular stimuli indicates the organized and directed character of feeling behavior.

Influences Upon Feeling Reactions

In common with all psychological responses, affective reactions are subject to various influences which determine their precise operation, aside from the stimuli and their settings. But unlike other sorts of activities the organic character of affective responses makes these influences much more pronounced. We have already

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considered the decided influence of the person's general physiological and hygienic conditions.

Our present task, then, is to indicate some of the more prominent influences upon affective action arising from the individual's own reactional circumstances.

(1) To begin with, it is popularly recognized that the type of response a person undergoes immediately before the performance of an affective reaction will distinctly affect its nature. This influence is apparent both when the prior action is affective or non-affective. For instance, if we have just been experiencing a depressing situation our following affective response to some other circumstance will not be nearly so expressive or so intense as it would have been had the immediately previous experience been a pleasant one. Or some types of previous affective situations may intensify the following behavior. On the other hand, the same or similar effects upon affective responses may be produced by intellectual preoccupation or by some other contact with non-affective stimuli.

(2) Again, we readily see the determining influence that the individual's general behavior equipment has on his affective responses. In the first place, the person having in his action make-up, feeling behavior of various kinds is liable to have affective reactions of a particular sort with respect to some specific happening, while persons lacking those behavior systems in their equipment have different or possibly no affective responses to that event. To illustrate, an individual who has been constantly stimulated to be tender with animals will have a decidedly more intense affective reaction when witnessing the maltreatment of some animal than another person who has not built up such feeling traits.

In the second place, the individual who has a large complex of different types of behavior systems in his equipment is more likely to have affective reactions connected with the objects correlated with those responses than is the individual with a generally meagre set of behavior traits. Most certainly the person having information and art techniques is much more subject to affective reaction with respect to intellectual and æsthetic stimuli than another individual who lacks such techniques. This same fact holds good for all types of behavior equipment coupled with complex affective reactions.

It is impossible to overemphasize at this point the cultural character of affective behavior. Owing to the emphasis of the organic and biological factors of affective mechanisms we are prone to overlook the essentially conventional character of most feeling responses. But in spite of the fact that in every reaction we must operate as animal organisms, probably ninety per cent. of all our reactions are cultural or conventional in character. So far as affective conduct is concerned we might suggest that since every

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individual is a product of a specific group, of a particular culturalization process, his affective responses are inevitably conditioned by the fact that he acquired his equipment in his particular group. Now since these groups or communities include varying social and intellectual centers, individuals will materially differ in their number and type of affective responses. Furthermore, since the different culturalizing groups are not merely different strata of a given community but large cultural centers in actually different communities we have a basis for national and racial affective traits. The former affective reactions, namely, those representing particular individual differences, may be illustrated by the popular notion concerning the physician's stoicism with respect to suffering, as contrasted with the rest of the community. National or racial affective traits are represented by such characteristics as the legendary insensitivity of the Romans toward death, compared with individuals of other national or racial groups. Naturally we do not believe that cultural differences and characteristics of affective behavior refer to the "expression" of feelings and not to the "feelings" themselves, for obviously upon the basis of our discussion no such differences exist. On the other hand, if our view concerning the cultural character of affective responses is acceptable it reinforces the description of affective phenomena as concrete responses of the person to specific stimuli.

Briefly to sum up the influencing factors originating in the person's behavior we may call the two main modifying determinants (1) immediate influences or those resulting from behavior immediately performed previous to the affective behavior, and (2) permanent influences, or those resulting from the deep-rooted behavior systems of the individual.

The Conditioning of Feeling Reactions

Of all the reactions which we perform probably the affective responses are most easily conditioned. That is to say, the specific reaction systems can be detached from stimuli in contact with which they were originally developed and reattached to newer and different stimuli objects and conditions. This increased susceptibility to conditioning obviously belongs to affective responses because of two of their primary characteristics. First, since affective reaction systems involve primarily the operation of internal mechanisms they possess a sort of independence of the stimuli. Again, since in performing affective reactions we do not necessarily manipulate or change our stimuli, the relationship between the response and stimulus is such that they are more likely subject to interchange.

This entire matter may be otherwise stated by suggesting that a peculiarity of affective behavior segments is that they are capable of being interchanged in various ways. That is to say, the stimulus object of one may become attached to the response of the

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other, and *vice versa*. Possibly this fact may be well symbolized by the statement that in affective behavior segments the response and stimuli factors seem to be less rigidly related than is true in other types of behavior.

This characteristic of conditioning, while probably attaching to all affective behavior segments is doubtless of more frequent occurrence among simpler feeling activities. And so while it is very common for us to transfer the simple euphoric responses induced by the brightness of the day to various other stimuli objects and conditions, we probably less frequently transfer the more complex affective actions. Illustrative of the transferred complex feeling response is the case of the person who, stimulated to love some individual, transfers his affective reactions to objects belonging to this loved person or to others associated with him, even including a whole family, nation, or race. Similarly, we carry over our antipathies and enthusiasms from one stimulus object or situation to another.

Again, an individual who becomes enthusiastic about some painting may condition his affective response by connecting it with all the artists of that school, although not all the members have the qualities to which he originally responded. Without doubt much psychopathic behavior consists essentially of the unadaptable conditioning of affective responses.

Affective conditioning processes may be considered to consist of two general types, one of which is not a genuine psychological phenomenon, though it has every superficial appearance of being such. We shall discuss each in turn briefly.

(1) Pseudo-conditioning processes are those in which there is no actual reattachment of a response to a new stimulus. On the contrary, the affective response just seems to persist and to be indifferently associated with various objects, as though it kept acting on its own momentum. Such pseudo-conditioning situations are exemplified by the actions of the person who allows his antipathies to be carried over from one individual to a whole group, without actually responding to each member of the group separately.

Now just here lies the criterion for spurious and genuine affective conditioning. In genuine conditioning some actual response to a particular stimulus object is reattached to another stimulus object. In spurious conditioning the actual reattaching process is absent, except in appearance. That is to say, there really is no new stimulus to which the old response could be attached. In actual practice the genuineness of the conditioning process is frequently far from being easy to determine. Especially must we be careful in situations in which the transfer is from some particular person to some abstract stimulus such as his profession. Such genuine but ostensibly spurious conditioning

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processes are common in various forms of insanity and may be descriptively designated as feeling illusions or affective maladaptations.

(2) Genuine affective conditioning processes may be differentiated into two sorts, depending upon whether the reattachment is to a new object or to the same object. Any object may ordinarily of course constitute two or more specific stimuli for different reactions. Similarly, the same reaction may become detached from one of the two stimuli which a single object or person constitutes, and reattached to the other. Or the reaction need not of course necessarily become detached from the old stimulus but attached to a new stimulus in addition. A striking illustration is the sex feeling induced in an individual by some person in one capacity, say as anatomically attractive, which same reaction may later be attached to the person as a friend, that is, remain as the response to both.

Genuine affective conditioning when the stimuli are different objects is exemplified in the case of a woman transferring a particular affective response to her first child to the later ones, or the transference of a love reaction from a child who has died to some adopted infant, or even to an animal.

The Place of Feeling in Behavior Situations

Such intimate behavior phenomena as feelings must inevitably play a very large part in all of our behavior situations. That is to say, they must, because of their peculiar character, be very pervasive throughout the individual's various activities. Not only do affective reaction systems operate in both affective and non-affective behavior segments but affective processes, whether reaction systems, reaction patterns, or complete segments, must and do play a very large part in our behavior complexes. In non-technical language we might say that practically every definitely human type of behavior involves some feeling reactions.

To illustrate, the majority of our reactions to human beings comprise some sort of affective response, especially if the stimulus individual is a person of the opposite sex or not exceedingly familiar to us. Also, in æsthetic, religious, or sports situations we may distinctly observe a number of more or less complicated feeling activities. Possibly the observation we are making here has been the factual basis for the idea very frequently expressed in psychological literature that feelings appear to be attributes or tones of other kinds of processes. Certainly, we find feeling activities exceedingly pervasive and also capable of thoroughly interpenetrating with other kinds of activity.

The operation of affective responses in what are essentially non-affective behavior situations, may be illustrated by considering a few varieties of complex activity. To turn first to an æsthetic behavior situation we will consider the constructive action of creating a work of art, a poem, or a picture. Such activity we might

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consider as essentially imaginative in character; in different words, the primary response is the development of an æsthetic conception and its later execution. Such activity also may be designated as a type of social behavior since the fact of creating any particular object in a particular kind of medium is conditioned by a series of group ideas, sanctions, and standards as well as other sorts of specific group institutions. Never can such complicated constructive art behavior be carried out, however, without numerous correlated affective responses.

From the object which is painted or from the person and events about which the poem is created the artist receives many stimuli for the performance of numerous simple and complex affective reactions. Present here are the calm of admiration, the excitement of enthusiasm for the work or subject, and sexual feeling for the subject the artist is handling.[1] In addition to these there is present the general euphoric responses with respect to the progress or success of the accomplishment.

The same or very similar kinds of affective behavior can be traced out in the appreciative or impressive types of affective conduct as well as in the constructive. Doubtless it is the operation of these affective responses, coupled with imagination reactions and others, which constitute the behavior basis for the empathic or *Einfühlung* phenomena of æsthetic behavior. Much the same type of combination of affective and other forms of behavior can be traced out in the case of moral action. In the solution of a moral problem, for instance, we also find these complex affective components giving character to the total behavior situation no matter how complex the latter may be.

Especially important is the observation that complicated meaning and understanding behavior situations functioning to adapt the individual in his most complicated activity, are veritably replete with affective elements. The meanings of things, the comprehension of objects and situations are complicated behavior activities containing a goodly portion of affective reactions. And just as in the case of the æsthetic situation in which color, shape, etc., condition the total behavior situation, so do such factors likewise influence the significance of things and persons from a reactional standpoint.

Just how the affective response factors operate in meaning activities may be pointed out in the following manner. Let us assume that when we have our first contact, or perhaps even some later contact, with some object that this contact results in a pleasant or unpleasant feeling reaction. Now since meaning responses are essentially actions which condition some later reaction, the pleasantness or unpleasantness resulting from the contact of the

[1] The writer hopes it is unnecessary to indicate that this statement has nothing in common with the view that art is the sublimation of sex urges.

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person with some particular object or situation induces a particular kind of meaning response with respect to that object, which response will later condition other reactions. Accordingly, we see how pleasant or unpleasant affective responses condition the development of meanings. This development, of course, is merely preliminary to the future operation of the meaning activity. Our point is that in its origin the meaning was greatly influenced by the affective response and the latter constitutes, therefore, a permanent factor in that meaning situation.

Varieties of Feeling Behavior Segments

Certainly by all relevant criteria, and especially because of possessing unique characteristics, affective behavior segments constitute a specific type of psychological activity. But on the other hand, affective reactions are not thus excluded from participating in the qualities of some of the non-affective reactions. So we might point out that the feeling behavior segment consists of reflexes, habits, volitional, and other types of psychological behavior. Quite definitely do the barriers between different classes of behavior break down here, in the sense that a particular reaction may at the same time be affective as well as volitional or habitual, as the case may be. How then may we distinguish between the particular types of affective reactions? We can do so most precisely by briefly describing each.

(1) Affective Reflex Action

Reflex responses naturally constitute the simplest type of affective behavior, consisting as they do of a simple unique reaction system correlated with a particular stimulus object or condition. As a matter of detail we might point out that affective reflex reaction systems consist primarily of the operation of visceral mechanisms. Affective reflex actions then clearly appear to be classifiable as members of the general class of reflex responses.

But here we must be on our guard lest we wrongly conclude that, because all affective reaction systems involve predominantly visceral mechanisms, all feeling responses are reflexes. Such is far from being the case. For as we have abundantly seen, not all affective responses are so simple as to involve merely a single reaction system. Whenever we have a response pattern (more than one reaction system) we must place the reaction in a different class. We will then have habits, volitions, or other sorts of behavior. For example, even a fairly simple sex feeling response must always be connected with social or informational responses in the same behavior unit or segment. Consequently, even such comparatively uninvolved affective reactions must belong to another class of action other than reflexes. As we have intimated in a previous section the question whether we must classify sex feeling reactions as affective at all is determined by the fact that the primary element is the feeling factor rather than the social or informational one which is also included in the same behavior segment.

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(2) Feeling Habit Reactions

Some of our affective reactions are definitely organized responses which are clearly integrated very closely with specific stimuli. Such an integration process brings it about that the mere appearance of the object constituting the integrative stimulus results in the practically automatic operation of the affective reaction. Since we call such integrated responses habit reactions, then affective behavior of this nature will answer to this description and we will call them feeling habit reactions.[1]

(3) Affective volitional reactions

By volitional reaction we understand a behavior segment in which the final or definitive response is conditioned, not only by its ordinary stimulus, but in addition either by other stimuli objects directly, or indirectly through reactions of various sorts. Many of our affective responses constitute such multiple determined responses; therefore they must be placed in the class of volitional reactions. The feeling reaction toward a picture is determined not only by the picture itself but also by the knowledge of its painter, the understanding of its technique, etc.

(4) Affective meaning responses

We have already indicated above that feeling responses serve to condition the operation of further and final reactions in behavior segments. Now such a conditioning function we call a meaning process. Therefore, the determining affective responses must be called meaning reactions in addition to feeling activity. Here in this case it will be observed that only some reaction systems in a behavior segment, namely, the precurrent determining reactions and not the final action, bear the name of affective meaning response; in this sense the present class of feeling reactions differ from the others we have been describing. But our point that affective reactions may at the same time belong to other types of behavior is no less cogent here than elsewhere.

Similarly our affective responses may be placed in several other categories. We might merely suggest in addition that affective responses may also be considered both as individual responses, in the sense of representing the unique reactions of an individual who has developed in his particular behavior situations a unique type of affective reactions, and as cultural ones, that is to say, actions in which the person has developed part of his behavior equipment because of some group prescription.

Classification of Feeling Reactions

It is impossible to classify feeling reactions in any sort of logical or adequate fashion. The various forms are too complicated and too individual in their operation to permit any satisfactory organization; yet these very conditions which make classification so difficult make it all the more necessary to inject some order into the multiform facts of affective behavior. Even the most unsuccessful attempt at organization would undoubtedly add something to our understanding of feeling responses and supply some measure of descriptive control over them.

[1] For a more detailed treatment of such responses, see Chapter XV.

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When we attempt, however, to plan such a classification we immediately face a serious problem. What criteria from all the possible ones that present themselves shall we adopt as a guide? Following is an incomplete list of them, which we offer in the form of questions.

(1) Temporal conditions; is the feeling response a momentary or prolonged one? (2) Smoothness of action; in other words, does the reaction operate consistently and on a level throughout, or is there a climax? (3) Directedness of feeling, is the reaction definitely directed toward some stimulus object or person, or not? (4) Localization; is the feeling reaction unmistakably localized with respect to some organs or some segment of the organism? (5) Is the action simple or complex? (6) Does it involve great activity or not? (7) Does the reaction appear independent of other behavior at the moment or does it accompany some other reaction? (8) Does the affective action represent one of acceleration or of depression and slowing down of the organism? (9) Does the behavior segment involve implicit reactions of other sorts? (10) Is the feeling reaction itself a totally implicit one? (11) Is the reaction itself of a reflex sort or of a habit type? (12) What particular sort of mixture of behavior is involved in the feeling behavior segment? (13) Is there a preponderance of some one quality in the feeling action, for example, pleasantness or excitedness, etc? (14) What is the type of stimulus? (15) Is the feeling reaction subtle, or crude and violent in its operation? (16) Is the affective behavior suffusing or overwhelming? (17) Finally does or does not the reaction represent the operation of some permanent reaction system (behavior trait) in the person's equipment?

Any attempt to classify feeling reactions must obviously be based upon some one or a group of these criteria. Moreover, whatever series of classes we adopt, each class must necessarily include thousands of members. The impossibility, then, of the classificatory enterprise in the field of affective responses is manifest. What we shall attempt to do is to select from the more common forms a few (10) representative types. For class names we adopt terms in ordinary use, specifying however, that such names need not be considered as exclusively and irrevocably adhering to the type of behavior with which we connect it. Follows then our attempt at classification.

Passions

Here we have a highly organized, usually intense and active form of feeling response which may be momentary or prolonged, overt or implicit. Passions are especially directed toward some particular kind of stimulus object or person. Again, a passion response may involve considerable implicit behavior of non-affective types such as information, as well as a critical attitude toward the person or object serving as a stimulus. These implicit

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components of passion responses comprise of course the anticipatory or precurrent phase of the reaction. To point to examples, we may cite the actions ordinarily referred to as hating, loving, revenging, despising, loathing, jealousy, and fits of anger.

Orgasmic or Irruptive Feelings

In this class we put (a) the feeling reactions ending in a very definite climax after a more or less prolonged operation and (b) the feeling responses which start with a sudden change of behavior. For these responses the stimuli are mainly situations which have abrupt endings or interruptions, or objects which change rapidly. Such actions are performed while hearing music that attains to a climax or which begins with great volumes of sound. Also these reactions occur in watching games in which there are striking gains and losses. The person's feelings are thus suddenly initiated or interrupted. Similarly, in observing theatrical performances we may have many sudden irruptions of feeling responses. Probably the best example of orgasmic feeling type can be found in sex behavior. For the orgasmic and irruptive type of feeling reactions we cannot find very definite word symbols in our language, but the expressions, striking disappointment, overwhelming surprise, or sudden indignation suggest the kind of behavior under discussion. In contrast to the passions the orgasmic or irruptive feeling responses are more turbulent, fitful, and less organized or well-knit and in this respect they are closer to the emotions than any other type of feeling behavior.

Affective sentiment reactions

Sentiment reactions represent very highly organized activities which typify acquiesence or readiness to do certain things or to refuse to do them. They are usually exceedingly complex and very intimately connected with complicated knowing and informational behavior. For the most part they are also developed and function as cultural or social modes of action. In each case sentiments are unmistakably directed toward some particular kind of stimulus object or situation, probably most frequently a social institution of the group behavior variety. Names symbolizing sentiment reactions are shyness, altruism, patriotism, modesty, shame, decency, indecency, cleanliness, charitableness, etc.[1]

Affective Dispositions

The main characteristic of disposition reactions is the fact that the feeling activity when it occurs in response to its particular stimulus represents a practically permanent behavior factor of the person's equipment. Thus the dispositions may be considered to a certain extent as giving character to the person. The stimuli for these reactions may be objects, situations, and persons. Such dispositions are tenderness, hopefulness, optimism, pessimism, etc.

Affective Attitudes

As contrasted with dispositions these reactions represent behavior of the moment and do not necessarily reach back to definite

[1] None of these names we mean to refer to social conduct but only to the particular *affective responses* of persons, but these affective responses may be social in character.

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elements in the personality behavior equipment. By feeling attitudes we mean more or less prolonged responses with respect to particular stimuli which are usually immediately present. They constitute reactions, then, that are organized with respect to some particular kind of situation object or person which is usually present. These reactions may be exceedingly intense, such as extreme happiness over some situation or hopefulness concerning some event. Very good examples of affective attitudes may be found in æsthetic situations; to be enraptured in a work, inspired or repelled, represents such behavior, and in ethical situations to be disconcerted or astonished by some one's action. When these expressions represent definite affective responses they may be considered as typical feeling attitudes.

Affective Moods

Moods constitute feeling reactions consisting mainly of a simple type of slightly organized conduct. Qualitatively the mood reactions are in effect conditions of depression or elevation of the person, but these depressions and elevations are none the less organized and directed towards a stimulus object or condition, since they comprise a number of varieties differing with the arousing conditions. Because of the simple character of these reactions, however, they have for the most part been considered as merely conditions which color other types of action. Much plausibility attends this observation, since the comparative simplicity of mood responses makes them especially subject to conditioning. In consequence, they seem to belong indifferently to various kinds of behavior situations. Also moods appear as not directed and autonomous responses because probably for the most part they are stimulated by hygienic conditions of the person himself. Moods may be symbolized by the popular color-terms, blues, browns, and rosy moods.

Continuous Feeling Responses

A very prominent type of feeling reaction that we are constantly performing is found in the affective responses of an unlocalized sort which accompany other actions and which to a considerable extent may be said to have their stimuli in other actions of the person. In these cases we have definite pleased, displeased, satisfied or unsatisfied, disappointed, apprehensive or other affective responses that parallel and accompany other actions. The essential characteristic of these continuous feeling reactions is that they are not independent responses; that is, they depend upon and are closely connected with other reactions. To illustrate, during a conversation we may have definite pleasurable, excitable, or other sorts of feeling responses, depending upon the nature of the conversation and the sort of person with whom we are conversing. Such forms of feeling reaction may frequently amount to a suffusion of the individual with pleasantness or other sorts of feeling. Continuous feeling reactions are naturally not connected with objects as stimuli, but rather with series of objects or

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continuing action (conversation), and in general with events and conditions.

Diffuse Feelings

In this class we place a large series of complex organized reactions the members of which have a longer or shorter duration in their specific situations. Although the responses of diffuse feeling segments are directly related to some stimulus object or condition, still the segment as a whole appears to feature the response indefinitely more than the stimuli objects and conditions. In other words, the reference to the stimuli objects is not very marked on the surface, especially when the total segment is of considerable duration.

Diffuse feelings usually constitute responses of a serious or important nature. They operate in situations which greatly affect the person. It is for this reason that the response appears so much more in evidence than the stimulus. Thus the responses are diffuse and apparently undirected. We might point out, too, that the most typical of these diffuse feelings have as their stimuli past or future situations or present conditions which are inevitable and cannot be controlled by the individual. This fact adds also to the diffuseness of these reactions. Well symbolized can such behavior be by the responses we call regretfulness, remorse, gladness, elation, dread, anxiety, ecstasy, and resignedness.

The diffuse feelings may be differentiated from the continuous feelings chiefly by the fact that the latter are not independent responses but are always related to some other kind of response. Again, the continuous reactions represent slighter forms of behavior.

Localized Feeling

By localized feeling we mean definite forms of direct feeling responses to stimuli which are immediately present and in close contact with the individual. These stimuli, however, may be simple or complex, with a simple or complex response on the reaction side. Here we refer to the pleasantness or calming affect produced by touching, stroking, or hurting the skin, or the kind of feelings that accompany such actions as eating in which we can localize a pleasant or unpleasant feeling on the tongue.

Tender Affective Responses

Classed here is a type of highly organized feeling directed toward a person or some other living thing. The specific qualities of these responses are correlated with the types of stimuli. That is to say, these reactions involve implicit responses to the suffering and the joy of the persons or other living things constituting the stimuli. To a certain extent the person reads himself into the situation of the stimulus individual, and imagines his trials and triumphs, and suffers accordingly. For names of these reactions we might use the terms sympathy, meltingness, pity, forebearance, etc.

Specific differences between the tender feeling responses depend upon the character of the reacting person and upon the relation-

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ship of the stimulus individual to the former. Of course, in each case we are ruling out any sort of intellectual compassion or pity and insisting that the reaction, when it occurs, must answer to the particular characteristics we have specified as belonging to the feeling reaction.

Individual Differences in Feeling

Such intimate personal responses as feeling reactions are, must obviously allow for greater individual differences than is the case with other types of reactions, none of which of course, are insusceptible to such variations. Observations confirm most decidedly this belief. Comparing persons we discover that some do not and cannot have such intense feeling responses in what are plainly much the same types of situations. The objects and conditions which some individuals endow with affective stimulational functions by building up feeling responses to them, never take on such stimulating functions for other persons. Here at once the notorious Peter Bell suggests himself as a striking example. Not only is this true for affective stimulational functions in general, but also for particular qualities of such functions. Still further we find that some individuals lead generally a more affective behavior career in the sense that they respond more frequently in a feeling way to surrounding objects and processes. What can be the basis for this fact?

Our first suggestion refers us to the stimuli conditions functioning to induce in the person the acquisition of affective reaction systems and the building up of feeling behavior segments. These stimuli conditions constitute of course actual objects and persons which are parts of our individual psychological surroundings. Especially important as candidates for endowment with affective stimulational features are persons. Consider only the possibilities of persons of opposite sex taking on stimuli functions for the feeling responses of individuals of the other sex. To a no less great extent such stimuli as induce us to acquire affective responses constitute cultural stimuli of all sorts. This fact is demonstrated by the extreme difference in affective conduct between members of different human groups, whether national, sexual, or some other sort. To illustrate, the traditional emotionality of women among the Europeans is almost certainly owing to cultural and institutional development. Similarly, national affective traits may be ascribed to the particular individual's building up of cultural modes of conduct.

Doubtless, another basis for the intensity and frequency of a person's affective responses is found in the immediate stimulational opportunity conditions. Opportunities for affective reactions are much rarer in the cases of some individuals. They live upon what is behavioristically a dead level, a plane of little affective action. Some individuals do not come into contact with objects, through the results of which contacts the person acquires

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affective reactions, and which contacts are the basis for the assumption of affective stimulational functions by the object. In such instances the individual makes fewer and less intensive affective reactions. Others are in contact with stimuli which continually call forth feelings of various types. Still others perform infrequent feeling responses because they are continuously subject to profound and long drawn-out affective acts, and are thereby excluded from many lesser feeling responses. Such individuals are steeped in sadness, despair, or melancholia or the corresponding exalted types of action and have no place in their activity for the slighter and evanescent feeling responses.

Not only do stimulating opportunities for feeling responses account for variations in individuals' affective behavior, but equally as potent are the presence or absence of restraints. Such absent or present restraining conditions are powerful conditions for affective functioning or the inhibiting of such feelings. To be expected, these factors are commonly localized in institutions of cultural stimuli. Numerous are the institutional habits which exert such a restraining effect upon individuals that they are greatly withdrawn from participation in activities, including primarily feeling behavior. We need only specify here the general ascetic interdictions of various religious groups.

A third condition making for frequency and intensity of affective conduct in particular individuals may be traced back to their biological, and especially their glandular, organization and functioning. This statement we make with considerable confidence, although it is of course impossible for us to state just how the person's glandular organization affects his feeling reactions. Possibly individual affective differences are owing to the more actively functioning glandular systems of some persons as compared with others. These differential glandular functionings of various persons may be considered as facts of their general biological condition, metabolic states, and general well-being. Further, such glandular influences upon affective life we may call primarily biological. A secondary biological foundation for glandular influences upon the number and intensity of feeling responses is found in the differential glandular activities which are first themselves aroused through the stimulation of objects and persons, but which only secondarily and later influence the individual's affective life. Immediately we may refer here to the rich and varied affective life due to the secondary biological functions stimulated by sexual stimuli of various forms. In general the secondary biological influence upon affective reactions may be considered as exclusively functional and not organizational or anatomical.

While we are much inclined to emphasize the glandular functions of the biological influences upon affective responses it must surely be recognized that other functions may also be operating.

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For example, the general conditions of the organism, the functioning of the digestive, excretory, and other physiological processes must play some minor rôle in influencing feeling responses. We must add here that naturally enough, none of the biological facts influencing feeling reactions can have much conditioning effect except upon the simplest of the affective reactions.

By a natural gradation the discussion of the biological bases for affective responses leads to a consideration of the affective components of temperaments. Whatever else temperamental conduct may be, no question exists but that such behavior includes as important factors a number of different types of affective reactions. The latter may consist not only of contingential behavior but also of cultural affective responses, as well as suprabasic and idiosyncratic reactions. More particularly we may point out that temperamental behavior includes the operation of feeling habits, dispositions, and other equipmental activities, as well as immediately operating feeling reactions both simple and complex.

Probably it is safe to assert also that not only do temperamental responses include large components of affective reactions but also that the feeling behavior components constitute their chief and most important factors. Temperamental responses are infinite in number so far as specific qualities of actions are concerned, since they consist of numerous different combinations of affective activities besides the others in given situations.

Temperament, as the name for equipmental behavior traits, likewise consists of particular combinations of feeling personality components. Accordingly, the assumption is well founded that there exists a very large number of distinct temperaments. Thus we believe that our hypothesis here can be employed to illuminate the traditional conception concerning temperament, namely, that all individuals may be divided into four temperamental types, the choleric, melancholic, sanguine, and phlegmatic. This conception was obviously based upon a rigid and exclusive classification foundation. Now while these terms are fairly descriptive of certain individuals at certain times they are not exclusive nor permanent descriptions. However they may be taken to be empirical labels suggesting prominent ways in which persons respond affectively to their surrounding stimuli.

The Influence of Feeling Reactions upon Other Behavior

Affective responses being essentially personal and subtle in their operation may be expected to exert considerable influence over both the development and operation of other types of activities. This influence upon other reactions we have already suggested before. At present we will consider the more formal influences of such behavior.

In the first place, then, we find that affective responses and the results they leave in the organism have influences upon the operation of reaction systems which are equipmental in character; that

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is to say, those that the individual has acquired as part of his more lasting behavior equipment. In brief, affective responses condition the inception of other actions. To illustrate, if we are now reacting affectively to some object and if this affective response is depressing or unpleasant, we may shrink from performing some other sort of activity even in the presence of adequate stimuli conditions. On the other hand, if we feel elevated or excited we may be more prone to undertake some other specific type of action.

Not only do feeling responses and their effects upon the organism condition the inception of reactional activities but also influence their continuance after they have begun. When we start some action which may stimulate a feeling of unpleasantness or disgust the probabilities are that the action will be summarily discontinued. On the other hand, if such an activity should stimulate in us a more pleasant or agreeable affective response the action may be continued indefinitely on the basis of such affective influence.

Secondly, feeling reactions may condition the acquisition of actions or particular kinds of action. This means that the individual will be influenced by affective responses to attempt to acquire new kinds of activities. Also the fixation or permanence of such acquisition is directly contingent on the character of the affective influence. An illustration in point is the way our likes and dislikes are developed. If we react to some object and it produces in us an unpleasant or unsatisfactory affection it is improbable that we will cultivate a liking for it, or if we do and it happens to be a tool of some sort, we will probably not exhibit any skill in the handling of it. On the other hand, if the feeling is of another sort, the results may be entirely different. Possibly the most striking illustration of the latter instance is afforded us by the consideration that much of our complex activity and behavior equipment is conditioned by what are commonly called first sights or impressions. In other words we are considerably influenced by first impressions and when they are analyzed we find they consist primarily of an affective condition produced in us by objects and persons. We may add here that it is through the affective reactions performed in connection with various objects and situations, that we are influenced to pursue our interests in them, which means, in effect, that we will acquire a variety of responses to such stimuli.

In similar fashion the affective responses exert a selective influence upon our behavior acquisitions and condition the permanence of various acquisitions. For instance, the acquisition of activities which are pleasant will be permanently maintained as part of our enduring behavior equipment, whereas if the acquisition is accompanied by unpleasant, disagreeable, affective reactions the acquisi-

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tion will only be temporary. In this connection we may draw attention to the basis for the brevity and longevity of our memorial conduct, although in memorial situations we must specify in individual instances whether it is the pleasant or unpleasant type of affective reaction which strengthens the retention of the memorial action.

A third distinct influence of the affective reactions upon other behavior refers to the type or mode of action so influenced. This refers both to the type of reaction acquired and the way it later operates. An everyday observation assures us that our thinking and reasoning actions receive no little influence from the affective responses induced in us by the objects and persons about which we think or reason. In many cases this affective influence may be just as potent as the influence upon us of the qualities of the objects and persons mentioned. Especially are our beliefs conditioned by the kind of affective actions induced in us by objects or by the recitals and descriptions concerning such objects. When in contact with a person who stimulates us to perform pleasant or agreeable affective reactions we are prone to acquire beliefs that are very favorable to him. Equally true, the intensity with which we believe what we do with respect to this individual will be marked as compared with similar beliefs concerning individuals who do not stimulate us to perform the same type of affective response. Here again, we cannot generalize about the kind of affective response which will elicit a particular kind of belief or intensity of belief. This is entirely an individual matter depending upon the person's specific situations.

What is true of our beliefs and thoughts may be equally true of all our different sorts of behavior. We have already had occasion to point out the influence of affective responses upon our meaning and æsthetic behavior. We may further suggest then, that our judgments are many times formed on the basis of the way we affectively react to the object or person being judged. In all of these suggested cases the influences of the affective responses may be entirely unknown to the individual at the time. We may be completely at a loss to understand why we possess such an unfavorable judgment concerning a particular individual. Later we may realize (usually after the fact is pointed out) that because a certain person is the son of a man who once defeated us for the first place in an athletic contest, he produces in us an unfavorable affective reaction which in turn influences our judgment of him. Here we must observe that the affective response is not aroused directly by the other individual, but rather the person we are judging merely substitutes for the stimulus which actually arouses our affective reaction.

Not only may the affective reactions be very remotely connected with the object that we are judging, but there may also be a very

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trivial incident connected with that object which calls out the affective response and which in turn influences our judgment, or some other kind of complex action. Sometimes it happens that an unfavorable or favorable judgment concerning a person has nothing more important as its basis than the fact that his name resembles that of the person who is responsible for one of our happy or unhappy moments. Probably this point is better illustrated by the circumstance of our being prejudiced against a particular kind of automobile because of having once read of some unfortunate accident in which such a car was involved and which produced in us some unpleasant response. So far we have been pointing out the influence of specific affective responses upon other particular reactions. We might suggest further that a very common human experience is to have some series of affective responses or a number of prolonged feeling activities influencing more or less the individual's total personality behavior. Thus, to use a very common illustration, the young man or woman who falls in love, and who is more or less constantly stimulated to amorous behavior, may as a consequence take on a very decided personality change. Ordinarily indifferent to his activities he may become under the new affective stimulation very keenly sensitive to his surroundings. Similarly, this individual in love may undergo a complete metamorphosis of personality. For instance, he or she may become transformed into a reformer of the world's evil. Literary history records in abundance instances of the quickening of poetic and other artistic proclivities in the amorously aroused individual. So striking is this observation that it has led to the popular but exceedingly erroneous theory that sex impulses in their sublimation constitute the bases for art.

Duration of Feeling Behavior Segments

Ordinarily our responses have definite beginnings and endings. Especially is this true for effective behavior. The initiation and determination of such an effective act as picking up a book are sharply marked and easily observable. In contrast, in the case of affective responses, conditions are seldom so precise and so easily distinguishable. Not only are the affective responses not in such intimate contact with the stimulating object, but also because they are primarily internal, involving general organic functioning, they do not possess such sharp differentiations of beginnings and endings. This fact brings up the problem of the duration of feeling responses. For apparently affective reactions are always more or less prolonged after the exciting stimulus has disappeared.

Whenever we perform a simple feeling reaction the excitatory or calming changes brought about in the visceral glandular organs cannot be very easily checked. Sometimes they continue for a fairly long period, after what the observer might call the completion of the adjustment. The fact of the matter is, however, that the reaction, perhaps in its original intensity, actually continues.

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In other words, the feeling response, as compared with other types, does represent a more continuous form of action. The diffuse feeling of sadness and loneliness that one experiences when leaving some well-loved person may last until long after the final response of the departure has been made; in fact, such a feeling may remain with the person even after he has entered upon a new series of activities. This indefiniteness of origin and culmination of affective reactions is much longer in the more complicated types of feeling behavior than in the simpler. Distinctly are the complex actions, such as the passions and moods very prolonged in duration. Possibly more than any other phase of affective reactions their prolonged character marks them as decidedly potent factors in conditioning other types of behavior. For instance, when I am disappointed or angry because of some disturbing circumstance or some wrong done me, this affective action, not ending abruptly with the termination of the actual stimulation, carries over to influence my further reaction to all other succeeding stimuli.

At this point a warning is appropriate. We must suggest that the continuation of the feeling reaction must not be confused with the purely organic functioning which is included in the feeling activity along with a definite feeling reaction system. This warning is especially necessary since it is true that whenever any feeling reaction is prolonged that act tends to become diffused after a shorter or longer period of time. In its later phases it very closely resembles a purely physiological tone. It is also true, no doubt, that in its final form any prolonged feeling activity terminates in purely physiological activity.

Feelings in Animals and Infants

Since the morphological constituents of affective responses involve actual visceral and other organic functioning of the organism it might throw some light on the general character of affective behavior to inquire into the capability of infants and animals to perform such reactions. For the assumption may be created that the primarily internal character of affective responses means that every organism is equally capable of developing such reactions.

So far as infrahuman animals are concerned we may probably safely assert that for the most part their activity which closely resembles affective behavior, consists primarily of visceral and other organic activities which are perhaps not at all phases of actual psychological reaction systems. But we are not inclined to assume that animals cannot perform actual psychological affective responses. They undoubtedly do, but we may be fairly certain that whatever behavior they have of an affective type is very simple in character. Probably infrahuman animals merely perform pleasant and unpleasant affective responses. It may be that they also perform some few affective reactions which may be a little more complicated, such as being pleased or displeased or finding things agreeable or disagreeable. But it is not easy to assume

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in the absence of the complicated stimulational circumstances which are essential for building up appropriate and coördinate responses, that animals can build up such reactions, much as they may possess the requisite anatomical and functional foundations. All this means to refer us again to the complex behavior organizations of our affective responses.

The affective behavior of infants is especially illuminating in this connection because we may with a great deal of confidence trace out the genetic development of the more complicated feeling responses during the course of a child's maturation. At first no doubt infants can only perform activities which are comparable to those of the lower animals. They merely perform pleasant and unpleasant, agreeable and disagreeable activities, etc. Later on, they develop as definite complicated reactions, the various loves, hates, jealousies, envies, or sentiments of shame, modesty, cleanliness, etc. Naturally the development of the affective responses in infants is not any more fixed and orderly than is true for the other types of psychological activity. The actual way in which these activities are developed depends upon the specific individual and the particular circumstances among which he grows up.

Whether the particular person will have complicated affective responses and what specific type of such reactions will be acquired, are necessarily contingent, as we have already suggested, upon the intimate details of his behavior circumstances. Obviously, as an illustration, persons who have no contacts with æsthetic objects will never experience the subtle and refined feelings which constitute responses to such objects. Contrariwise, whatever things the person has contacts with, may condition, when there are no interferences, his building up coördinate feeling reactions. Again, we may suggest that the mere capability of performing component visceral and other organic responses does not guarantee the acquisition and performance of feeling behavior. In the case of affective reactions, no less than in other types of behavior, the individual must conform to the facts and laws of psychological phenomena.

Abnormalities of Affective Reaction

As a consequence of the intensely personal and organic character of affective reactions these responses play a special part in the general abnormalities of the individual as well as themselves being easily subject to defective functioning.

Owing to their character affective reactions are easily put out of function or made to operate in a defective way. Whenever the individual finds himself in difficulties of a personal sort or in bad conditions which affect him among others, the result usually is that his affective reactions are immediately disturbed. This means that he is affectively too intense or he loses the normal accelerating and exciting character of his contacts with objects. Such disturbances of the affective life themselves constitute abnor-

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malities of psychological action. But they usually carry in their trail more serious conditions, since the affective reactions have so large an influence upon other action. As a consequence the disturbing effect may carry over to some or a few other activities resulting in difficulties of the person's adaptation. These disturbances constitute the simpler and more localized personality defects.

On the other hand, the disturbances we have indicated, beginning in the malfunctioning of the affective reactions, may have a bad effect upon the operation of the total personality. The result of this is a much more serious and less easily controlled abnormal situation. Classical examples of such total disturbances of personality are the stupors and catatonias which constitute total and complete maladaptations of the personality. In such personality abnormalities the individual may become entirely withdrawn from all ordinary contacts with his surroundings. This withdrawal from behavior contacts may go so far that the abnormal individual will not speak to anyone, nor even attempt to protect himself from injuries. Still more profound may such personality defects go; so that the individual will not respond to food or other necessities, nor perform reflexes that go beyond the lowest organic biological processes. Such individuals may not blink or swallow or move their limbs.[1]

[1] For a more detailed study of such conditions see below, Vol. II, Chapter XXX.

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CHAPTER XIII

KNOWING AS DETERMINING AND ORIENTATING CONDUCT

The Problem of Knowledge

Psychological activity in every specific instance may be considered to involve some type of knowledge factor. In a sense the psychological behavior of the person serves to bring about some change of relationship between the organism and the objects possessing stimulational function for it. All such activities appear to involve at least some appreciation of the character of the stimulus object or situation if not of the appropriateness of the act. It is in this sense that we look upon every psychological act as a differential response and as such involving a knowledge or cognitive factor.

But in our observation of the various types and instances of psychological activity we have discovered that some of our behavior is very far removed from any immediate adjustment or adaptation in any performative sense. Such reactions rather consist of an appreciation and understanding of the qualities and conditions of objects without any immediate further activity with respect to them. These activities we may call knowledge responses. We have here a very definite form of cognitive orientation. The individual merely becomes cognitively orientated with respect to objects and this process of orientation constitutes the total contact which the individual has at the particular time with the objects in question.

These orientation responses comprise activities the farthest removed from any sort of performance. They may be considered as purely informational in character, as serving merely to refer the person to the objects and qualities constituting the stimuli for such orientational reactions. Between these thoroughgoing orientational responses and the activities which constitute specific performative adjustments to stimuli objects we find a very large graded series of actions which can be described on the basis of their degree of detachedness from the stimulus object; in other words they are more or less independent of performance adjustments. Either they constitute phases of adjustments in the sense that the perceptual reaction systems (which are to a very limited extent knowledge or orientational) constitute an integral part of a total behavior segment, or they may be thoroughgoing orientational responses comprising whole behavior segments which may not at all

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operate in conjunction with any type of performative adjustment.

In the present chapter our problem is to distinguish and describe two distinct forms of knowledge reaction, both of which are not integrally related to performance activities but which may definitely influence them. The first of these, which we will call meaning reactions, always serves to determine the character of some other reaction which may be performative in character, whereas the second type, which we will call knowledge reactions proper, has a purely orientational function. The latter in specific instances may operate in connection with performance reactions but when they do the two activities must be considered as entirely independent.

MEANING REACTIONS

The Nature and Operation of Meaning Reactions

Meaning responses constitute specific reaction systems which do not themselves comprise adjustments to stimuli objects but function to condition the specific operation of other reaction systems or the final adjustments to the object arousing a meaning response. Now so far as this preliminary description of meaning reactions goes we observe a very close similarity between such responses and the perceptual reaction systems. Meaning reactions are indeed derived very directly from perceptual responses and performative reactions, but in their functional character meaning actions represent activities distinctly different from perceptual and performative responses. This difference consists of the fact that whereas perceptual reaction systems constitute actions intimately and immediately related to a final or consummatory response (so that one cannot occur without the other) meaning reactions, though precurrent to some later reaction system in a behavior segment, are very differently connected with the former.

Meaning reactions also are fairly autonomous and detached. In other words, in contrast to perceptual reaction systems, the former have gained a certain independence of the stimulus object. This signifies in effect that it is not so essential for the acting person to be in such intimate contact with the natural properties of the stimuli objects. Meaning responses are not reactions to what things are, but to what they stand for on the basis of the person's previous contacts with them. Accordingly they constitute references to the object which are not discoverable in an analysis of it. In other words, the stimulational functions of the meaning stimulus object are less dictated by previous performative and overt manipulative contacts with it than is the case in perceptual activities.

Another way to express this is to indicate that meaning reactions point beyond the present stimulus object or its qualities. Whereas in my perceptual response I appreciate or know only that

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with which I am immediately in contact, in the case of meaning responses the present object points to other qualities, conditions, and events. In other words, our meaning reaction systems refer to the imputed, attributed, or evaluated properties of objects. Not only do I perceive this object as a yellow circular disc but I also appreciate its monetary value, its difficulty of manufacture, and the admiration it excites. Such responses indicate a fairly definite evaluation of the object based upon a relation to other things or conditions, or a contrast or comparison with other similar things. This object I perceive is reacted to not only as the horse that it is (biological specimen), but also as the animal I own and as the one that came to me as a second choice (attributed qualities or values).

Still further we may contrast perceptual and meaning responses. In perceptual reactions the individual identifies an object and in this sense appreciates its meaning. It is for this reason that so intimate a connection exists between the stimulus, perceptual reaction system, and the final response. In the case of meaning reactions proper the identification of the object is not the function stressed but the significance of it, what it stands for, what its implications are. In many cases the imputation of properties to things may consist of more definite appreciations of them and their effect upon the reacting individual. Also in some instances meaning reactions constitute responses to stimuli objects whose stimulational functions involve imputed qualities and values which were developed in the contact of other persons with the natural properties of those objects. The individual now is reacting to the values of objects not derived from his own original contact with them.

Not only may we look upon meaning reactions as responses additional to the perceptual reactions to things and thus as different from them, but also they can be separated from the perceptual responses. This fact can be well appreciated by considering that the same perceptual reaction cannot only at the same time be associated with a variety of different meaning reactions but also with different meaning responses at different times. Thus under certain circumstances this plant which I perceive in a given or standard way means for me also the return of spring and refers me to incidents, work, or responsibilities connected with that season. At another time the same plant refers me to the beauty of its form and the adaptability of its characteristics, to the place where it is growing, etc.

But, whatever autonomy the meaning reaction systems may have with respect to the stimulus, they are rigidly connected with some following reaction system. In other words, they serve to condition the final reaction system in a behavior segment. In this sense they simulate perceptual reactions, but with this difference that

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in perceptual activities the precurrent perceptual reaction system is itself an intimate phase of the immediately following final reaction system, whereas the meaning reaction system merely conditions and leads to the consummatory reaction system.

The appreciation of the thing or the significance itself leads directly to some further action. In fact here lies the significative function, that in the apprehension of the object another action is led to, an action of approval, of expression, of rejection, or even an actual performance of some sort. Very distinctly can we divide off the general run of meaning reactions on the basis of whether they lead to performances or not. In the latter case the morphological character of the reaction system is itself a performative or manipulative activity, whereas in the other case a non-performative action is the response referred to. And, of course, innumerable intermediate forms exist between the limits of the broad performative action and the more meagre non-performative response.

When the meaning reaction system and its succedent are both non-performative the meaning response resembles knowledge action more than is otherwise the case. The resemblance, however, is slight from the standpoint of the connection with stimuli. For in knowledge reactions the connection with the perceptual stimulus object is very different than it is in meaning situations. In the former case the perceptual stimulus object is entirely substitutive for itself or for some other object. Not so in the case of the meaning response, for here the meanings attach directly to, though they are to a considerable degree independent of, those stimuli objects.

Because of the meaning reaction system's partial independence of the stimulus object its essential function is the anticipation of the character of the final or consummatory reaction system of the behavior segment. It is in this sense that the specific appropriateness and fittingness of the final response may be said to depend upon the operation of the preceding meaning reaction. In other words, the essential function of the meaning response is not especially an identification of the stimulus object (as is true in the typical perceptual behavior), but rather the meaning reaction system instead of looking back toward the stimulus object looks forward to the response. It anticipates a reaction that is to follow by implying or pointing to conditions and situations not discoverable in the natural object. For this reason the meaning reaction is not so closely associated with the stimulus object as it is with the final reaction or other reaction systems in the behavior segment which it conditions.[1]

[1] In perceptual behavior segments the same tight connection exists between the perceptual reaction system and the stimulus as between the perceptual and consummatory reaction systems.

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In spite of the fact that the anticipatory character of the meaning reaction is based entirely upon various references which it makes to situations and objects aside from the immediately present properties of the stimulus object, the references and implications are not entirely free of the immediately present stimulus object. For the operation of the anticipatory function of a meaning reaction is made possible by the previous development of the total behavior segment, in which the meaning reaction becomes associated with both the preceding perceptual reaction and the succeeding responses in the total behavior pattern.

Types of Meaning Reaction Systems

So far in our description of meaning reaction systems we have found it expedient in pointing out the nature of these activities to consider them mainly as such references to things and conditions as would traditionally have been denominated cognitive. Now we must suggest that so far as the morphological character of a meaning reaction system is concerned it can be of any type whatsoever. Meaning reaction systems may be apparent or inapparent modes of response; they may also be performative or even affective in character. The specific type that functions in any particular case will depend upon the source of origin of the specific reaction system. Implicit cognitive responses we discover to be derived from situations in which perceptual activities are prominent features. Similarly, performative meaning responses occur in behavior segments derived from definitely performative situations. The same condition prevails with respect to the other morphological meaning types. For expository purposes we may consider the various types of meaning reactions under four headings (1) overt-performative, (2) non-performative, (3) affective, (4) wanting and desiring, and (5) verbal meaning responses.

Overt-Performative Meaning Reactions

This type of meaning response we may naturally expect to operate in knowledge activities which are most closely allied to performances of various sorts. Typical examples are acts of skill of diverse types. Meaning reactions here function as prior movement or manipulation performances which condition the later operation of some other reaction system. Thus the particular way in which the mechanic's hand grips a tool conditions and anticipates the next manipulatory reaction to the tool. Again the person, who mixes ingredients without measuring instruments finds that the particular performance of getting hold of some specific ingredient conditions the act of depositing it with others, or of reaching out for more, or dropping part of a quantity that has already been taken up. In still other cases the exact movement in placing a wheel in some mechanism depends upon the movements just made.

Excellently are performative meaning responses illustrated in speaking, typewriting, and other chain reaction patterns. In these cases the stimuli conditions determine the character of the

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chain response while the particular members of the chain pattern are determined by previous reactions. In such a behavior pattern as typewriting from a copy the determining character of the performance meanings consists primarily of a control of serial order of letter strokes and word responses, whereas in speech even the determination of choice of words is possible. In all cases we suggest that the prior reaction systems in the chain pattern are meaning reactions in that they control and determine the operation of responses which occur later. On the whole we might indicate that these performative meaning activities operate for the most part on a subreactionalistic basis. But in the person's actual operation upon his stimuli the responses constitute definite meaning activity.

Non-Performative Meaning Reactions

Clearly, implicit responses of every sort can operate to determine the operation of other and later reaction systems in a behavior pattern. And so we have here a source of many varieties of non-performative meaning reactions. Any type or instance of referential response which carries us backwards in time to events and conditions recalled, may serve to determine the operation of other reaction systems. Again we may evaluate immediately upon observing some object or condition. Such an evaluatory act at once conditions the performance of a further act and here we have another specimen of a non-performative meaning reaction. All these activities are of course inapparent to the observer since they are exceedingly removed from any type of manipulative activity.

Affective Meaning Responses

Affective meaning reactions condition the operation of later reaction systems by inhibiting or furthering their functioning. This is true for the simplest affective meaning reactions. Thus the pleasantness or unpleasantness induced in an individual by a stimulus object will accelerate the operation of some later reaction system or impede its performance. To be more explicit, the object means something desirable or undesirable, something pleasant or unpleasant to the individual.

So far the affective reactions may appear questionable as meaning responses, since the specific character of following reactions are not definitely determined. In the more complicated types of affective meanings this question disappears. When our final or consummatory response to an object is definitely determined in its details by a depression, exaltation, or exhilaration response which the stimulus object induces in us, the significative character of the affective response is indubitable. Similarly, when a feeling of love or hate aroused by an object determines an approval or disapproval, or prompts us to treat the object gently or harshly, who can fail to accord such affective responses the characterization of meaning reactions? Affective meaning responses are well illustrated by the circumstances in which a gift is appreciated and cherished not because of any intrinsic value it may have but be-

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cause of the affective responses induced by the stimulus setting in which it is found, namely the presentation by a loved one. Very decidedly also are affective meaning responses exemplified by the fact that the significance and value of æsthetic objects are determined by the precurrent affective responses which they arouse in us.

Wanting and Desiring Meaning Reactions

Because of the similarity in the operation of desiring and wanting reactions to affective meaning responses it is not necessary to describe the former in detail. We need only suggest that as a matter of fact the wanting and describing responses which objects elicit in us determine the specific characteristics of later evaluating and performing reactions of various types.

Verbal Meaning Reactions

Probably the most prominent and prevalent of all the meaning reaction systems are those that are morphologically verbal in character. Because of the absolute intimacy of the verbal meaning reaction systems and the extreme ease of their manipulation they function very frequently and effectively as determiners of other action. To put this whole matter in a convincing way we will consider the great influence of verbal reactions upon our thinking. Observe how impossible it would be for some thought reactions to occur at all unless mediated by verbal responses. The same situation prevails with respect to particular instances of thinking reactions.

Furthermore, there is no doubt at all concerning the influence that verbal meaning responses have upon various planning and problem-solving activities. The conditioning effect of verbal meaning reaction systems is not confined, however, to the more subtle implicit responses but functions equally in connection with performative final reactions of all sorts. Finally we might point out the important determining influence of verbal meaning reactions upon the understanding of spoken and written or printed language.

The Psychological Bases of Meaning Reactions

Because of the complicated nature and elaborate functional character of meaning reactions we may well expect that they are rooted in a large number of fundamental psychological processes. Distinctly, such reactions have their bases in the elementary and simple characteristics of psychological phenomena as well as in the derivative forms of psychological activity of persons. We may therefore stipulate what are some of the basic roots of meaning responses.

A. ELEMENTARY BASES

Obviously, meaning reactions depend upon the modifiability of response to some particular object on the basis of some condition accompanying the original reaction. The fact that meaning reactions are secondary and derived activities in which the person has

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added a new stimulational function to some object means that the modifiability principle will be manifest. Clearly there must be different ways in which the modifiability principle operates in connection with the changing of the stimuli functions of objects. In its lowest terms it may be that the stimulational functions that are derived from most or all of the qualities of an object, or those with which the person has been in contact, are merged in new or different functions as a parallel process to the modification of responses to the specified object.

Another set of bases for the development of meaning reactions comprises the psychological principles of delay and inhibition. In other words, in meaning responses the original immediate adaptation to objects becomes less and less immediate and finally develops into a detached response instead of being a precipitate performative adjustment. The precise emphasis here is on the development of meaning functions upon a foundation of delayed action. The actual process is of course the inhibition of an original action and its crystallization into meaning form. What originally constituted the immediate definitive response to the stimulus object is inhibited and replaced by some sort of semi- or total implicit meaning response.

So far as the delayed reaction principle is concerned, its function as a basis for the operation of meaning responses is perhaps even better exhibited than as a basis for developing such reactions. In the meaning responses which eventuate in a performative adaptation we see that the performative action is very considerably delayed. To a certain extent this delay is an outgrowth of the sort of intermission introduced into behavior segments by the performance of definite attention and perception responses before the final action. In very complex meaning behavior segments this delay is permanent; that is to say, no performative action need occur at all.

B. COMPLEX OR DERIVATIVE BASES

Among the foremost complex derivative bases of knowledge reactions are the phenomena of association. Here we see that meaning responses depend upon the intimate connection of referential reactions with both the adjustment and substitute stimuli, as well as upon the association of the stimuli objects and conditions themselves. Again, the development of meaning reaction systems is contingent upon prior associations of various objects and their connection with specific responses. Furthermore, the modifications of actions through the change of the stimulational function of objects are likewise intimately involved with the association process. That is to say, the process of connecting a new stimulational function with a response instead of an older one, involves

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the process of associating with the stimulus object different responses than were previously made.

Already our study of meaning reactions has sufficiently indicated how deeply rooted many of them are in the implicit response. We need hardly mention, then, that the entire secondary and detached character of meaning behavior has its basis either in implicit activity or in the conditions approaching the situation in which some stimuli objects substitute for others.

The Stimuli for Meaning Reactions

Various types of stimuli may serve to elicit meaning reactions of diverse forms but all of them, we should note, are complexes involving in some cases several things or conditions, and in others merely a single natural thing or condition. In the first place, we might consider the object or individual which has been associated with the acting person in some previous time, in some specific place, and on some specific occasion, which now in addition to being perceived calls up in the acting person reference reactions because of its previous relation to him and the other things and conditions belonging to that prior contact. In this type of stimulus complex we want to draw attention to the casually existing relationship between the object and the contextual situation. The relationship between the object and its context achieves its prominence and its stimulating functional character only through the prior activities of the person. The stimulus object which elicits meaning responses to itself in some other context or to some phase of some former context belongs to that context; therefore some of these meaning responses may be aroused in a very casual way by the mere appearance of the object.

Another type of meaning stimulus is that in which one object necessarily stands for some entirely other object or situation or event because of an intimate natural relationship between the two. This intimate natural relationship must be discovered through the individual's contact with the situation, but on the other hand, this contact leads to the discovery of so potent an implication or relationship that the one object will refer immediately and perhaps necessarily to the other. The original significance, however, of the one object is not dependent upon the behavior of the individual. In other words, these stimuli provoke much more profound and important meanings or sets of meanings than in the previous case.

A third type of stimulus complex is that in which two objects or conditions are related in a casual way because of various characteristics they have. One object may arouse meaning responses consisting of references to another object because of a similarity between them, some common factor existing in the different elements of the stimulus complex. Other elements of the stimulus complex may be related through some resemblance other than a common factor. They may just appear similar.

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In all cases stimuli for meaning reactions must be differentiated from the substitution stimulus of the implicit activity. This careful discrimination between the two types of stimuli is made necessary by the fact that in both the meaning and implicit situations, we have complexes involving more than one stimulus object. Now this difference consists primarily in the fact that, because in the implicit stimulation situation the immediately present object serves as a mere substitute to refer the individual to the adjustment object, the implicit activity has to do primarily with the non-present or substituted-for object. Contrariwise, in the meaning situation it is the immediately present object which is the main thing reacted to, but its function is enhanced by its connection with the other features of the implicit complex. In drawing this distinction we must not overlook the fact that in complicated meaning reactions we may be responding to absent objects so that both types of stimulating situations would be operating at the same time and in the same behavior segment.

KNOWLEDGE REACTIONS

The Nature and Operation of Knowledge Reactions

Knowledge reactions constitute behavior segments of which all the reaction systems are implicit and therefore comprise responses to absent stimuli whether they are substituted for by the same stimulus object or by some other. Such behavior segments involve primarily the appreciation of the implications of the significance of objects and the understanding of their possibilities. Being thoroughly implicit, knowledge reactions are essentially evaluatory and referential responses to particular objects, events, and persons. When performing such action the individual enters into a definite cognitive relation with the adjustment stimulus object. In detail this activity may be looked upon as an orientation action in the sense of a realization of what the object is, how it operated before, who handled it, and with what results, etc.

Having noted that knowledge responses are completely orientational we hasten to add that insofar as they are connected with performance actions we might say that they constitute an equipmental readiness to perform some action upon things or a preparedness not to perform some activity. When knowledge acts are connected with performative responses, however, the two types of activity are entirely different and distinct segments of behavior. For this reason, when knowledge activity is involved, there is always a more or less protracted delay between the appearance of the stimulus object and the performance of the final response. Such a delay is obvious when we consider that in such cases at least two different behavior segments are performed.

Specifically to characterize knowledge responses we will more

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sharply limn them by delineating their differences from ordinary meaning reactions. First, as we have already observed, knowledge activities constitute behavior segments as over against meanings which are merely single reaction systems. This primary differentiation of a morphological sort implies a highly important functional difference, namely, that whereas meaning reaction systems are always connected up, and therefore conditioned to a certain extent by some succedent reactions, knowledge behavior segments may be completely independent of any other type of activity. Note that this independence is not a necessary or essential feature of knowledge reactions. It does nevertheless constitute a distinct point of descriptive variation between meaning and knowledge behavior.

Secondly, knowledge reactions may be further described as secondary and derived modes of activity. They always presuppose a remoteness from original contacts with things. The very fact that they can be performed, however, indicates that the individual has had previous contacts with the objects to which he is at present orienting himself, so that the orientation responses are definitely derived from original contacts. It follows then that their degree of remoteness from original stimuli objects and the character of their derivation depend upon the number of contacts and the consequences of previous contacts with the stimuli objects arousing knowledge reactions.

Still another way to characterize knowledge activities is to consider them as status reactions rather than as processes of any sort. By this statement we mean that when an individual is stimulated by a knowledge situation his response consists in assuming a relationship or a status with respect to the stimulus object. The term relationship here is to be understood as signifying a more elaborate form of connection than is true in any other type of psychological response. It is a factual necessity of course that in every performance of a psychological activity the individual enters into some kind of relationship with the stimulus. In knowledge reactions, however, the person assumes the status of a knower or orienter with respect to the particular stimulus object. Hence the relationship involves a much more significant and cognizing contact with an object.

Succinctly, when an individual acquires a knowledge status response with respect to an object, that status is a very distinct form of condition or action, and depends of course on a number of factors including in a very prominent way the character of the stimulus, the person's previous contacts with it and his general reactional equipment. In enumerating the types of status into which the person enters in knowing activity we will resort to the apportionment of them into three distinct divisions.

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In the first place, we may assume that the individual becomes oriented with respect to the identification of some object, person, or situation. In performing such a knowledge reaction he becomes placed as to the character of the stimulus object, its various qualities, divisions, and the interrelationships between them. Again, knowledge behavior enables him to orient himself to the serviceability of an object, or its possible serviceability in various situations. If the stimulus is a person he knows his dependability or possible dependability. Similarly, he is oriented with respect to the capacities and the ways in which an individual will respond in feeling, thought, belief, etc., in various situations. The same type of status may be true to a certain extent with respect to objects.

In the second place, the knowing response consists of the individual becoming oriented with respect to the relationship between a certain object of knowledge and some other object. This may amount merely to an appreciation of the contextual arrangement of things with other things and conditions. Or in more intricate instances, this contextual relationship may consist of the acting individual placing an object or person in an event; that is, he realizes both their connection with other conditions and things in a particular situation and at the same time the particular periods in which those stimuli objects were involved in some way or did something, performed some action, etc.

Under this same type of relational orientation we note another form, namely, the appreciation of the symbolic character of objects. The appearance of a symbol of some sort may constitute the stimulus for the person realizing the relationship between this symbol-object and the knowledge or condition which it symbolizes.

Clearly, all types of relationships can become the cognitive stimuli for orientation responses. Among them we may mention the comparison relationships. The individual may become oriented to the comparative standing of some object or person with respect to another object or person. This comparison and contrast relationship of things constitutes a very large series of stimuli for orientation responses of all varieties.

Our third form of orientation status consists of the person's reactions to his own relationship to things and conditions. On the whole this type of orientation is more complicated than the others, and involves an introspective and retrospective attitude and oversight on the part of the person concerning the relationship of the particular stimulus object to his own past contacts with it. Without doubt knowledge reactions involving this third type of status are the farthest removed from any sort of performance and consequently may be looked upon as essentially contemplative in character.

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Psychological Bases of Knowledge Responses

Knowing reactions besides having their basis in all the elementary forms of psychological behavior involve other complicated psychological performances. We have already sufficiently pointed out that knowledge reactions are always implicit in character. In this sense they are derivative and remote, always operating in connection with substitute stimuli which refer the individual to the adjustment stimuli.

Knowing reactions are also very definitely based upon verbal activities. The orientation action may work out in terms of indefinite incipient and vestigial responses of all sorts but to a great extent they are built up on the basis of verbal activities. This basis depends of course upon the individual and upon the particular kind of knowing activities involved.

Memory activity in its turn serves as a very distinct basic factor in the operation of knowing behavior. For instance, the exact reference or placing of things in past situations and conditions is a direct outcome of memorial activity.

Probably it is unnecessary to specify that association also constitutes an important basis for knowledge responses, inasmuch as the association features are especially important phases of memory reactions and implicit activities of every description.

Knowledge as Specific Behavior Functions

Although knowledge reactions are clearly not performance responses, still they are probably most frequently interrelated with performance behavior.[1] In general, of course, the activity most intimately connected with definite orientation responses is more effective than those not so interrelated, especially when the behavior conditions require an elaborate appreciation of the situation. In this section we shall discuss some various types of interconnection between knowledge and other types of responses of both performative and non-performative varieties.

Incidental or Merely Awareness Knowledge Functions

As the name of this type implies we have here knowledge functions in which the performance of some action involves information of some sort. Such information serves in an incidental capacity to determine whether or not some immediate performance shall occur or what particular kind of performance. This type of orientational aid with respect to objects is concerned with elementary properties of things and the previous relation of the individual with such objects. To a great extent the present mode of knowledge function operates very prominently in contingential activities, situations in which some knowledge of the stimulus can be quickly utilized to enable the individual to respond effectively to some immediately arising situation. Still another way of describing this type of activity is to point out that they also serve as the mere awareness of some action about to occur or a mere appreciation of what has just transpired. In all of these inci-

[1] Here we have essentially a problem of individual differences.

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dental knowledge functions we have behavior segments distinctly different from the behavior segments to which they are related but occurring with them in specific behavior situations.

Prognostic Knowledge Functions

These knowledge functions operate in much closer relationship with some form of definite performance; so that the knowledge function may be instrumental in the modification of the action to follow or in the conditioning of the details of that future action when it occurs. In general, the prognostic knowledge functions operate in circumstances more important to the individual than the former type, and constitute a foresight with respect to various conditions of future action. Furthermore, the prognostic activities may serve to condition future performance on the basis of the individual's foreseeing of the consequences of an act, or his knowledge of the implications of certain actions. Such awareness of the circumstances involved, therefore, makes him prefer one sort of action to another. Prognostic knowledge reactions not only influence the type of action to follow them in any given situation, but also serve to modify the details of the succedent activity.

Diagnostic Knowledge Functions

With these activities we are introduced to a very complicated and deliberate type of awareness action which may be further described as a discriminative insight into objects or situations. Such reactions are very decidedly prerequisite to any form of important behavior. It is to be expected then that these knowledge functions are very intimately related to specific performances, especially to complicated and important sorts. When knowledge of this type is functioning the emphasis is upon the exact and detailed nature of things and conditions, information which is essential for the handling of those things and conditions. Illustrative of such insight knowledge is the awareness of symptoms on the part of the physician in order effectively to prescribe some means of modifying the condition of the patient. The more effective the insight the more capable are the activities to follow. Such effectiveness depends naturally on the profoundness of an individual's appreciation of the character and implications of the symptoms functioning as knowledge stimuli. Diagnostic knowledge functions imply a subtle appreciation of differences, a discrimination of kinds, also a comparative analysis of the stimuli objects.

Judgmental Knowledge Functions

Many very important and complex types of knowledge reactions operate as a basis for the further development of some decision, judgment, or inference concerning objects and conditions of various sorts. We have here knowledge reactions stimulated by objects which serve as bases for the formulation of some judgment or intellectual attitude concerning the character of the objects, and the action to be performed with respect to them. Either these judgments and decisions concerning knowledge objects lead to the

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possibilities of particular performances or to further orientative reactions. In the former case, we have knowledge reactions intimately related to performances but much more remotely than in the previous instances we have discussed. In the latter instances in which the judgment leads to additional orientation the knowledge reactions are of course entirely unrelated to performance behavior segments.

Speculative Knowledge Functions

Under this final heading we place those knowledge reactions which are definite materials for further actions, but these later actions are purely orientational and as such entirely disconnected from any overt performances. Speculative knowledge involves information of various sorts with respect to objects and actions related to further orientations. Also we may indicate the connection between speculative knowledge responses and various forms of æsthetic appreciation. In general, we may consider that this type of knowledge is connected only with activities we call contemplative. This knowledge, which itself constitutes a type of orientation, is related to additional more elaborate orientation circumstances in the form of details leading to an intellectual attitude. To illustrate, an individual becomes oriented to some specific features of his economic life and as a result the information thus acquired serves to orient him to larger economic principles or to his economic surroundings as a whole.

In mentioning these various forms of knowledge functions, we have been discussing both reactions to objects and conditions immediately present, and also to objects and conditions not in such close contact with the acting individual. Since knowledge or orientational reactions are always implicit in character, when the object is present we must consider it as substituting for itself in other connections, and with respect to properties and conditions not immediately available for contact with the acting individual.

In surveying the different types of knowledge reaction functions we find that there are various specific relationships between knowledge behavior segments and other segments with which they are connected. In some cases knowledge functions are parallel with other reactions. In other situations they either succeed or precede them. It is in behavior complexes in which the performance reactions are less dependent upon the knowledge reactions that the two types of action may parallel each other. But when the effectiveness of the performance depends upon the operation of the knowledge reaction, the latter must necessarily precede the operation of the performance. Succedent knowledge reactions operate ordinarily in cases in which the total reactional situation is contemplative and speculative, and in general when there is complete independence of the knowledge reactions of any performative behavior.

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The Origin and Development of Knowledge Reactions

It is to be expected that the great number and different varieties of our knowledge activities must have many and various origins. Also, each specific instance of knowing action must have its own development in the behavior history of the person. Now while it is impossible to trace out the genetic and developmental conditions of specific knowledge actions except in an extremely hypothetical way, still we may avail ourselves of some general principles applying to knowledge responses. Following this suggestion we will first point out that on the whole our knowledge actions originate from two large differentiable sources. One of them is the actual contact with objects and situations. The other is the indirect or secondary source of being told something by someone who presumably has had direct contact with the object or condition to which the knowledge responses refer. Naturally much of our information concerning particular objects or conditions may in this manner be removed by many degrees and even absolutely and entirely from actual contacts with things.

A. DIRECT SOURCES OF KNOWLEDGE REACTIONS

Knowledge Primarily Dependent Upon Stimuli Objects

In this source of origin we find that the knowledge or orientational reference which the person makes to objects or conditions depends upon certain prominent or important qualities or features which the individual observed while in some direct and immediate contact with those objects. Namely, some of our knowledge depends upon the fact that certain objects have had certain effects upon us, that they have done something to us, surprised us, injured us, or in some other way made themselves stand out as prominent factors in the series of our surrounding stimuli objects. Later these objects become stimuli for knowledge reactions and thus bring about reference reactions which inhibit some future activity. This is the source of the merely referential knowledge situation. A secondary or referential knowledge form of behavior is developed purely on the basis of the original stimulating features of the object. Naturally these elementary origins of knowledge reactions have to do with very definite adaptational responses which are determined by the actual objects to which the adjustments are made.

From this source of intimate relationship between objects and the acting individual we derive a whole series of remoter and more general behavior sources for other knowledge reactions. As an illustration of a source a little farther removed from the referential type just discussed we may cite the case in which for purposes of adaptation the person has to evaluate an object by referring it to some other object with which he has had a particular kind of successful, satisfactory, or still other sort of contact. True enough the source of the evaluatory type of knowledge activity lies also in direct contact with various things, but the element of comparison

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enters in to complicate the whole situation. It is not inappropriate to suggest here that while to a great extent knowledge reactions operate in much the same way as they originate, still, in the process of elaboration and growth of our behavior, knowledge reactions developed in a particular way may later operate in a very different manner with respect to psychological details.

Knowledge Primarily Dependent upon the Behavior of the Person and his Reactional Biography

Instead of originating primarily on the basis of the properties of things, or of the accidental securing of our attention, or because of certain consequences of our contacts with objects, some of our direct knowledge may have its source in our behavior equipment. Both the fact of having such direct knowledge and the specific kind of knowledge may be owing in the first instance to our own desires and curiosities. Normally such direct knowledge sources are more complicated and function in more elaborate behavior situations. On the whole also such origins lead to the development of deeper and more intimate knowledge concerning the stimuli objects of information reactions.

Thus conditioned by his needs and desires a person may be influenced to ascertain the qualities and conditions of things as well as the relations between them. In this way he discovers the likenesses and differences between the various objects to which he is thus learning to orient himself. Not only may such needs and wants influence the acquisition of knowledge reactions but also they may determine the kind of information to be acquired as well as the quantity and quality of such knowledge.

A very complex type of knowledge having its main source in the person's behavior equipment is the ascription of qualities to or evaluation of things which we might call descriptive orientation. Here the individual deliberately imputes qualities to objects and situations by asserting that certain similarities to other objects exist or by describing the thing in terms of some other thing. This orientational development proceeds upon the basis of the person's already acquired knowledge and other equipment and is very definitely influenced by the latter.

Another type of knowledge responses having their source in the behavior equipment of the person is the deliberate correlation activities whereby the person contrives various correlations between one thing and another, on the basis of his former knowledge. Because of what he has already learned in other and perhaps similar circumstances he may now attempt to discover or contrive all sorts of relationships between things. He may so orient himself to various factors in situations that the substitute and referential stimuli may stand for causal, serial, coördinate, and other relations. An example of this type of activity is the attempt to correlate certain general dysfunctional conditions of the person, let us say, with other factors such as temperature or specific metabolic disturbances. Another example is the attempt to correlate the ac-

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tions of the nervous system for instance with the ability to perform certain reflex responses. In cases of this kind what we have is new information based upon a contrived organization of various characteristics of the same object or references of one to the other.

By far the most complicated source of knowledge activity based upon both our needs and previous knowledge is the experimental situation in which we modify and transform objects and situations, by means of definitely known and appreciated techniques. In such manner we discover relationships between the original object and its transformed modifications as well as the processes by which these modifications and transformations are effected. Through this deliberate modification of objects and situations we achieve a series of conditions and objects which serve as symbols for the process of modification and the new product, as well as the old object. Here we have the development of new problems or objects, new in the sense that they did not previously exist in nature or were not previously known. This deliberate development of knowledge may have a definite source in curiosities we may have concerning such objects, in the possibility of deriving them from the original materials, or in our interest in the manipulative or experimental process itself. Such experimental knowledge may of course also have its roots in the person's needs for the new information or the new product.

In this last type of knowledge source we find that the referential functions are necessarily and most effectively mediated by language symbols as well as by other signs. For example, the transformation of properties of objects must be brought about by the averaging of observed results which must be expressed in mathematical symbols. To a great extent also, all deliberate contrivings of relationships between things in order that one can serve for another, are mediated by the use of language in various ways. In general, the use of language symbolism indicates that the knowledge activity is secondary and less closely related to natural properties or qualities of things.

B. INDIRECT SOURCES OF KNOWLEDGE REACTIONS

Informational Sources of Knowledge

Indirect or purely informational knowledge is more detached from actual conditions of things than any form of information derived from direct contacts with objects. Referential responses to things acquired through the imparted description of other individuals may be so far removed from any actual contact of the person with the knowledge objects that the information may consist of the remotest and farthest stretched analogies and possibilities. In many cases, of course, when such sources of reference are not present in one's own previous contact with things the actual sources of the knowledge under discussion may be located and confined completely in the other person's contact with the

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knowledge object. When an individual is informed of happenings in another person's experience we have an indirect knowledge situation which is closest to the direct knowledge sources.

The exact knowledge behavior in simpler situations consists in the performance of knowledge and information responses in the form of referring to similar events and conditions in one's own previous experience when stimulated by verbal signs connected with those events. Lacking such a connection between verbal signs and facts referred to, the imparted information cannot be appreciated or understood. Unless one has some situation in one's own experience to which the imparted description refers there is no understanding and the act of imparting information constitutes no source of knowledge. It is in this sense that one understands the meaning of gestures and grimaces which other people make by repeating them (in whole or part) to oneself. In some cases they can be comprehended only in this way.

In more complicated situations the imparted information involves materials further removed and detached from any resemblance to one's own actual contact with things. The entire situation then is conducted upon a symbolic plane. Naturally enough the situations and conditions to which the knowledge reactions are orientations may be completely theoretical and abstract problems or situations, having no direct connection with concrete events.

To a great extent we know all complicated things and events only in a thoroughly detached way and only in language and verbal terms. We may in many cases develop our two phases of knowledge stimuli, the referring and the referred to, exclusively in verbal terms. In other words, the thing referred to is a verbal formula while the referring stimulus is naturally the same sort of verbal material.

Degrees of Knowing

In two distinct ways do knowledge reactions differ in degree. In the first place, different knowledge responses vary from each other in the degree of the individual's orientation with respect to the object of knowledge. In the second place, the same types of knowledge reactions from the standpoint of orientation may differ with respect to the intimacy with which the person is in contact with the knowledge object.

Orientational Degrees of Knowing

In the simpler degrees of knowledge the individual does not appreciate very definitely the differences between the adjustment and substitution phases of the stimulus object. It will be recalled that since knowledge reactions are implicit responses the adequate stimulus is some object which substitutes for another object to which the knowledge action refers. Now in the simpler reactions the two phases of the knowledge stimulus may be functions of the same object; that is, an object may substitute for itself in some form. Here the person may still be performing a preponderantly adjustmental reaction to an object and the orientational features

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will be secondary. In general this means, then, that the stimulus object calls out very few referential responses. On the contrary, the behavior to the object is primarily overt, but is also reacted to at the same time with a knowledge reaction comprising very few orientational references.

This simple degree of knowledge activity may also be illustrated by orientation reactions not derived from prior overt activities, namely verbal knowledge which originates from informational sources. Students very frequently acquire knowledge of certain scientific facts or historical events primarily in verbal terms. For such a student there is no sharp differentiation between the word which ordinarily should serve as a clearly defined substitution stimulus and the actual fact or event substituted for. In this situation the substitute stimulus does not bring forth in the reactions of the individual many references to the adjustment knowledge object. As a consequence there are no elaborate or well-defined knowing reactions.

In the higher degrees of orientational knowledge the stimulational and adjustmental features of the stimuli stand out in bolder relief; so that the immediate reaction to the substitution stimulus feature calls out a number of references of various sorts to the adjustment stimulus. This situation prevails whether the stimuli features constitute phases of the same objects or whether distinctive objects serve the two partial functions.

The possibility for the expansion of knowledge referential functions affords the basis for more and more complex degrees of knowing. The degree of knowing depends upon the number and kind of references made to the adjustmental stimulus object. The complexity of the knowing, therefore, is directly proportionate to the number of references made to the qualities and conditions of the stimulus object, to its relations with other objects, and also to the actual contacts the knowing individual has had with the adjustment stimulus object. Further intensification of the degree of knowing is made possible by the inclusion of references to consequences of the contacts which the individual has had with the adjustment object. In the most intense degrees of knowing the individual himself serves as a fertile source of reference for his own orientation to the knowledge object. Such references point to his connections with things in such a way as to include whatever connections exist between the objects of knowledge and the person's reactional equipment, his memory of the objects, his skills and techniques with respect to it, as well as his ability to describe it or perhaps change or improve it.

Contactual Degrees of Knowledge

Our second type of degree of orientation refers to the present intimacy of the individual's relationship to his stimuli objects. Whether the reaction constitutes a simple or complex orientational response is a direct issue of whether the individual is very inti-

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mately or less intimately related to both adjustmental and substitutional phases of the stimulus. To be plainer, the reacting individual may orient himself with respect to an object in a detached way. He may know the object to which he is reacting with all its implications and yet his activity will be colorless and not very intimately concern him. Or just the opposite, the reactor may inject himself very intimately into the present orientational situation and as a result place himself closely in contact with the stimulus object and conditions.

The differences between knowledge of equal degrees of orientational character, but of different degrees of the person's contactual intimacy with the stimuli objects, may be well illustrated by the knowledge one may have of some abstract fact or of some personal circumstance. One may know equally as much about the chemical properties of a substance as about the present immediate behavior of one's child in school, but with what a difference in one's own connections with the two knowledge objects.

Degrees of intimacy with knowledge objects undoubtedly depend upon the presence of affective factors in the knowledge response. Also such degrees of intimacy are contingent upon the equipment and training of individuals. Strangely enough there are persons who are more intimately in contact with abstract knowledge objects than with objects of an intimate personal sort. A scholar, for instance, may be in a much closer knowledge contact with his immediate mathematical problem than with the hygienic condition of his children.

To a certain extent there is a definite correlation between the orientational and contactual types of degrees of knowing. As we have already seen in describing the former, the very conditions of the orientational response presuppose that the individual takes a large part in the knowing situation. In consequence, it is probable that the performance of such complicated knowing reactions must always take place while the person is in intimate contact with the stimuli. This means in effect that probably our most complex orientational responses must be definitely personalistic in character. The distinction between orientational and contactual degrees, however, in the simpler knowledge situations is clearly marked off and observable. Also, it is not improbable that human individual differences reach so far that some persons may be more intensely related to knowledge objects of which they know less, than to other things of which they know infinitely more.

Stimuli and Stimuli Settings for Knowledge Reactions

In our description of knowledge responses it has been necessary to point out at the same time most of the characteristics of knowledge stimuli. Briefly we might now sum up some of the outstanding features of such stimuli.

The simplest type of knowledge stimuli are those in which one feature of an object serves as a substitute stimulus for orientation

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reactions to some other features of the same object. These two phases of the knowledge stimulus may be considered to be either a whole object and its parts, a thing and its qualities and properties, the visible and hidden features of a thing, or a person and his reactional or biological traits.

In more complicated stimuli we find the two stimuli phases consist of two entirely different things. One indicates, stands for, points to, or implies some other thing. To illustrate, one object or condition may be the cause or effect of another object or condition. Or some other very significant relationship may be the basis for a reference made to another stimulus object. Taking personal stimuli as an illustrative type, one person may be the parent, child, or brother and at the same time stand in some other relationship to that related individual—a hostile one, for instance. In such a case the references providing the orientation may be to the other related individual, as well as to the type of relationship between the two persons. Here we have a reference to an intangible object (the relationship) and a tangible one, namely the other person. Again, the orienting references may be constituted of some person, some thing, or various events and conditions in which they were involved or might be involved.

Still other stimuli consist of an object or person in one setting calling out orientating responses to the same object or person in another setting. It happens that in knowledge reactions, the settings constitute more intimately related features of the total stimuli situations than is true in other kinds of behavior complexes. These settings, therefore, constitute common sources of knowledge references.

Considerable light is thrown upon the nature of knowledge stimuli by the distinction between natural and contrived connections of the stimuli phases of knowledge objects. By natural connections we mean the actual relationships between a single thing and its properties and between different things and their respective properties which exist in nature. Thus, we have as a matter of fact a whole-part and causal relation which we come upon by way of casual discovery or actual investigation. Such relations between things have existed, of course, prior to any investigation. In other words, some objects have meanings of their own, that is to say, they have significances, relationships of which we must apprise ourselves but which we do not create in any sense. The values which things have for particular purposes are derived from their relationships and constitute the natural stimulational basis for our knowledge. Such natural values are the tensile and ductile properties of metals, the displacing properties of various materials, the uses and possible uses of things, etc. The significant point here is that certain objects in nature carry within themselves various properties serving to make possible and even neces-

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sary a differentiation in the object between its immediate stimulational function and its referential one. Of the many varieties of natural relations between the functional phases of knowledge stimuli some belong to things and conditions in the physical realm, whereas others are found in the social domain.

Contrasted with these different sorts of natural relationships we find innumerable related stimulational functions which are definitely contrived. Typical illustrations are the names we set up as symbols of objects or persons and still more abstract symbols for things, such as physical, chemical, and mathematical notations and formulæ which are presumed to signify various specific concrete or abstract things, relations, etc. Also present among symbolic relationships between objects, are the various mediations of things, such as the symbolization of certain conditions by the movement of the mercury in a capillary tube as used in the various manometers, thermometers, etc.

In general, we might point out that the stimuli for knowledge activity may consist of any object or situation which is complex enough to afford the basis for orientation responses. These may be natural or imputed properties, natural or contrived relations of various sorts, or natural or contrived circumstances of existence. Wherever we find objects with differences so that one may substitute for the other we have a potential knowledge stimulus. As a matter of fact, then, we might indicate that whatever object or event, condition or person can serve as a stimulus for psychological phenomena at all, may also constitute the stimulus for a knowledge reaction, since it is almost inconceivable that any actual psychological stimulus object should not afford occasion for orientational reactions.

In concluding this discussion of knowledge stimuli let us note that, for psychological purposes at least, the meanings, values, or significances of objects in most cases may constitute qualities or properties of those objcts in exactly the same way that colors or textures are inherent features of objects. As such the various significances of a thing may be considered as having as natural a connection with the object to which we refer them as the causal or other relationships have with things.

Intimate Reactional Processes of Knowledge

Following upon the consideration that knowledge reactions consist of reference responses to an indefinite number of different objects and conditions appears the fact that the specific morphological character of these references must be very different in different knowledge situations. Accordingly in any case of knowledge activity we might pursue the question as to what specific kind of reference is made to the adjustment stimulus. The answer elicited by this question is that our knowledge reactions comprise many forms of specific behavior mechanisms. The specific type of reference mechanism depends not only upon the kind of thing

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to which we are orienting ourselves but also upon the various relations of this thing to other things, as well as to our interest in the thing and the orientation. For illustrative purposes we might consider a few different morphological types of knowledge reactions.

In the first place, we will treat the knowledge mechanism involved in references made to qualities and shapes of things, and other concrete characteristics and properties. Since in such cases the knowledge or the orientation is in terms of how a thing looks, tastes, or smells, the mechanism consists primarily of activities which we have called image responses. In other words, the arousing phase of the dual stimulus calls out a reference to some kind of color, shape, size, texture, odor, or temperature of an object in terms of a vestigial reaction to such things made in some past time. For the most part such knowledge responses occur in situations in which the orientation is primarily referential and not so much evaluational. Clearly, then, such mechanisms are involved predominantly in simpler situations.

Another very important type of knowledge mechanism, both referential and evaluational, with perhaps a tendency toward the latter, involves reactions which are made to a certain extent in terms of various affective attitudes called out by the individual's previous contact or present relation to the object. Manifestly, the objects involved in such knowledge situations are things, events, or persons, capable of arousing such evaluational or referential reactions. An excellent illustration is the knowledge response to some art object. In such an instance our knowledge of the object is heavily charged with affective factors.

A still different type of knowledge mechanism is the reference to or evaluation of some kind of machine or process. At once we observe that this knowledge reaction involves many overt movements comprising a reminiscence of the actual manipulation of the object. Probably in most cases whatever movements constitute the features of the knowledge reaction, are vestigial remains from actual previous contacts with the object now referred to or evaluated.

As a final illustration of the different mechanisms of knowledge activity we suggest the case in which the complete knowledge reaction is performed in terms of verbal responses or other modes of indirect adaptation. The whole situation is handled in terms of descriptions and verbal explanations in a variety of ways. With this form then we adapt ourselves probably to the most complicated of all the conditions or things to which we adjust ourselves in a cognitive way.

Considering the enormous number of possible knowledge situations it is only fair to assume that every form of implicit mechanism will serve, either alone or in combination with other types,

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to constitute referential or evaluation orientations to our surroundings.

Individual and Institutional Knowledge

Knowledge as orientational responses to things, whether considered as merely referential or evaluational, may be distinguished on the basis of whether the action is individual or institutional in character.

By individual knowledge reactions we mean referential or evaluational responses to things or conditions developed in the person's private experience with various stimuli objects. Further, when such responses operate they are performed as personal and individual adjustments to things. To a great extent we find that knowledge reactions of the individual type are more often connected with stimuli of an everyday sort than is social knowledge. In addition we may safely say that in most instances individual knowledge reactions are concerned with the actual natural properties of things rather than with any sort of traditional or group evaluation of them.

As compared with individual knowledge reactions, institutional or group knowledge is usually not developed in the personal experience of individuals but represents a person's accumulation of references to and evaluations of stimuli objects through the influence of other individuals upon him. In different words, institutional or group knowledge implies reacting to things in an orientational manner on the basis of conventions of various sorts, conventions developed through the influence of individuals on each other in certain localities or intellectual levels in given communities. As in the case of individual knowledge behavior, knowledge reactions of an institutional or group sort may include evaluations of natural objects and their properties. The large mass of institutional knowledge, however, comprises actions to all kinds of things and conditions which do not have any natural basis. This type of knowledge is secondary and represents an accumulation of secondary evaluations, rather than actual references to specific qualities, values, or meanings of particular things. The accumulation of institutional knowledge reactions in the individual behavior equipment goes on in the same way as his acquisition of reactions of worshipping, believing, and otherwise habitually acting to things and conditions in conformity with the activities of other individuals.

It is not unimportant to indicate that individual knowledge reactions are ordinarily merely specific responses of persons to things. In contrast, institutional knowledge may be thought of as representing actions which, since they function as the accumulated possessions of some particular group (in behavior form of course) are also stimuli in a definite sense. In other words, group knowledge or conventional evaluations of things serve as institutional stimuli. In this sense they are available to every member

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of a given group for adoption as orientational reactions. When thus taken over such reactions constitute common ways of reacting to given objects and conditions. Institutional knowledge, therefore, forms the substance of the way whole sets of people respond cognitively to nature and natural phenomena, to government, economic surroundings, political arrangements, and personal relations of all sorts.

As a final comparison of social and individual knowledge behavior it is illuminating to note that on the whole the latter consist of simpler reactions and situations than do cultural orientation functions. This pragmatic division, however, must not in any sense be considered as a very binding one, for there is no essential necessity governing the differentiation. The most intricate meanings and evaluations of things may have to do only with the intimate experiences of some particular individual. This fact is illustrated by the work of the scientist in which to a certain extent the individual worker himself is in possession of some of the most complicated orientation responses to natural properties of things. On the other hand, the social responses that afford an individual evaluations of other persons and conditions, may be taken on without any appreciable effort on the part of the individual and on the whole the behavior situation may be exceedingly trivial.

Influences upon the Operation of Knowledge Reactions

Because knowledge responses consist of indirect orientational reactions they are subject to many influences in their operation, influences which may have considerable effect upon the character and validity of knowledge situations. These influences appear both when the knowledge stimuli are tangible objects and when they are propositions or other informational stimuli.

Let us consider tangible objects first. The mere fact that the knowledge response is always a referential action in which the person is not in direct contact with the object, means that orientation with respect to or evaluation of a thing may be determined more on the basis of what has been heard or is believed to be known concerning the thing than upon what the individual has actually discovered in it himself. This fact is the basis for much misinformation concerning the character of events and things. No better illustration of the possibility of such misinterpretation can be cited than the palpably precarious character of testimony,—especially under stress of an examiner's questions.

Turning to the kind of knowledge which has for its stimulus intangible things, or information concerning tangible objects, that is to say, secondary reports of contacts with objects, we find that here the chance for conditioning the knowledge reaction is manifest. The susceptibility of such knowledge activities to extraneous influences is demonstrated by the inclusion in such informational

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reactions of many references, not actually found in or implied by the stimuli. In other words, the reacting individual may become oriented with respect to the stimulus object in a way which is not at all warranted by the character and properties of the informational stimulus.

Two outstanding consequences follow from the fact that our knowledge reactions are subject to many influences in their operation. In the first place, knowledge may vary in efficiency. As we should expect the sort of knowledge that is less liable to extraneous influences, and which in consequence consists of orientation with respect to the actual character of the knowledge object, is much more effective. This effectiveness applies both to situations in which the knowledge or orientation functions to mediate some further performance and in those in which they serve a purely orientational purpose. In this connection it must not be overlooked of course that a great number of compensations are possible. To begin with, no exact knowledge may be necessary in a given situation, or the lack of actual references when required may be balanced by some other factor.

The second consequence ensuing from the fact that knowledge may be conditioned by extraneous influences is that our informational responses vary in accuracy and validity. It is possible that our knowledge or orientational responses to things may not be representative or descriptive of the character of the stimuli objects. That is, the references may belong only partially to those objects. Distinctly we have here the basis for the differences between true and false knowledge. True knowledge constitutes references to the actual characteristics of the knowledge object, its strength, beauty, and so forth, while false knowledge refers to references to such qualities which are not actually found in the stimulus object but are unwarrantedly attached to them.

Among the numerous specific conditions influencing the character and validity of knowledge reactions we may mention the inadequacy of observation. The individual in his primary contacts with things may not observe accurately the characteristics of the stimuli objects and as a consequence his orientational responses are such that they will not conform very closely to the characteristics of the knowledge object. The validity and effectiveness of our knowledge may likewise be influenced by the inconstancy of observation in the sense that the individual does not observe closely enough or long enough to discover that the qualities of the object vary, or that at some particular time certain conditions hide or modify various specific qualities or all the qualities of an object. In these latter cases we might suggest that the influences upon the validity and effectiveness of knowledge may be considered as primarily stimulational in character, although of course the ob-

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servation as preparation for orientational responses must be considered as the actual influence. It is clear on the whole, then, that in this paragraph we are pointing out types of knowledge reactions which have to do with tangible things and events.

Decided influences upon our orientational reactions, both those having tangible objects as stimuli and those constituting reactions to intangible and informational stimuli, are the person's needs of various sorts. These needs condition the phases of objects which will be reacted to at the time and under the particular circumstances. In this way his entire orientational response for the object involves essentially specific selected features, although his knowledge equipment may consist of many more response items of various sorts. From the standpoint of effectiveness of responses, activities so influenced may prove much superior than others. It is clear, however, that as thoroughgoing orientation reactions such influenced responses will be entirely inaccurate.

Similarly, the interests of an individual and his present knowledge status may have a very decided effect upon the operation of his orientational responses. As we have seen in a former section such influences constitute the sources for the original development of knowledge at all, and so obviously the accuracy and effectiveness of such knowledge must be equally conditioned.

Other potent influences upon the operation of responses, especially to information, are various circumstances concerning our informer. If he is a person greatly admired or respected our knowledge responses to the imparted information functions more readily and intensely. Also the authority and the previously ascertained general accuracy of our informants influence the confidence with which we employ such information as secondary adaptations to the knowledge object.

Among other of our reactions having definite influences upon the operation of our orientational responses we may enumerate such actions as rivalry, envy, aspiration, etc. These activities and many others play a definite part in the way we orient ourselves. To illustrate, while our own group is at war with some other group our knowledge of the enemy group tends to limit itself to conditions and circumstances which are most favorable to them. At the same time our orientational responses with respect to our own group consist of references mainly to conditions and circumstances which increase its standing and value. Under such circumstances the way our knowledge actions operate is entirely out of proportion to the actual knowledge equipment that we may have acquired with respect to the knowledge object. This disproportionate relation exists entirely irrespective of how well our original knowledge acquisitions correspond to the actual character of the knowledge object.

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Classification of Knowledge Activities

Orientation reactions may be differentiated from each other on the basis of type of orientation and the knowledge status attained with respect to the stimulating object. As a criterion of orientation status we might consider whether the knowledge reaction is primarily referential or evaluative. Accordingly we may isolate four types of knowing behavior.

(1) Cognizing

This type of activity, which may be considered as the simplest form of knowledge, consists primarily of a referential form of orientation. The knowledge status that the individual attains to is that of an identification of an object. The individual becomes oriented primarily because he is able to distinguish the object from other objects, but the emphasis of course is on the isolation of the present object on the basis of its qualities and conditions which are referred to in the cognizing activity. As an aid in describing the cognizing type of action we might point out that it constitutes much the same sort of cognitive reaction to objects as the perceptual responses, with the difference, of course, that cognizing reactions are referential in character and are not immediate reactions to the qualities and properties of things.

(2) Recognizing

So far as complexity is concerned these activities are precisely like those of the previous type. On the whole they represent referential activities, the identification of objects and conditions. The primary difference between these two consists of the fact that in the recognizing responses the orientation is primarily temporal in character. The orientation consists of a placing of the individual with respect to the object with which he has been in contact before. This recognizing orientation is independent of the qualitative character of the objects. Whatever the object may be the individual merely becomes oriented with respect to it in a temporal way. It is this thing that I have known before or with which I have had previous behavior connections. In the recognitive orientation response there is no specific or detailed reference to the kind of thing that one is reacting to. The emphasis here is primarily upon a delayed reaction, the latter phase of which constitutes an identification response.

(3) Appreciating

Here we have a type of knowledge orientation which is somewhat more complicated than cognizing. In this case the individual's orientation consists of an elementary form of evaluation. The simplicity of this evaluation consists in the ascertainment of some relation with respect to some other object. Here we have a type of classification or definition of the stimulus object in terms of related objects and situations. Such classification or defining reactions may involve a comparison or contrast of objects and in general a placing of one object with respect to other objects and conditions related to it in some form. The degrees of appreciation of objects depend of course on the number of references we have

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already initiated, namely, the number of things and conditions a present object is connected with.

(4) Understanding

Our fourth type of knowledge action constitutes a more profound form of orientation with respect to objects. Chiefly, it consists of an understanding of the intimate relations which a person has discovered or contrived concerning some stimulus object. In general, the understanding form of knowledge response embodies an appreciation of a connection of objects with certain principles of development, operation, or existence. Probably the primary factor here is the evaluation or assessing of an object or estimating it in some way. Upon the basis of the principles we have just been suggesting the orientation may go on in a very complicated fashion with hardly any limit to the degree of its intensity.

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Knowledge reactions have appeared to be among the most resistant to observation as objective phenomena. Consequently, in the entire psychological literature there is remarkably little in the way of materials which deal with knowing, or in general with implicit actions as natural facts. Accordingly, the materials of knowledge and implicit reactions comprise one of the strongest positions of spiritualistic psychology.

Because the phenomena of knowing constitute activities which are not grossly observable such as the activity of picking something up, or walking, they have been considered in the history of psychological thinking not as actions, but rather as some sort of existence or entity usually referred to as states of consciousness or states of awareness. Frequently, however, in an endeavor to avoid bad appearances, thought and implicit reactions have been dignified by the application of the term process.

With the recent development of the objective movement in psychology this situation has undergone considerable modification; so that knowing begins to take on the complexion of an activity of the person. However, in the excessive heat of the mentalistic and behavioristic controversy, thinking was discussed as though it were an operation of the bodily organs and especially of the laryngeal structures. This latter view developed as part of the general attitude that knowing and thinking are exclusively verbal activities.

In consonance with the general organismic attitude of this work, we cannot treat knowing as anything but an interacting activity of the person with his surroundings which offer specific knowing stimulation. Therefore, it is far from exact to think of knowing as something the individual does quite aside from stimulation by surrounding stimuli objects. On the contrary, every detail of a knowing act, as well as its origin and present initiation, is a direct function of the stimuli surroundings and circumstances.

Another point remains. We have attempted to limn the perspective for the study of knowing reactions without specifying that as a matter of fact neither in the old spiritualistic nor in the newer behavioristic psychology has any very definite distinction been made between knowing, thinking, and other related activities, although when we study human actions, as specific forms of concrete, stimuli-response interactions, we find each form that can be

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isolated to be entirely different sorts of conduct. In the foregoing discussion such a distinction has rigidly been preserved. In the present chapter we have treated only actual knowing responses, reserving the study of thinking, reasoning, and other related activities for their apportioned places in the second volume.

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CHAPTER XIV

THE NATURE OF VOLITIONAL CONDUCT

The Problem of Volitional Conduct

Every human individual performs a great number of complex actions which represent more or less cautious contacts with stimuli objects and appreciation of their character. Unfortunately, however, these activities have never been isolated and individually described. Rather, they have been grouped under the heading of volitional or voluntary action. Now it is our belief that the ordinary description of volitional actions not only involves characteristics not possessed by some of these reactions but also includes delineations of qualities possessed by voluntary actions.

In the present chapter it is our purpose to differentiate between volitional action and voluntary behavior and to describe in detail the former.[1] To us it appears indubitable that what are traditionally called voluntary and volitional behavior (these terms have always been used synonymously) consist of at least two entirely different types of action.

While we plan to divide what is traditionally called voluntary behavior into at least two named classes, to wit, volitional and voluntary, we do not at all pretend that we can reduce to only two kinds all of the adaptations that are ordinarily called voluntary (or volitional). It is possible that even the subclasses of volitional behavior alone, which our analysis will reveal, ought to be considered as independent types of psychological phenomena.

By way of justifying our separation of voluntary action from volitional behavior we will attempt to point out some salient differences between the two.

Voluntary action is typically the response to a definite problematic situation. Accordingly, the response pattern of voluntary behavior includes a choice of action, a definite preference with possibly a precurrent decision and even a complete reasoning act. These choice and deliberative responses are completely absent in volitional behavior. Again, voluntary action as a type is manifestly more complex than volitional behavior, for it is probably (especially when it involves a precurrent, reasoning action) the most complicated of all human action. Further, by stating that voluntary action involves reasoning factors we have implied that its patterns are replete with implicit actions of all sorts and with

[1] The latter will be treated in Chapter XXV (Vol. II).

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self-communicative language, and in these respects are different from the actions we call volitional, although it is not unlikely that they merge into each other at some point.[1] Also, voluntary action may involve genuine delay of behavior, the postponement of an action until a future time, while volitional reactions, as we shall presently indicate, occur in their completeness immediately upon the first presentation of the stimulus.

The Nature of Volitional Action

In general, volitional responses constitute very complex forms of behavior occurring under shifting and flexible conditions, or when a number of conditions must be reacted to at the same time. Characteristically, therefore, volitional reactions involve a number of auxiliary responses in addition to the final action. Because we must be dealing here with a single act of psychological adaptation (behavior segment) we call the final adjustment the definitive or consummatory response. The volitional behavior segment, then, consists on the response side of a definitive response (batting the ball) and other precurrent reactions (in part responses to auxiliary stimuli, stance, arm and hand movements, head actions, eye movements, etc.). Let us be sufficiently cautious here to observe that the volitional reaction pattern as compared with other types, contains precurrent reaction systems in addition to the ordinary attention and perception reactions characteristic of every behavior pattern.[2]

To be concise, a volitional reaction is one in which some other acts besides the definitive response must be performed in order that the definitive response itself can occur; as when one must go somewhere, or stoop down in the place where one is located to pick something up. Or else, the reaction involves the use of instruments or apparatus which have to be reacted to both *per se* and also as means to accomplish the larger action to the adjustment stimulus. Here the volitional action is illustrated by aiming a gun or writing with a typewriter. Not only is one reacting in these cases to the person to whom one is writing, or to the object at which one is shooting, but also to the typewriter or the gun.

Coincident with the operation of several responses in the volitional behavior segment, we find in such situations more than one stimulus. We discover here no exception to the fundamental psychological principle that each response system must have its own particular stimulus. Accordingly, volitional behavior segments comprise a series of auxiliary stimuli besides the adjustment stimulus. The latter correlates with the definitive response, while the

[1] Our sixth subclass of volitional action comes close to being a voluntary response.

[2] A habit response, for example, involves (1) an attention act, (2) a perceptual reaction system and (3) a simple or complex final action, but the volitional response involves in addition meaning and auxiliary reactions. See p. 424 ff.

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auxiliary stimuli are connected with the auxiliary responses. In our aforementioned illustrations the gun or typewriter are auxiliary stimuli, that is, auxiliary to the adjustment stimulus, the target aimed at, or the person written to. As we shall presently have ample occasion to observe, the preceding precurrent reactions may serve as stimuli to succeeding responses.

Volitional reactions may also be considered as detached or somewhat removed from the stimuli. Because much preliminary or precurrent behavior must take place before the final responses operate, such consummatory reactions have the appearance of being detached from their correlated stimuli. Moreover, there may be great variance between the definitive and the auxiliary reactions; so that the same sort of auxiliary acts may be connected with entirely different definitive responses; consequently this fact adds to the remoteness of the consummatory responses from the adjustment stimulus. Such remoteness does not imply a genuine temporal discontinuity of stimulus and response, since, far as the final response may be removed from the adjustment stimulus in time, the intervening activities are directly in line with the final activity. For this reason we might say volitional reactions are durational activities and not delayed. It must not be overlooked that besides some phase of the response starting immediately upon the appearance of the stimulus the other phases follow directly until the conclusion of the particular behavior segment under discussion.

Possibly by far the most intrinsic characteristic of volitional behavior is that the definitive response when it finally occurs is definitely conditioned and directly determined by the preceding auxiliary reactions as well as the objects and conditions constituting the stimuli to those reactions. All this is of course in addition to the determining of the consummatory response by the adjustment stimulus or its setting. Consider that the foremost differentia of volitional responses is that because the stimulus situation shifts or is flexible the final response is indeterminate until it is conditioned by the auxiliary stimuli objects and conditions.

The precise mode in which the precurrent responses condition the final or definitive response differs in the numerous types of volitional behavior which we daily and hourly perform. In some cases, and these the most simple, the definitive action is preceded by some single overt act, placing the person in closer contact perhaps with the adjustment stimulus, as in the case of approaching a picture to look at it more conveniently. In such an instance the precurrent movement or action may be considered in function very closely analogous to the attention reaction which precedes the perceptual behavior system in an antecedent phase of the total behavior segment, although in volitional behavior the precurrent action is ordinarily connected with a performance and not a

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knowledge act, namely, the consummatory action.[1] These volitional precurrent actions may be responses to the original adjustment objects, since the same natural objects may encompass a variety of stimuli, or they may be responses to auxiliary stimuli independent of the adjustment stimuli. In the former cases they must be closely integrated with the other precurrent actions and the final reaction in the behavior segment.

In contrast with this simplest case, volitional reactions may be conditioned by series of precurrent responses that have been in previous circumstances connected with both the stimuli conditions and the definitive action which reappear in the present behavior segment. Such a situation as this we may look upon as a middle stage in the hierarchy of volitional reactions: middle stage, we say, because the determining or conditioning character of the precurrent response is owing to an actual previous contact of the person with the same general stimulating conditions, while the most complex reactions in the volitional series are those in which the person performs actions precurrent to the definitive response and which constitute full and direct anticipation of that final response. Exemplifying such behavior are the activities of a mechanic, say, in inspecting or assembling a complex standard machine. It is such actions as these that deserve the name, if any do, of purposive behavior.

Our most intricate volitional action situation is illustrated by the moves in playing chess. The play of the opponent is the stimulus to perform a definitive act (move), but this act is also conditioned by the status of the board at the time. This illustration we use because there can be no question concerning the anticipation of the player's act, since, as a matter of fact, he also anticipates the move of the opponent.[2] Now this knowledge reaction preceding the final act operates in no other way than to anticipate the final response; there is no deliberation and no problem solving. When such processes do occur, however, the behavior segment is much more complex and deserving of a different name; in fact, such more complex reactions we call voluntary action.

Still another way to characterize volitional reaction segments is to point out that they invariably involve meaning responses of a greater or lesser complexity. In fact many of the precurrent responses above referred to are such meaning reactions. Sometimes these meaning responses are simple overt reactions, while in other cases they consist of definite, complex, implicit behavior of various sorts. Moreover, in the more complex volitional responses many

[1] This does not mean to say that the consummatory response cannot be an informational reaction.

[2] We assume in this illustration that the conditions are not so definite that an actual choice has to be made, for in that case we should prefer to call this a full-fledged voluntary action.

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meaning reactions may operate, whereas in the simpler types one or only a few may function. Of such meaning responses and their operation are constituted whatever is meant by foresight of the final phase or the complete volitional reaction pattern.

The Volitional Behavior Segment

Upon examination a volitional behavior segment reveals immediately a number of striking marks which differentiate it and make it stand out as a unique type of behavior.

In the first place, a volitional reaction system is so complex that in the more complicated sorts it involves as much action and adjustment as would ordinarily be comprised in several and even many behavior segments. In a genuine sense, then, volitional behavior segments are compound and may be said to consist of a number of component segments. In view of the final adaptational connection between a stimulating situation and a response, however, we cannot say that there is more than one behavior segment in the whole situation.

In the second place, volitional behavior segments are phenomena of occasion. The total activity, though not the detailed adjustments, is improvised through the influence of the specific environing conditions (adjustment and auxiliary stimuli) at the time. We might look upon each behavior pattern as a unique combination of response factors, all of which, operating in conjunction with their connected stimuli, amount to an original form of psychological adjustment. In this respect volitional responses are most sharply marked off from habit responses, although the latter frequently attain an amazing complexity.

Only the total combinations, however, are unique, for the objects reacted to in volitional behavior are after all familiar to the person. It is only the particular arrangement of them which makes the total reaction original. This situation is dissimilar from the one we find in imagination and reasoning action segments, for in these activities the stimuli objects are not merely adjusted to but are recreated in a distinctly new manner. Likewise the final acts in these cases are unique and may be said to be developed in the particular situation in which they operate.

Both the flexibility and complexity of volitional behavior segments are owing to the fact that because the stimulus conditions are uniquely organized, the final or definitive response must be determined and conditioned by the whole series of environing circumstances (stimuli) and not merely by the adjustment stimulus. In consequence, the person performs many and diverse activities between the time he is first stimulated by the adjustment stimulus and the time he performs the final or consummatory response. The necessity to meet all the conditions impressed upon the acting person by the various auxiliary stimuli, complicates and makes each volitional reaction unique.

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The Operation of Volitional Action

Just as in every complex case of psychological behavior, volitional reactions comprise the operation of a definitive final response (securing paper for instance) to some adjustment stimulus (say, the need to get the paper). But we have seen that the definitive action is not only conditioned by the adjustment stimulus but by other stimuli and actions and as a consequence numerous specific modes of operation are possible, depending upon the precise conditions of the situation. Just how our illustrative act will work out will depend upon whether the paper can be secured by merely extending the hand, or whether the person has to go to another part of the room or to an entirely different room to get it. It depends also upon whether the person knows precisely where the paper is, or is only acquainted with that fact in an indefinite way. In general, we may say that volitional reactions differ from each other in the matter of how closely the anterior meaning responses (directing oneself or moving toward the paper or the place where it is located, or naming the place) are connected with the definitive response (specific movement of securing the paper) and with the necessary interpolated reactions (getting ladder, opening cabinet, etc.), besides of course varying in the specific identity of the stimuli and responses involved.

In the sort of illustration we have used, and even more in increasingly complex situations, must the descriptions of how volitional actions operate take account of how the adjustment stimulus (need for paper in our illustration) initiates a meaning reaction (movement or set toward the paper or knowledge of its location, conditioning all later action), which is also partially conditioned by auxiliary stimuli (location of paper). Also, such a description must take account of how the auxiliary stimuli (floor, chair, door, ladder, cabinet, etc.) initiate and condition intermediate reactions (going into other room, opening cabinet), which in turn condition the consummatory response (getting paper) in common with their own (auxiliary) stimuli; and finally how the consummatory response (initiated by the adjustment stimulus) through the meaning reaction, which in a sense represents it while at the same time conditioning it, determines to a certain extent what the intermediate actions should be like and also which of the surrounding objects should be auxiliary stimuli.

But let us observe that here we are considering a case in which the final or consummatory response of the behavior segment is itself a fairly simple action. We can well imagine how much more complicated the situation is when this definitive act is itself a complicated behavior such as the solving of a technical problem or the drawing of a plan.

Yet in spite of the great variety and complexity of volitional behavior we may still isolate as a general characteristic of such action at least three stages or types of operation, each of which we

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may discuss separately. These types we may sum up as follows: (*A*) the initiation of the meaning factor stimulated primarily by the adjustment stimulus and secondarily by the auxiliary stimuli, and operating in direct conjunction with the definitive response or through the intermediation of auxiliary responses; (*B*) the functioning of the auxiliary reactions in connection with the preceding meaning reactions and the following consummatory response; and (*C*) the operation of the definitive final response.

(A) The Meaning Factors

As soon as the stimulus appears the volitional reaction begins; but, as we have seen, these reactions operate, under shifting and relatively indefinite conditions, so the definitive response must be preceded by other and aiding reactions. In everyday speech we would say that the person must discover and know what to do under the present circumstances. Our interest here is to point out that we have movements or other acts initiated at once, which acts belong to the volitional pattern of response but are not the definitive reaction system. In every case, however, they are not merely parts of the behavior pattern but condition the later parts. To illustrate, I perceive the tennis ball coming toward me and my definitive act must be the placing of it at some definite point on the opposite side of the court. Now before I can accomplish the necessary act I must discover the best way to strike. This anticipatory knowing action consists of various movements of the person preceding the specific striking act.

Now such reactions as we have been indicating, which function to determine the future or further operation of other reactions, are meaning responses. And while they may not always be open to the observer's inspection, as is true of all subtle implicit meaning reactions, they are nevertheless always components of volitional behavior segments. These meaning responses need not always be clearly prior in action to the other two phases, but may in some cases operate practically or quite simultaneously with the auxiliary reactions and possibly almost simultaneously with the definitive response also.

Precaution must be rigorously observed to the end that we do not confuse these meaning reactions with perceptual responses that always have a place in every complex behavior segment.[1] Perceptual reactions are indeed themselves meaning responses of a sort, but are quite distinct from the type under discussion. The volitional meaning responses which we are now describing are determining or conditioning reactions operating in addition and posterior to the perceptual responses. In general, we may distinguish between the perceptual and volitional meaning reactions by observing that the former are more closely connected with the

[1] Reflex responses, for example, comprising as they do a single reaction system only, involve no separate preceding perceptual reaction system.

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adjustment stimulus while the latter are more definitely integrated with the definitive response.[1] The distinction between the perceptual and other latterly occurring meaning reactions may well be illustrated by indicating that whereas the perceptual reaction constitutes the person's awareness of the identity of an object, the other meaning reaction comprises his appreciation of what to do about it. Such an appreciation we ordinarily refer to as an understanding about the thing, especially when the appreciating person can state the fact in words, and in practically all cases it involves an immediate positive or inhibitional action (moving toward it or away from it, seizing it, or checking all such action) with respect to that object.[2]

Furthermore, the meaning reaction in volitional behavior segments may be and usually is stimulated by the combination of adjustment and auxiliary stimuli, whereas perceptual responses have only their specific adjustment stimuli objects or conditions and their settings. That the distinctly volitional meaning reactions can follow the perceptual response is manifest from the fact that they may just as likely follow another type of meaning reaction. Upon the clue that volitional meaning reactions may be overt or implicit we may proceed to expose two varieties of the meaning phases of volitional responses.

1. In the first of these varieties the adjustment stimulus calls out a compound series of acts all of which are closely interconnected with the final action. The segment of behavior works out as follows. The necessity to do something we may consider to be the adjustment stimulus. This stimulus is attended to and perceived auditorially perhaps as a bit of imparted information or visually by the condition of certain objects. Immediately a series of interconnected reactions follow. Similarly, in aiming a gun, when the mere aiming is the act in question, the presence of the stimulus conditions brings about the appropriate responses. The essential fact here is that some of these reactions serve as meaning responses; in other words, they determine the character of the later reactions and the definitive response. Eschewing completely the mentalistic implication, we have here typical cases of what James called "resident and remote controls." This means to say from our standpoint not that mental states control muscles but that preceding reaction systems condition succedent ones with a final determination of the consummatory response.

[1] The perceptual reaction system is of course very closely associated with a final reaction, but in the case of volitional behavior this final reaction is not the same as the definitive response. It would be more like the standing, looking and head-straining acts which are inside the behavior segment and precede the definitive action.

[2] Let us suggest the fact that it is because volitional responses are correlated with fairly indefinite and shifting stimuli that the two types of meaning reactions are necessary.

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2. Turning to a somewhat more complicated situation, the person, besides attending to and perceiving the occasion for action, must also pay attention to the stimulus object we call the first auxiliary stimulus. Here we note the distinction between the adjustment stimulus which may be an object as well as a condition and the other stimuli in the behavior segment. Such a situation would be represented by language behavior or aiming a gun at a moving target. In other cases the occasion for action is not sufficient to initiate the overt meaning action which led to the definitive aiming response, or in other words the overt meaning acts are insufficient determiners of the aiming act. In addition to these overt precurrent acts this type of behavior segment requires a series of implicit meaning responses. These responses operate as images or ideas as to how to point the gun and refer to both position and rate of movement of the target or the appropriate use of words and mode of expression in a language situation. The person may have either a definite or a vague appreciation of what the needs of the situation are and how to meet them.

(B) The Auxiliary Intervening Factors

The auxiliary responses are indirectly stimulated by the adjustment stimulus, but they are still essentially independent responses excited to action by their own stimuli. These intervening responses are well illustrated by the acts of getting the key, switching on the light, etc., which are performed as part of the action of getting a book which we know is in the library. Because of the influence of the adjustment stimulus upon these intervening responses they are of course directly connected with the definitive reaction and as a consequence of their independence they have a decided influence upon the final reaction. Plainer put, the dual connection of these interposed responses makes them not only into means for carrying out the final and definitive adjustment to the primary stimulus but also into actual and rigorous determiners of that adjustment.[1]

As in case (*A*) so here the intervening responses may all be either (1) overt or (2) implicit, and moreover there may be here also combinations of overt and implicit reactions, as well as (3) the semi-overt verbal reaction. In fact, verbal responses constitute a large portion of the intervening responses in volitional reactions.

1. The merely overt intervening conditioning responses are illustrated by the gross acts of walking, reaching, or stooping in order to carry out some definitive response to a stimulus. Some striking though not common actions which show this type of intervening function are the balancing movements made by the tight-rope walker and the bicycle rider in the acts of getting from

[1] These intervening reactions may be to a certain extent at least meaning reactions, but in their independence of operation and remoter connection with the adjustment stimulus they are very different in function.

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one place to another. Again, in reading, numerous eye movements constitute the intervening responses.

2. Implicit intervening reactions may be considered as more definitely foresight responses than are the overt reactions, for we observe that while the former are stimulated in much the same manner as the latter, yet the very fact that the latter are implicit responses means that they are adaptations to absent objects. This means to say, then, that the adjustment stimulus object, as well as some of the auxiliary objects, has served in the capacity of substitute stimulus. Now because these implicit reactions are part of the total volitional behavior situation, the absent objects or conditions reacted to are involved in the behavior segment in which they function, and operate effectively to condition the definitive responses. To illustrate, I am stimulated by a stack of letters to prepare replies, but an auxiliary stimulus indicates the lack of time to complete the task. It is necessary to foresee certain objects and to anticipate various conditions in order to arrange the work and select the part to do at once from the remainder which must be left for a later time.

3. Because of the commonness of verbal components of most of our complex behavior it is hardly necessary to comment upon this form of intervening volitional action. We might indicate, however, that probably the verbal type of intervening behavior is best exemplified by the language manipulations in "mental" or oral arithmetic.

In concluding this discussion of the intervening responses we are impelled to point out that not all the anterior determinations of definitive responses make for the smooth operation of them or for the advantage of the acting person. Quite frequently the interposed responses provide an untoward determination of the consummatory reactions. Often enough they serve most effectively to interfere and disturb the definitive response. This situation is well exemplified by the fumbling and generally disturbing responses which are introduced in a volitional behavior segment by the extraneous stimuli which "rattle" the ball player as he is about to strike the ball. The universal knowledge of this principle lies at the basis of the hostile remarks of the supporters of the out-side team.

(C) Definitive or Final Response

Whatever type of pattern is constituted by the precurrent phases of volitional behavior, the final response may consist of two general types of action. On the one hand, it may be a single reaction system or a group of closely integrated reaction systems; on the other hand, it may be a rather complex series of more or less discrete reaction systems. In the first type the final act is illustrated by jumping off the tight rope when the walker gets to the end of it, or it might consist of writing one's name on a paper after having reached for and secured it. The more complex situa-

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tion is exemplified by all the page turning and place determination involved in looking up a word in the dictionary, or the activities included in the swinging of one's golf club after having performed the preliminary actions.

Wide bounds must be allowed in many cases for the operation of the final or definitive action, for the detailed responses may be many, although great precaution is necessary to prevent us from overstepping the limits of our given behavior segment. This means to say that frequently it is extremely difficult to delimit the boundaries of volitional behavior segments or to determine exactly where a volitional reaction leaves off and some other reaction begins. Thus in our illustration of reaching for a book to look up a word it may be that the turning over of the first page is the end of our first volitional segment and that immediately after this a new segment is initiated. Theoretically, of course, we have a decisive criterion, namely, the operation of a new adjustment stimulus, but in practice we frequently find difficulty in determining what the new stimulus is or when it begins to operate.

The definitive action in volitional segments, whether complex or simple, may be overt, implicit, or verbal. The act may consist of a stroke of a bat or golf stick (overt), the thought of a person or object (implicit), or the pronunciation of a name or other word or phrase (verbal).

Classification of Volitional Action

When we attempt to introduce some sort of classificatory order into the thousands of volitional reactions that we are constantly performing we discover that the difference between such reactions comprise variations in complexity, diversity in the specific manner in which the definitive responses are conditioned, and dissimilarity in the number and types of stimuli operating in the various segments. Upon the basis of a joint consideration of these criteria it is possible to classify and arrange in some order the various types of volitional behavior. From the exceedingly numerous classes of such behavior we arbitrarily select and describe six illustrative classes.

1. In the first class, in ascending order of complexity, we have a series of behavior segments in which the adjustment and the auxiliary stimulus (there is only one of each of these) consist of the same object, for example, the brake which needs to be set (adjustment stimulus) and is stuck (auxiliary stimulus). The attention and perceptual reactions will be comparatively simple, since there is only the one object to attend to and perceive. Again, the conditioning reactions will be fairly simple, completely overt, and entirely integrated with the definitive or consummatory response.

2. In the second class of volitional responses the adjustment and auxiliary stimuli are not the same object. We can react to the speeding tennis ball and to our opponent at the same time. Our

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attention in various degrees and alternations must be directed toward the two stimuli, as well as our perceptual acts. Now in this class of volitional reactions we assume that there are auxiliary reactions which are both integrated and unintegrated with the terminative response. All the auxiliary responses that are not in the direct line of the stroke (speech reactions for example) may not be integrated with the latter, but the responses that are directly connected with the definitive response may also be intimately integrated with it.

3. A still more complex class of acts consists of those in which, besides the adjustment and the auxiliary stimuli, there may be one or many other stimuli objects or conditions calling out reactions functioning to condition the definitive response. These auxiliary responses are overt reactions operating as more or less independent responses between the earliest attention, perception, and meaning actions of the volitional segment, and the consummatory response. In these types of volitional actions we may well expect the attention and perceptual responses to be enormously complicated. Well exemplified is this class of volitions by the behavior segment in which one finally arrives at the proper point in the stream and casts the trout fly.

4. Very different from the foregoing forms of volitional reactions are the segments in which preceding responses serve as definitive stimuli for the following responses in the segments. This condition introduces a greater complexity in the total behavior segment and a greater preliminary indefiniteness in the final action. The latter is in consequence all the more conditioned by the preceding responses. Such segments operate, of course, in situations in which the definitive response is not entirely determined by the adjustment stimulus. For example, in case of fire one must remove certain valuables to a place of safety, but just where the disposition of the articles will take place will be determined more by what the person will be made to do in the course of working out the behavior segment, by various exigencies (auxiliary stimuli), than by the adjustment stimulus.

5. A more complicated and differently operating determining influence is found in the volitional reactions in which the definitive response is conditioned by implicit responses. Such segments involve the adaptation of the person to objects and conditions not present but which necessarily must be taken into account in order to carry on the response to the original adjustment stimulus. These implicit reactions may operate in two distinctly different ways. In the first place, such responses may merely facilitate the ongoing of the behavior segment that is occurring at the moment. That is to say, the implicit response may facilitate the progress of the person toward the completion of the definitive response. Or in the second place, the implicit response may operate to condi-

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tion what the final reaction shall be or shall be like. This latter situation represents a more complicated type of volitional response and must be placed in another class.

As an example of a volitional reaction of class (5) we may take the case of the person escaping from a fire. The stimulus is fairly exacting and the course of the volitional segment may be determined by the implicit responses. The reader will observe that but for the kind of reaction involved, implicit rather than overt, the present class of acts is like those of class (4). In class (5) the determining response is a reaction to any immediately present object, but such present objects serve as substitute stimuli for absent objects, conditions or actions. Our point here is that the definitive response in the segment is determined by the implicit actions serving as stimulus for another action in the segment. Perhaps another illustration will clarify this point.

I am stimulated to make some extemporaneous remarks at a dinner gathering. Immediately it is necessary to seize upon a topic and most likely the occasion which brought the members of the party together will serve as the source of that speech. As I gather momentum for my address I observe several of my neighbors and under the proper circumstances thereto I begin to reflect upon what "X" is thinking about my handling of the subject. This implicit response to his thought may stimulate me in such a way that my further remarks assume such a shape as to make my speech an entirely different sort of thing than it might otherwise have been. More complications may be introduced into the total volitional behavior segment if we further consider the person making the speech and his reactions to himself as constituting the source of the responses which condition the later behavior, and in turn the terminative response of the particular behavior segment.

6. By far the most complex type of volitional reaction is the one in which the definitive response is almost completely determined by the precurrent responses in the behavior segment, rather than by the adjustment stimulus. The latter in this case merely determines that the act should occur and conditions some of the precurrent acts. This type of determination of the final response by precurrent responses we might look upon as a definite form of anticipation. The person is stimulated to bring about some sort of condition, say the construction of a house or the setting up of a piece of apparatus. But just how the apparatus or the house should be designed or built must be determined by the nature of the results to be obtained, and yet no very precise specifications are available. The individual must then respond implicitly to much of his past actions in previous similar situations and to the objects there met with, in order to design and construct some sort of similar apparatus which correlates with or is in some sense common to similar conditions in his past experience. This class

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of volitional reactions in their typical form may be thought of as at least approaching the inventive. Let us note once more that the stimulus conditions the individual to perform a type of reaction that has no definite model but which has to be organized and determined by the general conditions of the stimulus.

What are the Stimuli and Stimuli Settings in Volitional Behavior?

The problems involved in the study of stimuli factors in volitional behavior segments are manifestly more crucial than they are in other cases of psychological behavior. For in addition to the functional indefiniteness of the adjustment stimulus the other stimuli are very complex, many of them operating and all of them functioning in peculiar combinations. We may consequently divide up our analysis of the stimuli conditions into four general divisions, to wit, (*A*) classes of stimuli according to their nature (kind of thing), (*B*) classes of stimuli according to their function, and (*C*) classes of stimuli according to their complexity and temporal position in the behavior segment. To this triple division of stimuli must be added (*D*) some observations concerning the settings or background of the stimuli.

(A) Classes of Stimuli according to their Nature

From the nature of the volitional behavior segment it follows that the stimuli for such activities will be exceedingly contingent and peculiar to some very specific situation. Even when the stimuli are concrete objects, therefore, they will have to fit into an immediate momentary situation. For example, if we are responding to an opponent in a game we always find him to be a shifting and unstable object. Otherwise, of course, we would not be observing volitional behavior but rather habit responses or other forms of conduct. Needs, events, actions, and conditions, therefore, will constitute a large portion of volitional stimuli.

In general, we might suggest that the most typical feature of volitional stimuli is their characteristic of indefinite definiteness. This characteristic is excellently illustrated by the stimuli which we name specifications. That something must be done we are thereby informed; also it is made known to us what sort of result is expected, but just how the activities will be executed remains to be determined by the particular exigencies of the behavior situation. Not to confuse this reaction with voluntary behavior we must add that we are not concerned here with anything but the carrying out of a plan of action, not at all with choosing the plan.

Conventions of various sorts and social contingencies are stimuli for complex volitional responses. Precedents and other social institutions set our paces for all sorts of social conduct for the precise carrying out of which various other auxiliary stimuli provide the immediate conditions. Such conventions also function as fertile sources for auxiliary stimuli of all sorts which operate to determine definitive responses stimulated by other objects and conditions.

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(B) Classification of Volitional Stimuli according to their Function

Here we need only set down the fact that besides the adjustment and auxiliary stimuli, the nature of which we have already had occasion to point out, we find other stimuli in volitional behavior segments all of which, however, may be called auxiliary. These latter are divisible into various orders according to their places in the behavior segment. To illustrate, the need for some particular kind of paper upon which to make a note may be considered the adjustment stimulus; the absence of this special type of paper may be considered an auxiliary stimulus of the first order. Now the next stages of the volitional behavior pattern will involve movements stimulated by the chairs, doors, cabinets, etc., met with in searching for the paper; these objects we may refer to as auxiliary stimuli of the second order. Again when a volitional behavior segment involves much preliminary trial and error action these acts themselves constitute stimuli which influence the definitive response, and we may name these auxiliary stimuli of the third order. Prominent among such determining actions are the language responses of various sorts.

It may well be that a still more intensive analysis of volitional behavior than we have already made might yield even more determiners in the form of stimuli and these we might consider to be auxiliary stimuli of higher orders than those already mentioned.

(C) Classification of Stimuli according to their Complexity and Temporal Position

As we might expect, the volitional responses having so many stimuli may operate in different manners and combinations. To express it differently, they may function singly or in groups and constellations; in the latter case a number function simultaneously, whereas in other cases they operate in chronological order. Stimuli conditions vary greatly of course with the complexity of the behavior situation and it is possible that we may have a single adjustment stimulus and a constellation of some one or all of the different types of auxiliaries, either operating in chronological order or simultaneously. We cannot at this point resist the temptation to indicate again that the auxiliary stimuli operate directly or indirectly to determine or condition a final response which is not completely and exclusively determined by the adjustment stimulus.

(D) Volitional Stimuli Settings

Possibly much more than in other types of behavior do we find in volitional action a great prominence of the various stimuli settings. What ordinarily amounts to no more than a background for a stimulus-object, bringing about a refinement in the response or a sharper differentiation of stimuli by specialization of action, becomes in volitional behavior segments definite stimulus factors. These setting objects or conditions become in many cases full-fledged auxiliary stimuli. Reflect upon the prominence of the settings to the stimuli in a chess game or in some similar behavior situation. What is at one moment, when a given move is made,

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the background of one's stimuli, becomes later, when the opponent is moving, a very decided stimulus itself for one's own next action. How important the settings appear in such a situation is also manifest from a common but erroneous belief that all the chessmen are at once the stimulus to every move reaction.

The extreme importance of the stimuli settings in volitional behavior is a consequence of the contingent character of the total situation. Very striking is the contrast in this respect between the volitional action and a reflex response. In the latter case the adjustment stimulus is not only the only one operating, but the setting or background of the stimulus ordinarily plays no part whatsoever in the behavior segment. When in comparatively infrequent situations the settings do figure in the behavior circumstances they serve merely to increase or decrease the vigor with which the response is performed, but they cannot alter the morphological character of the response. Quite different is the situation in volitional behavior segments; in every case the total general surroundings have both indirect and direct influences upon the intimate characteristics of the behavior pattern.

Correlated with the increased function of the setting which makes it into an auxiliary stimulus, is the shifting of the adjustment stimulus to be the background of the now prominent setting. In most instances probably the setting objects could not become actual stimuli without this functional modification of the adjustment object or condition in the behavior segment. These functional displacements are all of course typical consequences of the fortuitous character of volitional behavior.

Volitional Actions as Performative and Informational

Contrary to the usual notion we believe volitional actions comprise informational responses as well as performative reactions. That is to say, volitional acts may consist of responses in which the individual performs some sort of knowledge or informational adjustment to some object as well as overt manipulations of all sorts.[1] In support of this thesis several propositions may be adduced.

In the first place, no principle of volitional behavior is opposed to this thesis; rather the description of volitional reactions is entirely consonant with our view. For if volitional behavior consists essentially of a mode of adaptation in which there is a definitive and auxiliary response and moreover an adaptation in which the definitive response is determined by auxiliary stimuli in addition to the adjustment stimulus, then it is entirely possible that the adaptation may be informational as well as performative.

In the second place, when we ask what determines whether a reaction is informative or performative do we not get the answer

[1] Whenever we "place" a vaguely familiar individual somewhere in our past experience we are performing an informational volitional reaction.

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that this is entirely a functional affair? That is to say, if the behavior segment adjusts the individual by way of some cognitive orientation we call it a knowing or informational reaction, whereas if the reaction results in at least some change in spatial relation between the person and the object we call the reaction performative. Now it is certainly clear that volitional responses may be of both sorts, and our criterion as to which sort, lies in the nature of the definitive response and the adjustment stimulus. Do not many if not all of the trial and error manipulations in reasoning activities answer to our description of volitional reactions? And when such reasoning reactions are theoretical in character and not practical problem solving activities then the volitional responses are informational. The same designation may be correctly applied to numerous of our volitional responses when they are autonomous and independent of other reactions.

That volitional responses may be informational as well as performative appears likewise from the fact that in the actual determinations of the consummatory reaction many informational stimuli may operate to excite determining knowledge reactions. This is true of course of any sort of volitional reaction and especially so when the definitive response is itself informational in character. To a certain extent, then, all complex volitional reactions, at least, involve informational behavior of various sorts in the carrying out of the total segment. Is it not very likely, then, that the whole segment should be informational in character?

The Range of Volitional Behavior

Here we might raise the general question as to what sorts of situations involve the operation of volitional behavior segments. The answer to this inquiry is in our opinion simple and unequivocal. Probably every one of our complex human situations provides us with a series of occasions to perform such behavior. Whenever we adapt ourselves to different or somewhat unfamiliar surroundings, when we are obliged to handle tools or manipulate complex objects such as machines, while playing games of various sorts, or engaged in constructive activities we perform a great many volitional responses.

If we consider the situations just mentioned as the stimuli conditions for individual responses we may then refer to another series of situations as social. All of our social situations are replete with conditions in which our definitive responses are carefully and directly determined by a variety of auxiliary stimuli, in many cases very prolific in number. These social situations all supply us with fairly indefinite situations for the adjustment to which is required the distinctly volitional form of behavior.

Possibly the whole problem of the range of volitional behavior can be no better comprehended than by pointing out that for the most part our language responses conform to the volitional type. The carrying on of a conversation or the delivering of an oration

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constitute a most intricate complexity of volitional behavior adjustments.

The Development of Volitional Responses

Volitional reactions have histories. No matter how complex or how indeterminate in character they are, they must date back to previous coördinations of responses and stimuli. Indeed this principle marks an essential condition for the operation of any volitional reaction at all. This does not mean merely that certain phases of the volitional response such as the auxiliary reaction systems constitute part of the behavior equipment of the person. It means more than this; it means that no complex volitional action can be an actual adaptive action unless there exist genuine associations between the various stimuli and the various responses in the behavior situation for the particular person who is involved in it.

Furthermore there is no doubt that all connections between responses and stimuli in a volitional-behavior situation represent coordinations which go back to some historically anterior trial and error contact of the person with the general stimulating conditions in which the reaction is performed. Were it not for this fact it is doubtful whether determining responses could condition consummatory reactions. Moreover, it is certainly true that a person will be most efficient in performing indeterminate actions who has had most experience in that particular field. The machinist who starts out to execute a specified activity finds many suggestive stimuli to condition the prompt and effective carrying out of that project, whereas the uninitiated individual finds either undetermining stimuli in the various machinists' objects (tools), or else all the stimuli happen to be thwarting. It must be very carefully observed, however, that the possibility and effectiveness of the operation of volitional behavior segments depend entirely upon the fact that numerous reactions may be made to influence each other rather than upon any very definite organization of responses with one another. The fact remains prominent that volitional behavior consists of adaptations to unstable and unstandardized conditions which require a not too close connection between responses if we are to meet the given situation, although without some connection the whole adaptation would remain unachievable.

That in general the components of volitional reactions must have some organizational history appears also from the fact that were this not so and the adaptation were made, it would have to be a totally new adjustment as far as that is possible in human behavior. But this is never the case in volitional action. The stimuli circumstances do not demand it nor do the reactional situations justify such an interpretation. Now this, as we have seen, happens to be precisely the practical distinction between volitional and voluntary actions. In the latter case we may assume that the actions involve the development of a practically new mode of re-

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sponse. In the case of volitional reactions, on the other hand, we really have no more than a new combination of previously acquired stimulus and response coördinations.

The Conditions of Volitional Behavior

Already we have seen in the preceding section that when a person has had considerable experience in forming particular sorts of stimulus and response coördinations this experience constitutes a favorable condition for that person's participation in volitional reactions related to that type of stimulus and response coördination. To this condition we must add others, among them being the availability of objects and persons which can constitute stimuli to determine the operation of the volitional reaction and its progression toward its definitive conclusion. The more possible stimuli (objects, persons, etc.), we have around us the more chance there is for the volitional action to occur and the greater our ability to adapt ourselves to a shifting and indefinite situation. Absolutely indispensable,of course, is the presence of some of those possible stimuli objects for the ongoing of the volitional act at all. The number of possible stimuli is, then, a functional factor in the facilitation of the working of volitional behavior.

Volitional Reactions and Habits

No one, it is safe to say, will confuse volitional reactions and their operation with habit acts and their particular mode of functioning, especially when the more complex forms of volitional reactions are concerned. It may be true, however, that the simpler sort of volitional reactions may appear to the observer to be very like the habit response. We propose, therefore, to suggest a fundamental criterion which will distinguish these two types of behavior. Let us note that volitional behavior, no matter how simple, involves a reaction within a reaction; that is to say, it consists essentially of the operation of a definitive response to an adjustment stimulus, a definitive reaction which is not only conditioned by that adjustment stimulus but is also very closely and definitely determined by auxiliary responses and their stimuli. In the case of habit responses, on the contrary, we have a single form of activity, integrated from simpler activities in some cases, to be sure, but still a single mode of adaptation which is very closely integrated with a single adjustment stimulus. Again, volitional reactions contrast markedly with habit activity in that the former are not determined until the definitive response is about to operate, whereas the latter was entirely determined at some past period when it was originally acquired as a reaction. As a consequence of the differences between volitional reactions and habits the latter appear as entirely automatic, while the former have the appearance of being completely casual and occasional.

Do Animals Perform Volitional Reactions?

Complex as volitional reactions are there seems no good reason to assume that the higher animals do not perform such behavior. This statement does not hold, however, for the very complex types. It is probable that no animal, even of the highest order, performs

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the type of volitional reaction in which the organism definitely anticipates some specific mode of response. This conclusion we may reach from an observation of the complexity of the action itself as well as from the consideration that such complex activity involves much implicit behavior of an intricate sort. The evidence from animal studies leads us to doubt much whether any animal is capable of performing such intricate implicit responses.

Probably the best evidence we have that animals can perform even complex volitional responses is found in the experiments upon animals in puzzle boxes. There can be no question but that the act of a cat in working its way out of a cage involves a great deal of volitional behavior, but those same experiments indicate that the type of volitional behavior in which complicated implicit reactions are necessary fall outside the range of the animal's capacity to perform.

Volitional Reactions and Knowledge

In the traditional psychological treatises volitional reaction is always considered to be closely connected with knowledge, for in the first place, volitional reaction is not distinguished from voluntary behavior, and in the second place, the organism performing volitional reaction is presumed to possess some definite foreknowledge of what he is about to do. We believe that while it is entirely proper to say that volitional reactions involve knowledge, this knowledge as we have indicated, is not a very deliberate form of anticipation of the definitive response excepting in the most complex voluntary reaction. To be very plain, we reject completely the conception that knowledge represents some sort of mental state entity different from the motor action which follows it. We cannot conceive of psychological phenomena except as members in a homogenous series of activities of the person which differ only in functional and morphological details.

For our own part, we believe that knowledge in volitional reactions is constituted mainly of the operation of medial stimuli, namely, determining responses and their stimuli in addition to the adjustment stimulus. Knowledge in volitional reactions, we conclude then, is distributed throughout the whole behavior segment.

Briefly, then, we might indicate that much of the knowledge in all volitional reactions consists of the perceptual responses to the adjustment and auxiliary stimuli. Also in all volitional reactions the overt and implicit meaning responses represent knowledge reactions of varying complexity. Likewise, the elaborate implicit anticipatory responses which look toward the consummatory reaction rather than to the present stimuli, constitute very definite forms of knowledge reactions. It is these forms of volitional action components, we believe, that are usually thought of as foresight responses. Now we suggest that because such responses are found only in the most complex volitional behavior patterns, we

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must either enlarge our conception of volitional reactions to admit other forms than those which contain such elaborate anticipatory reactions, or else we must admit as knowledge all the other perceptual and meaning reactions that are distributed throughout the total behavior pattern. Further, it may be suggested that whenever we have a complex anticipatory response in a behavior segment we always find there in addition a large number of distributed knowledge factors; in fact, a larger number than when the complex anticipatory reaction is absent, for in the former case the total behavior situation will be more complex.

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CHAPTER XV

THE INTEGRATIVE NATURE OF HABIT REACTIONS

The General Nature of Habits

Habit reactions constitute in their widest phases specific forms of intimate connections between behavior adjustments and particular stimuli objects and conditions. Through repeated contacts of specific responses with sundry particular objects, persons, and circumstances, the former in the course of time become practically inseparably integrated with their specific stimuli. As a consequence, we find that in some cases of simple behavior, habit reactions are automatized actions, since the process of integration results in a minimization of the challenge which an unintegrated stimulus usually offers the individual. Because the person has developed a large number of such intimate integrations of stimuli and responses the mere presence of the stimuli call forth the correlated responses. Consequently it appears that the person is conditioned or guided by the stimuli in such a way that he is enabled to respond more readily and definitely to his various surroundings. In other and more complex situations the integration of responses and stimuli serve not to provide the organism with automatized acts but rather with specialized behavior equipment for complex stimulating conditions.

Habits, then, in their broader aspects are describable as forms of action that appear to place the organism *en rapport* with surrounding objects and result in an ease of adjustment that could only be brought about by the development of an intimate relationship between responses and stimuli. We may look upon habit responses, therefore, as involving specialized forms of the associational processes, in which reactions are intimately interconnected with specific objects and other forms of stimuli.

Probably the most essential fact involved in the operation of habit reactions is that the mere presence of the integrated object constitutes the stimulational function for eliciting the coördinate response. Correspondingly the chief fact of habit formation is the organization of the connections between the response and the objects or qualities of things; so that later the mere contact of the person with those things is sufficient to elicit the response.

Need we say that habit reactions are active positive processes and not merely the passive conformity of the person to his surroundings? The fact of having a habit does not mean undergoing

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a change that will make us fit into our surroundings. The psychological fact of habits is not at all a passive change as of a garment which fits better after being worn or a lock which works better after being used. Such presumed analogies do not touch the problem of habits in the least, as James seemed to think.

But if the habit situation is an active one, in what consists the activity? We answer, as we have so many times repeated, in the organization of specific responses to specific stimuli. The emphasis is always and foremost upon the fact of integration and not upon any change in the individual, although as we shall see the possession of an equipment of habits naturally means decided changes in the person. Indeed, when we learn what a person's habit equipment is we are in a fair way to understand him and to predict how he will act under given stimulating circumstances.

Let us be carefully warned at once that our conception of habits as the integration of specific responses with particular objects and conditions precludes and invalidates the mistaken notion frequently exploited that habits constitute a general type of acquired reactions, and that the term habit merely contrasts with the term native, the symbol for unlearned reactions. This is not so in fact, for certainly it is true that an equal number of our reactions, the acquisition of which no one can doubt, are not correctly described as merely intimate integrations of responses and stimuli, a description which does mark habits. Here we might mention thought and feeling reactions of all sorts, many skill responses, and language activities. When we make all acquired reactions into habits do we not unduly efface the differences between our reactions and make of habit merely a term to stand for the fact that reactions are acquired?

Twofold is our objection to such a view. In the first place, it involves a radically false assumption concerning the inheritance of actions, for no actions can ever be inherited, and in the second place, it overlooks the fact that habit reactions are definite and specific forms of reaction systems; that is to say, habits constitute a particular group of reactions. If we care at all to trace the source of this mistaken identification of all acquired behavior as habit responses we may find it in the acknowledged fact that habit reactions do not, as some of our simpler reactions do, involve a very close dependence upon the organic constitution of the individual. This source, rooted in fact as it may be, does not in the least provide an adequate justification for the attitude that all responses called acquired are habits.

Another reason for the contention that all acquired responses answer to the same description as habits is that the acquisition of habit responses does undoubtedly presuppose a fair amount of behavior equipment already possessed by the person. But this indubitable fact in no wise means or implies that the reactions

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comprising that already possessed equipment are not themselves entirely or mainly acquired. It is this latter case that we take to be the fact, and we need only add that this already possessed equipment may consist of habits as well as of many other kinds of reaction systems.

Very important is the characteristic of habit responses which may best be described as that of the practically non-transformation of the stimulating objects and circumstances. Let us recall again that the significant feature of the entire habit situation is the interconnection of a response and a stimulus. Hence it is not surprising that aside from the case in which the stimulus is an endogenous reflex of the individual, no change or increase in the object or other stimulating situation occurs, either when the habit is built up or when it operates later. Similarly, habit activities may in general be considered as involving much less the building up of reactions than the connecting of such responses (after they have been acquired) with their respective stimuli, although the former process constitutes an essential feature of some types of habit development.

The Fundamental Psychological Basis of Habits

Habit reactions have their basis primarily in two of the fundamental characteristics of psychological phenomena, namely, (1) differentiation and (2) integration of behavior and also (3) in a more complex process, namely, association. Habit responses represent an intensive form of the differential connections between responses and stimuli. Intensive connection we say, because in the habit situation there is not only this connection between a specific response and a particular stimulus but a practically fatalistic operation of the response when the stimulus is presented. Possibly it is not inappropriate to suggest that the acquisition of habit responses is equivalent to a minimization of the chances for inhibition and delay of the responses in the presence of their coördinated stimuli.

The principle of integration operates directly in the organization of more complex reaction systems from simpler ones, a process which is of no slight importance in the development of habit responses, since the integration of responses with stimuli frequently involves considerable development and expansion of reaction systems. Especially noticeable is this situation in the organization of typewriting, swimming, and other primarily manual activities.

Lastly, the associative process is of great importance in habit formation. In detail, the habit forms of association are such close connections of response patterns and stimuli that not only are the various member reaction systems integrated into a unit, but this pattern as a unit of response appears also to be very closely integrated with the stimulus, so that the whole behavior fact becomes an indivisible unitary process. Upon the closeness of this integration of the members of the behavior pattern, and the whole

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pattern with the stimulus, can we differentiate between degree classes of habits, the limiting point being such a loose connection that the segment of behavior can no longer be called a habit action. Thus one of the incidental results derived from our study of the psychological basis of habit responses is a touchstone by which to distinguish habit behavior segments from other types. This characterization of habit behavior segments we shall discuss in the next two sections.

The Character of Habit Behavior Segments

According to the typical description of habit reactions, they are, in terms of behavior segments, simple final responses to stimuli; in fact they are discussed much in the fashion of reflexes, excepting of course that the former are always assumed to be acquired. Just why habit actions should be aligned with reflexes is found in the traditional psychological belief that habit actions when acquired involve few or no mental factors but are on the contrary the operation of various organizations of muscular apparatus. Connected with this belief and possibly as a result of it the view has flourished that habits are exclusively manual actions of various sorts. In consequence, psychologists following James undertook at one stroke to describe and account for habits in terms of neural connections much as they did in the case of reflexes, with this difference, of course, that in the case of habits the neural connections were presumed to be located in the so-called higher and lower centers of the brain instead of in the spinal cord. Now we on the contrary unhesitatingly believe that such a method of describing habit action is contrary to the actual facts, resulting as it does in an unwarranted abridgment of the classes of habits, and worse, it leads to an inadequate description of any type of individual habit act. Accordingly, we propose in the present section to examine the typical habit behavior segments in their response phases, reserving for a later section the study of the stimuli factors.

When we examine a habit behavior segment it goes without saying that whatever may be meant by conscious or mental factors they cannot be lacking in habit reactions, for such reactions are very definitely differential responses to specific stimuli. This differential process we assume to cover the part of consciousness or awareness. Moreover, habit behavior segments on the response side, comprise a great variety of reaction patterns differing in morphological character and degree of complexity. Now since every response pattern involves both precurrent and final reaction systems it cannot be true that habits are exclusively final or motor adjustments. How this error is made may be easily accounted for by the fact that since the habit behavior segment represents so intricately organized a response to a stimulus, the precurrent phases may be easily overlooked. Certain it is, nevertheless, that habit responses may and frequently do involve the operation of a very elaborate pattern of precurrent activities before the final re-

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sponse occurs. Possibly this situation is very well illustrated by language activities in which the unit of response is a pattern (sentence) of which the last element (word) only may be considered as the final response.

Credence is lent the view that habit actions are simple final responses by the fact that the precurrent attention reaction is functionally very simple. Instead of being a definite autonomous reaction system as is the case in volitional or voluntary actions, in habits the reaction system is much abbreviated morphologically and slighter functionally. All this is to be expected in a behavior segment in which the whole response factor is very definitely integrated with the stimulating conditions. Functionally speaking the attention factor in a habit segment operates, in overt reactions at least, merely to bring the person in contact with a new stimulus by a shift in postural attitude. In the larger types of habit action the attention factor is of a more complex sort but always simpler than in a correspondingly complex behavior segment of another type of psychological activity. But however limited the attention reaction may be in habits it is undeniably present and adds to the complexity of the total behavior segment.

What is true of the attention precurrent reaction is equally true of the perceptual or ideational precurrent reaction systems. They also are very intimately integrated with the attention factor and the final reaction as well as with the stimulus object or situation. Because of this integration of response factors with the stimulus any very deliberate cognitive action appears unessential, a fact which has lent support to the view we have mentioned, concerning the absence of mental factors in habit responses. Patently, the presence of the perceptual and ideational reaction systems, howsoever fused they may be with the other members of the response pattern, adds to the intricacy of the habit situation precisely as the inclusion of the attention factors.

To the complexity of habit behavior segments there is in fact no end. Possibly it is in part at least owing to this intricacy of habit responses that psychological literature is so replete with discussions concerning subconscious phenomena. For it is indubitable that habit integrations, among other psychological phenomena, make it possible for us to do so many and such different actions without any apparent interest in or awareness of those actions at the moment. Is it not such activities as these that we characterize as subconscious phenomena? Clearly such phenomena are no more mysterious than the fact that the person who is in constant or frequent contact with particular complex stimuli can build up an elaborate equipment of habit reactions, which becoming organized as part of his personality, can later operate without knowledge or direction on the part of the person.

Possibly we can make the most striking observations of the

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operation of a person's complex habit responses when his behavior is so exaggerated as to amount almost to dissociation. Then the operation of habit reactions seems truly remarkable upon the surface. And so it was in connection with abnormal individuals that the doctrine of the subconscious was primarily developed and most extensively fostered. An added feature that made possible the interpretation of complex habit responses as some mysterious "subconscious" was that such responses need not necessarily be cognitively acquired. That is to say, we may organize these complex habits without in the least knowing at the time that such an acquisitional process is going on.

It is not our purpose to attempt to establish an identical relationship between complex habit responses and what may legitimately be called subconscious action, for in the first place, such a direct and complete identification does not in fact exist, since subconscious behavior involves much more than habits and in the second place, we have another aim. We are rather interested in pointing out by our references to the so-called subconscious and unconscious activities the enormous complexity attained by the habit behavior segments, and in showing again that the inevitable implication of this complexity is that habit responses must be looked upon both as precurrent and as final responses.[1]

A Comparative Analysis of a Habit Behavior Segment

No better analysis can be made of a generalized habit behavior segment than by comparing it with a reflex segment, since the simple habits of a manual sort, consisting as they do of simple automatized responses greatly resemble the reflexes.

Outstanding as a difference between reflexes and habits is the relative prominence of the response and the stimuli factors in the organization and operation of the behavior segments. In the case of reflexes the action depends almost entirely for its formation and operation upon the biological character of the person. In other words, reflexes are very intimately related to the individual's organic structure and functions. The emphasis is on the organism's adaptational need, but these needs are more or less independent of the specific surrounding conditions. As a corollary to this fact of the dependence of reflexes upon organic conditions we remember that the reflex segments on the response side consist only of single reaction systems and never patterns of response.

Now in contrast with reflex segments, habit acts are developed more prominently as adjustments to definite, external circumstances and in consequence the responses are more conditioned in their genesis by the needs and exigencies of the stimulating surroundings. When we assert that habit responses depend more definitely upon external conditions we mean to confine our statement to the narrow limits of the immediate stimulus-response sit-

[1] Cf. Chapter IV for a discussion of what is ordinarily called subconscious and unconscious action.

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uation. For it is clear that the auspices of any behavior development must include many elements which are not specifically stimuli conditions, such as organic or more remote economic conditions, etc., all of which intimately concern the individual irrespective of what his surroundings may be. To take a concrete example, the acquisition of typewriting skill responses may be originally and primarily induced by economic pressure and certainly not by the machine, but note that the specific reaction systems are intimately determined by and bound up with the copy and machine stimuli. In plainer words, habit behavior depends more upon the stimuli conditions than upon the structure of the person, although the latter element must always be an essential factor in the formation and operation of all behavior. This fact, by the way, is only slightly less true of thought habits than of comparatively simple skill reactions.

But just because habit responses depend more for their development and operation upon stimulating situations they are more complex and involve more than one reaction system. And these many reaction systems are naturally precurrent attention and cognition responses.

In point of fact and in complete consonance with our analysis in the preceding section we may locate the salient features of habit responses in the precurrent reaction systems which we may call the cognitive factors. According to our view the sole cognitive fact in a reflex lies in the differential character of the simple reaction system constituting the entire response phase of a reflex behavior segment. Now this of course is the simplest type of cognitive phenomenon in the entire domain of psychological facts. Now in the case of habits a much more complicated cognitive situation is present; here the cognitive factor is represented by the operation of a definitely morphologically autonomous reaction system, the function of which appears to be to mediate between some specific stimulus and some particular final reaction. This cognitive precurrent reaction system may be merely a perceptual response, or it may be an implicit meaning reaction. The former kind is found in the simpler habit segments, while the latter may be the precurrent components of the more complex habits.

Our hypothesis that habit acts are primarily integrations of responses with stimuli, suggests that the precurrent cognitive reaction systems of the habit segment are perceptions or meanings directed only toward the stimulating objects or circumstances. They do not anticipate the final action which follows or the results or consequence of the response, although of course the precurrent reaction is always in some way connected with a final response. Let us observe that the question whether there is or is not a precurrent reaction system in the behavior segment and the problem as to whether the precurrent responses refer to the stimulus or the act

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or both, give us the varying degrees of cognition. When the organism has the precurrent reaction system integrated very closely with the stimulus, as is the case in habit, then we have a comparatively simple cognition involved. What we have here is a process of double association or integration; on the one hand, there is the integration of the precurrent reaction with the stimulus, and on the other, just as definite an integration of the same precurrent reaction with the final reaction. For instance, the stimulus for the typist is his copy, his perception of the words before him the precurrent reaction, which directed only toward the stimulus is, however, intimately integrated with the final reaction, or the striking of the typewriter key in our illustration.

In behavior that is more complex than habit reactions the integration of precurrent reaction and stimulus is not so binding. Therefore, the connection between precurrent and final reaction systems may be such that the person also perceives the final act. The precurrent act may then be called preparatory. In such a case the activity is described as containing or involving much more or higher awareness. When the precurrent reactions are relatively free in the behavior segment (and this almost inevitably means that it is an ideational process), free, that is, in the sense that the person can anticipate the final act and look forward to it and modify it, then we have what is almost the complete antithesis of a habit response. This is true even if there be no control or modification of the final act but merely its anticipation or possibly a silent self-remark about it, a questioning whether it should be done or how. This complex type of behavior appears all the more antithetical to habits when we observe that in many cases of habit segments the precurrent or preparatory reaction is a single overt response, for in such a case we find that the segment includes the least awareness, excepting such segments as contain only a single reaction system, that is to say, no precurrent or preparatory act. In a genuine sense, therefore, habit responses are actions standing midway between the reflex type of action and the various orders of volitional response.

The Stimuli in Habit Reactions

Because habits cover such a large range of our behavior equipment and because they are specific integrations of responses with stimuli we find that as a record of fact the stimuli phases include a large block of our surrounding objects and conditions. Among these multitudinous stimuli we must include persons, things of all sorts, as well as actions and institutions, besides physical, social, and cultural conditions of every description.

Naturally, habit responses to physical things constitute a large part of our simpler automatized responses. It follows that there is a definite correlation between the increasing complexity of such physical objects and the complexity of the habit reactions integrated with them. For instance, habit responses built up in con-

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tact with an automobile or more complex mechanical object are indefinitely more complicated than habits organized through contact with simpler physical things. Thus we acquire through various combinations of stimuli our complex skill habits which we will later call achievements and accomplishments. To play the piano we must integrate responses of musical information and piano key manipulations with the music and piano stimuli. Similarly, in typewriting the integration process involves the organization of movements responsive both to the machine and to the copy.

Exceedingly prominent as stimuli for habit responses are actions of the person himself and of others. As such the actions of the individual may be divided into two classes; the first being the organic reflexes of various sorts, which directly and exclusively stimulate various simple autonomic habit responses as well as serve in the capacity of auxiliary stimuli to the person's acquisition of complex habits of thought and feeling. Illustrative of the simple habit reactions integrated with organic actions are the mannerisms of walking, facial gesturing, bodily carriage, mode of hand shaking, and speech mannerisms. Among the individual's more complex habit responses those partially integrated with organic actions are such as traits of thought and feeling, particularly characterizing one's outlook upon life, as pessimistic, optimistic, melancholy, etc. In the second class of actions stimulating habit responses we may place all the other reactions, overt muscular acts, speech responses or implicit behavior, any one of which may be intimately connected with some other action as its response. Doubtless the best examples of the operation of responses as stimuli to habits are found in the various combinations of our language habit reactions.

Besides simple and complex objects of various sorts, events and conditions induce us to acquire many habit acts. On the whole such habits are not only more complex than those stimulated by objects, but are also somewhat more indefinite and general in organization. Consider the difference between an automatized manual act and a response of verbal or general gesture of social politeness.

Complex events and institutions, such as economic conditions and political happenings, constitute a common variety of habit stimuli and of course the habit acts integrated with such stimuli may be expected to be very intricate. Here our habit reactions partake a good deal of social custom, that is, acts determined by social usage and convention. Because the stimuli in the present class are more indefinite in their description and appear extremely vague we may be pardoned the impression that at least some habits are general forms of reaction and not specific response types. The more we consider the specific fact of integration as

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the principle of habit behavior, however, the less plausible appears this surface impression concerning the generality of habits.

Very incomplete would be our attempt to mention some of the outstanding forms of our habit stimuli if we left out of our enumeration the personal ideals and other individualistic institutions that are integrated with definite complex social, economic, and æsthetic habit responses. Possibly the least ambiguous illustrations of such stimuli can be found in the domain of our habitual moral and æsthetic conduct, which if examined carefully appears definitely integrated with personal stimuli, whether operating alone or in conjunction with other stimuli forms.

The intricate organization found among our stimuli situations offers us considerable insight into the complexity of some of our habit responses. Consider for instance the various physical and social objects and conditions affecting such a pervasive and common action as our conduct at the dinner table. The specific phases of our dining behavior are connected not only with the food, service, and other persons dining, but also with social, moral, and economic customs and conventions in confusing array. The situation is magnified and intensified when we consider those stimuli integrated with still more complex actions than eating.

Besides the connection of habits with many stimuli objects and conditions, habit responses are also very closely linked up with the settings of stimuli. Particularly noticeable is this fact in connection with social habit responses. In such activities the person's actions, though operating very directly through the influence of their integrated stimuli, do not render him insensitive to change in the specific stimuli settings among which the reactions take place. By stimuli settings we mean to refer of course to objects, persons, morals, social, and æsthetic circumstances; in fact, everything that is or can be a stimulus can also be the setting or background for a stimulus. When we consider the infinite possibilities of combination of stimuli and settings we achieve much information concerning the correlational facts which may or may not be considered as causes for the enormously intricate habitual equipment of a highly organized personality.

Types of Habit Responses

If habit behavior is primarily characterized by the fact that it consists of responses very closely integrated with stimuli it follows then, that because of the great variety of stimuli with which we are in contact, the number of different classes of habit reactions will be very large. As opposed to the psychological tradition to which we have referred, namely, that habit reactions consist only of comparatively simple overt acts, exemplified by swimming, walking or typewriting, we propose the hypothesis that our habit reactions comprise acts of the most diverse classes and individual descriptions, acts which are stimulated by the most divergent forms of

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objects and conditions. An investigation of our behavior equipment reveals immediately that we have habits of feeling and of thought as well as of motor skill. Furthermore, be it observed that the terms motor skill, thought, and feeling are conventional rubrics based upon the traditional conception of the tripartite division of what was presumed to be the subject matter of psychology, namely, consciousness. What we are eager to point out here, therefore, is that a valid appreciation of the actual types and descriptions of our habit equipment must be based upon an actual study of our responses. The concrete reactions in our behavior equipment representing close and specific integration of stimuli and responses reveal a large catalogue of habit types. Indeed, it is to a large extent true that our complex habit responses constitute a good portion of the behavior equipment of our mature personalities.

Unfortunately for the student who desires to classify habit responses, the fact just mentioned, namely, that habits are pervasive and common forms of our behavior equipment, and that they are specific forms of adaptational adjustments, provides almost insurmountable difficulties. How can we bring order into such a host of divergent behavior data? That such an arrangement can only be accomplished by utilizing a series of different criteria is almost obvious, and so whatever organization is made of the habit facts will have to be made at the expense of a rigid logical scheme. As a matter of fact, our classification will be made on the basis partly of the stimulating situation, partly on the morphologic organization of the responses, and partly upon the place the responses take in the behavior equipment of the individual. However, the most striking and comprehensive basis of organization will be found in the stimuli situations forming parts of the habit behavior segments. Again, we must note that the names we employ for the classification of our habit responses should not be taken in any sense as exclusively belonging to habit reactions. That is to say, when we mention sentiment as an example of feeling habit we must immediately point out that the name sentiment does not refer exclusively to habit actions but may be just as appropriately applied to numerous other forms of responses. Especially must we guard against the uncritical acceptance of a popular conventional term as a substitute for an analytical psychological category.

But if we attempt to classify habit responses upon the stimulus basis we must almost inevitably duplicate the discussion of the preceding section, inevitably, because of the extreme integration of stimuli and responses in habit segments and because the enumeration and description of habit responses can frequently be made only in terms of the stimuli auspices under which they occur. However unsatisfactory our classificatory procedure may be, we have no option but to proceed in this manner. For our present

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purposes therefore we may adopt a three fold classification of stimuli, dividing them into (1) physical surroundings, (2) social surroundings and (3) personal stimuli, namely, personally formulated ideals and other institutions. Such a division must appear extremely inadequate and arbitrary, but since in the present section we are primarily interested in the responses such a classification will appeal to us only and precisely in the measure in which it is found useful for our immediate purposes.

Habits integrated with Physical or Natural Stimuli

Here we may illustrate our point with a series of specimen acts as follows.

a. Among the simplest habit responses in this class are the so-called manual acts exclusively denominated habit by the older psychologists. The examples usually given are swimming acts, telegraphy, dancing reactions, typewriting, walking, writing, and other overt formal responses of a practically mechanical sort. In general, we may add to this classification numerous other abilities of the person consisting of specific reaction systems, which, being so integrated with a particular physical stimulus, operate immediately when that stimulus appears. Here we may name the components of such reactions as cooking, and craftsmanship of various sorts.

b. Prominent among habit responses integrated with physical or natural stimuli are the aversions and preferences which give so marked a character to our personality. We might mention here the aversions toward objects or persons having certain qualities, sizes, and shapes, toward animals of various morphological descriptions or harmfulness, and the preferences we acquire toward objects, persons, and conditions. Also, we might include here various likes and dislikes which, of course, are generally more complex responses to things and persons than mere preferences. From the morphological standpoint the responses under this division may be considered as involving more the feeling qualities of tastes than the effective attributes of skill responses.

c. Another series of habit responses integrated with physical and natural stimuli we may refer to as capacities of many sorts, adding, multiplying, distance judging, and accomplishments such as reactions of painting, drawing, and the manipulation of musical instruments. Also we might add here process responses of all sorts as well as general reactions to more or less indefinite behavior situations. Keeping cool in almost any danger situation is an example in point. Our criterion for differentiating these behavior segments from more complex ones in class (a) is the greater indefiniteness of the habits now under discussion, the greater difficulty in formulating a morphological description of them, and the generally more important function they perform in the daily activities of the person.

d. Probably the most striking if not the most familiar aspects

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of our behavior to physical and natural stimuli are our various attitudes toward and beliefs about them. More or less intangible and indefinite are the attitudes towards the relationships of things themselves. Such habits of thought and opinion may very frequently be most appropriately named superstitions. But this does not exclude the presence in the individual's behavior equipment of numerous other attitudinal types. The main point here is that the stimuli mentioned are the immediate incentives for the arousal of informational, economic, social, and æsthetic responses, reactions which in many cases precede or are accompanied by overt acts. When this happens the mechanism appears to be such that the habit responses, or the habit responses coupled with their appropriate stimuli, serve together as the stimuli for the accompanying or correlated overt responses. For some individuals the appearance of lightning is the stimulus for some superstitious notion which in turn becomes the stimulus for the performance of some rite if it be only the seeking of seclusion and shelter.

Habits Integrated with Social and Intellectual Stimuli

a. Many of our habit responses to social stimuli are of the same morphological character as those to physical stimuli. We need only suggest some concrete examples. When we speak of an individual as having industrious habits we must plainly include in such a statement direct, overt acts. Similarly, to speak of a careful speaker means to pass judgment upon the person's direct, overt, language responses. Why it is that we have identical habit responses integrated with both physical and social stimuli is transparent when we recall that the same physical objects can serve as physical and social stimuli.

b. While it is obviously true that overt habit responses of the sort usually described as motor reactions may be connected with social as well as with physical stimuli, still it is clear that for the most part habit responses to social stimuli will be of a less direct and overt type. Many types of social, habit responses there are which, because of their unfocused character and extension in time, are usually thought of not as adaptation acts but as qualities of the person. To illustrate, we believe that an act of politeness involves a pattern of habit reaction in precisely the same sense as a typewriting act, but because of the general character of the social situation we usually fail to note the unitary character of the response pattern. Of a certainty when we locate the politeness habit in the specific act of tipping the hat or in bowing we have a case of social habit which is in no wise different from the overt habit response to physical stimuli, but we would indeed find it unprofitable so to restrict the politeness behavior segment. We conclude, then, that the classification of social habit responses must comprise less tangible responses of a definitely adaptive sort than those we find in overt reactions. Now although we cannot give specific detailed account of the social habit responses we may in

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lieu of such definite description refer to some of the categories which our language has developed for suggestions concerning the social habit reactions, and perhaps also for some insight into their nature. Let us specify as social habit behavior, social mannerisms, politeness, sincerity, suavity, encouraging, deprecatory, appreciatory, dissenting, dissembling, mercenary, artistic, efficient, exact, conforming reactions, etc. Without attempting to specify precise stimuli for each case, the categories of which should be of infinite length, we might point out that a differentiation of the members of this class of habits can be made by considering that the stimuli include things, persons, institutions, and conditions of every variety. Efficiency and industry habits are responses to physical-social stimuli; mercenary and exact habits probably correlate with social conditions or stimuli, while sincerity and suavity responses correspond to persons as stimuli.

c. Both interesting and important are the numerous habit responses, which because of their particular morphologic organization, we may call feeling actions. In this class we may place sentiments, faith, reverence, awe, prayer, and mystic exaltation reactions to what we might call religious stimuli conditions and situations. Also, among these feeling habits we classify love reactions toward persons, and appreciative responses to art objects and æsthetic works of nature. Easily recognized are the feeling habits of depression and incipient melancholia which we acquire as responses to social stimuli of various sorts and to some sorts of physical stimuli also. Faith habits need not be connected merely with supernatural things or conditions represented by words or other institutions, but we develop faith reactions to our capacities and success in life, or acquire faith in other persons and in social institutions. When we consider such habit responses as sentiments we are more than ever convinced of the large series of specific stimulating situations to which we respond with complex feeling habits; for we make sentiment responses to all kinds of political, moral, economic, religious, and æsthetic situations. It will not be superfluous to mention again that our criterion in this class of habit responses is mainly morphological. To be specific, we might propose the hypothesis that these responses involve large elements of glandular, autonomic—nervous, and affective factors irrespective of the stimuli with which they are connected.

d. To another series of complex social reactions we give the name intellectual habits. To the intellectual surroundings about us we acquire direct and immediate modes of response. Morphologically all the members of this series when considered as a class are more alike than unlike, while the members of any specific one of the types differ more from the members of non-intellectual

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habit series than from any specific type of the intellectual series. But this fact of morphological likeness between the members of the intellectual habit series does not extend at all to their functional character for in their operation the different members are unique. To illustrate this difference we propose to call these habit reactions, attitudes, opinions, beliefs, convictions and intuitions.

1. By intellectual habits we mean the fairly vague cultural responses to intellectual stimuli. Workingmen respond habitually to problems affecting them in a manner that we might call a worker's standpoint. Similarly the capitalist is habituated to think in terms of the increase and conservation of capital and industrial control. Habits are very directly connected with the group auspices under which they are formed. Thus nationality, social stratum, profession, clubs, churches and in fact every group connection modifies the cultural attitudes, no matter what the individual starts with. Naturally there are many factors which condition this modification of intellectual attitudes, among which are length of contact with the present person or group, besides stability and authority of the stimuli in the situation.

2. Opinions as intellectual habits are specific intellectual attitudes concerning particular facts and conditions surrounding the individual; they are the permanent records of the results achieved from the specific problems a person has faced and are genuine products of the interaction of an individual with his informational surroundings.

3. Intuitions are subtle modes of intellectual responses developed within the boundaries of a given field. Individuals appear to have capacity to perform certain intellectual functions with an ease, rapidity, and correctness which on the part of others requires long and laborious calculation and reasoning. In the popular mind women are especially gifted with this power, but this conclusion, as all those of similar origin, is unwarranted by fact. Intuition is an everyday capacity possessed by all individuals in a certain degree. Women who have had family responsibilities for a considerable time come to discern with acuteness and subtlety the conditions affecting the home group. They habituate themselves so efficiently to conditions influencing the family and its interests that they become marvelously adept in observing untoward changes in it, and respond immediately in the way of correcting these undesirable conditions. The same situation prevails in the case of the experienced business man who seems to solve his problems without any reasoning. Here the fact is the same as in the preceding case; long familiarity with similar conditions engenders a capacity to short-cut the solution; the usual trial-and-error factors are gradually eliminated. The individual concerned has learned precisely how and where to direct his atten-

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tion in the particular case; the facts in the situation need not be elicited; they appear directly upon the surface. Intuition then is a habit of solving problems of all sorts no matter what they are specifically, whether practical problems of everyday life or technical problems of commerce, industry, law or what not. Intuitive modes of intellectual activity are especially common in mathematical studies and the consequence of this sort of integration we have been describing is that the mathematician solves complex problems by ostensibly merely glancing at them.

4. Belief habits are very similar to opinions but a difference can be located in the definiteness with which the person is in contact with the informational stimuli. Belief habits are actions integrated with stimuli facts to which the individual reacts in such a way that the facts in question are inadequately known or appreciated by the acting individual. Possibly it is true also that belief habits are the connecting links between intellectual and feeling habits.

5. Convictions are definite modes of intellectual response towards somewhat less specific informational stimuli and conditions and are more deeply rooted in the behavior equipment of the individual than are opinions. That is to say, a greater element of social convention enters into the process of building up convictions. Consequently they are more obviously a part of our intellectual equipment and refer to more prevalent and stable facts and conditions in our cultural milieu. Also, convictions may be said to be characterized by a lesser appreciation on the part of the individual as to the conditions which led up to their acquisition than is the case with opinions.

Other intellectual habit responses might be isolated and in each case we would find a typical form of response coupled very intimately with some sort of social or intellectual stimulus situation. We need only mention impressions of all sorts, superstitions, prejudices, and conventional views, to make clear that the list of intellectual habits is a longer one than we have intimated. Consider the infinite possibilities for the integration of habit responses which are found in and suggested by the various cultural and social institutions about us. To make a catalogue of our habit equipment we would have to point out the responses induced in us by all our surrounding economic, social, national, religious, political, and intellectual institutions.

Habits Integrated with Personal Stimuli

Since personal stimuli are merely social institutions of various sorts deliberately modified or accepted by the individual we naturally expect that habit reactions to such stimuli will be more refined and individual responses of the same general order as we have just discussed. One feature above all stands out, however, to characterize habits integrated with personal stimuli, and this we may

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define as a peculiar intimacy of response in any particular case and a definite coloring by the peculiar behavior equipment of the person.

Among the prominent habit reactions in this class we may mention ideals of all sorts, moral, social, scientific, æsthetic, etc., ambitions, strivings, criticisms, and other familiar adjustments to personal stimuli. We should not expect of course to find any degree of commonalty between the personal, habit equipment of different individuals.

From our study it should seem strikingly clear that such a catalogue of habit traits or characteristics of behavior can only be very fragmentary and schematic. Any enumeration that is made must very obviously be merely a sample of any person's equipment. In the first place, it is impossible thus to catalogue all the habits that are acquired by various individuals since the list would be of appalling length. In the second place, no significant catalogue can be made unless it is taken from the equipment of specific individuals. Above all we must observe that the names we apply to habit reactions are not only not absolute terms representing a single form of habit, but as we have already indicated they are not exclusively the names of habit responses. They may just as easily be applied to acts which do not answer to the particular integration characteristics which we have suggested as the particular marks of habit behavior segments.

How Habit Responses are Acquired

To inquire into the mechanism of the acquisition of habit responses means to investigate the conditions under which they are built up. Immediately we observe that two sets of such conditions must be attended to, since habit acts have two salient features, namely the stimuli situations and their corresponding responses. Accordingly we find in this fact a natural division of our inquiry.

a. Response conditions

Under this rubric we may discuss the conditions of habit formation which have to do mainly with the response factors of habit behavior. First we may point out two main sources for the development of the habit response systems.

1. The Development of new reaction systems

The organism has at any period in its career a definite equipment of response systems which have been developed upon a basis of previously acquired ones. Now the newer organization, or perhaps we should say, in some cases at least, the reorganization of response systems, is a process of integrating a larger action system by the stimulation of some given stimulus object or condition. In the final analysis these habit response acquisitions go back to what we may call basic behavior, that is to say, the first and original adaptive responses. The latter in turn were integrated from simple responses which may not improperly be called organic responses and original action properties of the individual.

2. Another and equally fruitful way of developing habit response systems is by conditioning reactions we already possess.

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This process is very similar if not identical with that of conditioning reflexes, and exemplifies admirably the essential feature of habit behavior, namely the integration of responses with stimuli. Through this second mode of habit formation are built up the large majority of social habit responses.

b. Stimuli conditions

In some cases the stimuli may be correctly said to be responsible for the cultivation or establishment of the habit responses with which they are connected. Among the stimuli conditioning habit reactions are the following.

1. Natural objects and conditions

Because we have around us physical objects, persons of particular sorts, and physical conditions we integrate with them specific modes of behavior. To illustrate, it is almost inevitable that we build up swimming or rowing habits when we live near a river or other body of water and especially if we must frequently cross the stream. We must consider habit responses as essentially adaptive functions. Consequently when the natural surroundings dictate, the appropriate responses will be acquired. The same may be said about the acquisition of language habit reactions. Language conditions necessitate the building up of particular sorts of verbal and speech reactions.

2. The Person's own Reactions

Exceedingly important as stimuli conditions for the development of habits are the individual's own responses. Frequently we build up habit reactions because some of our own previously acquired responses acting as stimuli make such an acquisition necessary. Doubtless in our dressing, writing, and similar behavior we have many examples of responses forcing themselves as stimuli into integrational connection with other responses as the stimuli phases of habit, behavior segments.

3. Interoceptive or Organic Reflexes

A common and well known stimulus condition for the acquisition of habit responses is the functioning of the person's own organic reflexes. In fact these reactions play so large a rôle as habit stimuli that they deserve special mention. With such stimuli are integrated the habit responses popularly called drug and drink habits, as well as other cravings socially disapproved of. In these phenomena we have a definitely circular process, in that we acquire the stimulus as a habit response. The ordinary mechanism is somewhat as follows. Through contact with liquors, drugs, and other objects we develop organic reflexes of all varieties which may be considered as organized into definite habit responses. Because these responses are organic reflexes they are easily aroused to action. But in the course of their organization these organic habits become integrated with various overt manual and social acts which have become in a genuine way responses to the organic habits as stimuli; so that now when the organic reactions are functioning they serve as stimuli to call out the other actions. It is these latter we are calling the habits in this case, although the phases of drug habits which we call the coercive and distressing features

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may appear as the typical features in the habit situation. These types of habit actions are peculiar among all the habits of our behavior equipment in the fact that only in them are the stimuli in any way increased or modified.

4. Human or Social Conditions

For the formation of complex social habit responses a definite series of human conditions are urgently operative. We need mention only the economic, social, and moral pressures exerted upon us by our surrounding conditions. Frequently such conditions are direct adjustmental stimuli for the acquisition of habit responses, but in many other cases these economic, social, and educational conditions serve merely as auxiliary stimuli. Consider the particular thought habits of a person who is definitely an adherent of a certain professional or other vocational group. How differently the minister appreciates social dicta and how much more sensitive he is than the gambler or other person who profits more by various unconformities to group pronouncements than by the support and perpetuation of them. Also, within a fairly restricted circle we can observe how much more stable and definite are scientific facts and formulations to the teacher of them or the practitioner who uses them than to the discoverer and the investigator. And how much more easily the discoverer is induced to question and relinquish what are considered facts than the physician or teacher.

5. Social Institutions

Meriting special discussion are the social institutions among which we all live and which almost inevitably and imperiously compel us to build up all descriptions of social habits. By social institutions are meant customs, conventions, organizations, and actions which are common stimuli for the behavior of the various individuals forming the groups among which we carry on our behavior. Many if not most of what are called social traits consist of social habits acquired through contact with institutional stimuli.

6. Personal Stimuli

A very important form of habit responses consists of those which we are practically forced to acquire as responses to personal stimuli, prominent among which are the attitudes, thoughts, and beliefs of other persons directed toward the high estimation and the furtherance of our interests and advantages. We are therefore forced to acquire habits, actions, and thoughts for the preservation and progression of those interests. How many such habits the person actually acquires it is almost impossible to estimate, but that the list is an enormous one it is not difficult to convince ourselves.

In connection with habit stimuli a very interesting and important problem arises with respect to the influence our intentions have upon the acquisition of our habit behavior equipment. In the simple responses to natural objects it is clear that the person's intentions are as far removed from the acquisitional situations as

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can be. But in the acquisition of our complex social habit responses a far different condition prevails. In the more complex situations we may be very definitely and very largely conditioned by our choice and preference. We intentionally build up habit responses of all sorts to suit our own fancy and purposes both by our interest in the results to be obtained from the possession of the habit and our interest in the action itself. When the intention of the individual is considered in connection with various stimulating circumstances we may properly speak of the motivation operative in habit formation. For by motivation we mean the process of weighing and evaluating the various objects and conditions stimulating us to action. When we have a problem of motivation in connection with habit formation we may properly say, then, that we are considering both the response and stimuli phases of the habit situation. Typical of intentional habit reaction acquisitions are the mannerisms, customs, and accomplishments we build up in order to attain to a certain level of society or to gain an advantage over other persons or groups.

c. Combination stimuli and response conditions

A great many of our habit responses are acquired through the influence of both stimuli and response conditions operating at once, but contrary to our other two cases in which either the stimuli or response conditions were more predominant, in this case the two conditions are equally prominent. Specifically, these twofold influences upon our processes of habit formation may be considered as identical with the general conditions of association, commonly referred to as frequency and recency of contact, the condition of the organism at the time, etc.

Modification of Action through the Operation of Habits

Very definite are the modifications brought about in the individual's action through the operation of habit responses. Especially is this clear when we distinguish simple habit behavior from more complex social habit acts. For the modes of operation of these varying types of habit are entirely different and the consequences to the organism may even be incomparable in the two cases. So far as the consequences to the person are concerned it appears generally true that the manner in which the simpler actions operate determines an increase or decrease of efficiency on the part of the person. In the case of the complex habit responses, on the other hand, we usually discern no particular effect upon the individual's ordinary behavior circumstances. Upon the fact of the presence of different forms of habit reactions we may describe the changes introduced in the person's action.

In the case of simpler habit reactions we may enumerate without any attempt at logical organization the following different ways in which the person's action is modified through the influence of habit function.

In the first place, action may be or appear simplified and easy to accomplish, a fact whose plausibility follows from the funda-

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mental character of a habit response. If the habit action consists of an intimate integration of reaction systems, then clearly the adaptive actions will be very simple. How simple appears the work of the expert typist, that is, the person who has integrated many reactions with typewriting stimuli, as compared with the learner. Exactly the same situation may be observed in the case of dancing, swimming, driving an automobile, or in the manipulation of any other sort of machine.

Accuracy also appears to be an almost inevitable outcome of the integration of responses and stimuli. This condition is especially observed in the situation in which skilled acts are employed in the production of intricate objects and mechanisms such as the drawing of maps, the engraving of plates or the manufacture of chronometers. To a considerable extent this accuracy resulting from building up of habit behavior segments is directly traceable to the specificity of stimulus-response integration. An excellent example is found in language habits. A child may be observed to speak correctly to his parents but to use different words in speaking to his companions.

Speed as well as accuracy is achieved in the adaptive responses by the integrative process. The automobile driver who has effectively integrated his responses with their appropriate stimuli operates his machine with such rapidity as to avoid entirely the dangers and accidents which are the lot of the person who has only partially integrated his responses and stimuli or perhaps has not done so at all. The increased productiveness of the expert worker is in large measure to be accounted for by his integration of specific habit reactions with particular stimuli objects and conditions.

Because habit responses work so easily and so accurately the individual can do more work in a given time with less fatigue. This fact means really that a given amount of product can be obtained with a great reduction of unnecessary movement and therefore with a slighter expenditure of energy. For a given period of time, therefore, and for a given amount of work the individual need not become nearly so much fatigued as is the case when the responses are not, other things being equal, automatized. Naturally under such conditions the individual can attain a higher efficiency of production than would otherwise be the case.

Again, since each specific operation is smoother and more rapid the person can do a larger number of things in a given time. No better can this point be illustrated than by the case of the experienced automobile driver who can do several things at once, for example carry on a conversation though he is driving through a maze of traffic. The usual deliberate control of acts of a manual sort is obviated, since the integration of responses with stimuli means that the actions are conditioned primarily by the stimuli without much attention on the part of the active person.

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Whatever is true of the effective and performative habit responses that we have just been reviewing is likewise true of the various intellectual and æsthetic habit reactions. The experienced lawyer can greatly facilitate the conduct of a case because he has built up a large set of legal habit behavior segments with legal information and procedure as the stimuli. Similarly, the physician with the largest diagnostic habits integrated with disease symptoms is by far the most skillful and efficient practitioner.

Our discussion of the operation of the simplest habit responses cannot be completed until we have added two qualifying statements to the whole series of remarks already made. The first point is, that while our illustrations have all been taken from the domain of comparatively simple responses they are not in fact confined to them. Advantages accruing from habit acquisitions may operate in the solution of simpler mathematical and other problems as well as in more definite performative responses.

The second qualification refers to the fact that while all of the habit reactions work out in the way we have suggested because of the interrelation between the stimuli and their responses, habit actions are not always necessarily beneficial to the person who has acquired them. Quite as frequently as not the possession of habit responses in the equipment of individuals will mean their inefficiency on the whole, and the defectiveness of much of their behavior. It is obvious that when we possess a number of habits of a particular sort we are *ipso facto* conditioned in our responses and thus limited in our variability and adaptability. In many cases we are in this way prevented from building up other and perhaps better responses to given situations. Again, habit integrations lead to uniformities of action which militate against necessary changes or improvements. More striking does the problem of utility appear when we consider that various tics, choreic movements, as well as personal mannerisms are habit responses. Invariably in every case such habit responses constitute distinct disadvantages to the person who has built them up.

Turning now to a consideration of the modification in a person's behavior induced by the building up of complex habit reactions, we discover that they affect most strikingly the character of the person rather than the way he adapts himself. Not that the latter factor is entirely excluded. It is possible that by acquiring certain complex social habits we may be liked and approved of, and in consequence achieve and maintain a place for ourselves in the esteem and graces of our contemporaries, with perhaps the result that we obtain some economic or other immediately adaptational advantage. Of course, here as in the case of the simpler habit situations one may acquire habit reactions that will redound most unfavorably to one's economic and social position.

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The changes in one's general personality and equipmental status are illustrated by the case of a person who develops habits of musical talents, accomplishments, and abilities. Now whether or not he profits economically from the possession of such habits he will have definitely modified his personality, not only by adding musical habits to his equipment but also by the effect the latter will have upon the rest of his equipment. The building up of such musical habits does definitely place the person in a particular position with respect to equipmental excellence. This proposition assumes of course that musical habits are valuable. But the proposition carries over to any and all kinds of habit equipment.

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Because of the nature of the facts involved, habits have traditionally been more faithfully described as they occur than perhaps any other kind of action. Also, habits have been treated in almost every period of psychological development.

Especially in the modern development of psychology have the Scottish psychologists been interested in the study of what they have called the active powers. For example, Reid (*Essays on the Active Powers of Man* 1785) has defined habit in much the same way that it has been treated in still more recent times. In the Scottish period the emphasis on the active powers may be considered to have been to a certain extent a protest against the over-intellectualization of psychological phenomena by Berkeley, Hume, and the other so-called associationists.

With the rise of the evolutionary development and the consequent emphasis on biological factors in psychological phenomena, the study of habits and other activities became a more pronounced condition still in the psychological tradition. For example, with Spencer and Bain (*Principles of Psychology,* and *Emotions and the Will,* respectively), the discussion of actions takes a very prominent place in psychological treatises.

The interpretations of habit, however, have not been so successful. One of the most outstanding difficulties has been that habits, as also movement and gross actions in general, were considered to be something distinct from knowledge or the so-called ideational processes or even feelings. Accordingly, in the earlier period habits were interpreted as active mental powers, and as such different of course from the intellectual powers. In more recent times, the emphasis has been placed on the bodily character of habits, so that habit came to be a name for motor activities of various types. Thus habits were presumed to consist of only a limited number of overt and effective actions. This latter view of habits is most brilliantly presented in James' Principles. In detail, then, the most comprehensive and authoritative interpretation of habits came to be that of the organization of neural elements. Not only the habit response as such, but also its formation and modification were explained in this way.

Aside from the numerous destructive criticisms to which the neuronic theory is subject (not the least of which is the necessity to assume that while some higher neural structures have a part in the formation of habits, these must give way in the later opera-

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tion of the habit reaction to lower neural centers) there are, we believe, other objections.

In consequence, we might contrast the traditional discussion of habits with the viewpoint presented in the foregoing chapter. In the first place, habits are no more considered by us to be motor actions than any other kind. In the second place, the basis for habit formation is not put in some feature of the habit reaction system, but rather, habit activities are considered to be behavior equipment of the individual more intimately integrated with their correlated stimuli than is the case, with other reaction systems. The view submitted we believe constitutes a more factual description of habit activities.

END OF VOLUME I.

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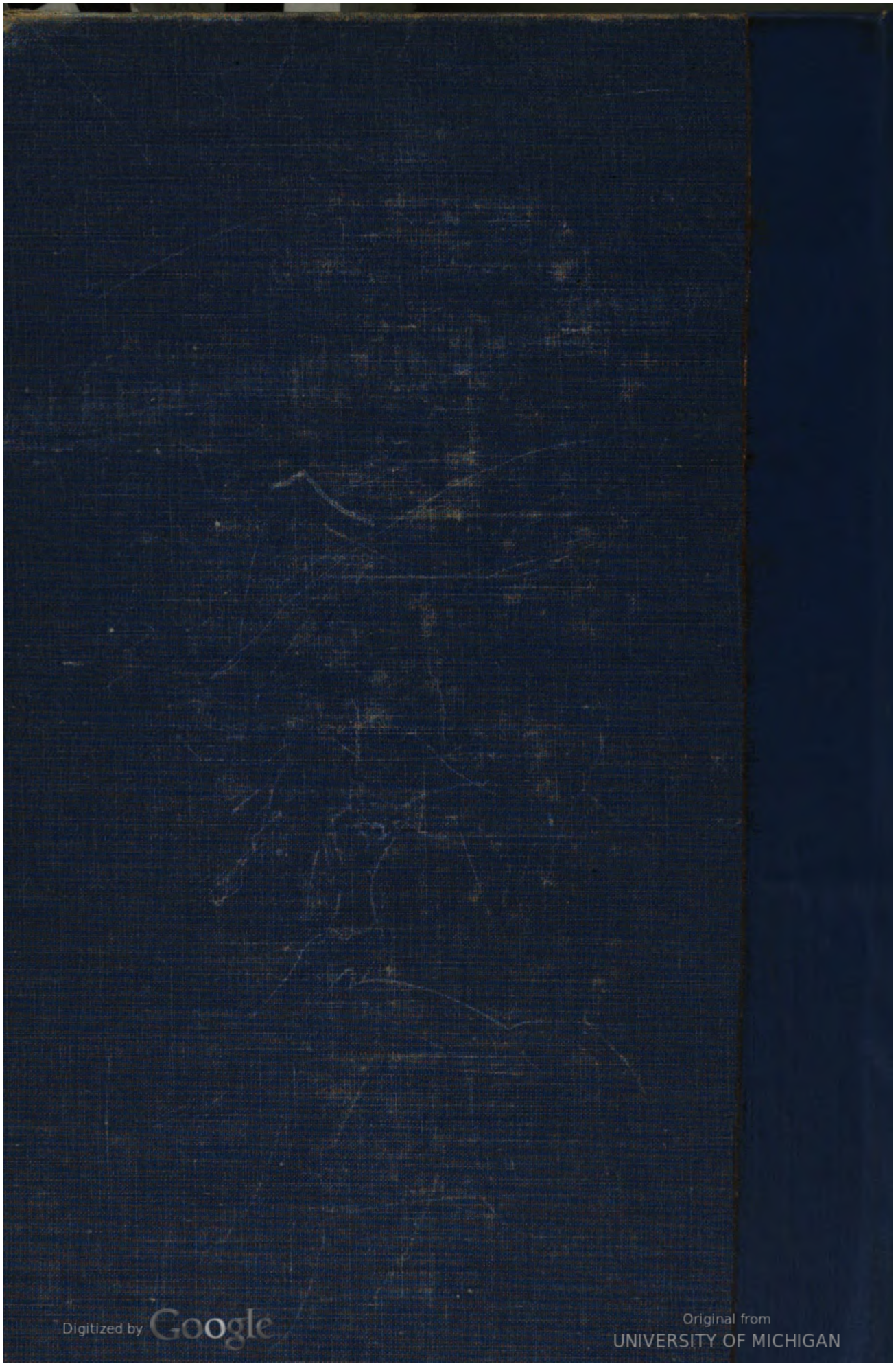
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