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ADVANCED EDUCATIONAL PSYCHOLOGY

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Advanced Educational Psychology

Edited by

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Preface

Public policy statements on vital indicators of development, such as, health, education, child development and family welfare have been welcome in recent years. They supplement, and in most cases, complement broad-based and generally focussed schemes, including Operation Blackboard, Literacy Mission, Health Cover for All by 2000, Navodaya Schools and others designed for the specific benefit of the millions of the country's poor, deprived, isolated and neglected masses. The efforts of planners and policy-makers has been motivated by the broad principles of the welfare state. Inputs need to be conceived, structured and channellised into the development mainstream. The present publication is a modest attempt in this direction.

It deals with the critical segment of educational psychology and covers such valuable aspects as: learning theories, race and intelligence, intelligence and attainment, personality determinants, personality development, and personality and cognition. The book fulfills a long-felt need in the field of educational research and training.

TARA CHAND

RAVI PRAKASH

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1 Contemporary Learning Theories

The two most prominent families of contemporary learning theory are stimulus-response associationisms and Gestalt-field theories. These have been in process of development throughout the twentieth century and have roots which extend back into earlier centuries. Their immediate fore-runners were mental discipline and apperception. In a sense, both families were protests against inadequacies and inconsistencies of earlier psychological systems.

This chapter develops "background thinking" which underpins the positions of the two families in regard to learning. It traces how they developed historically, their philosophical implications, and their chief assumptions about the role of psychology. It then shows how adherents of the two families differ in their interpretations of perceptive and motivational processes.

During the 1920s and 1930s, teachers' colleges moved away from Herbartianism as such. This is not to say that Herbartian ideas were completely dead. They were then, and are today, accepted and practiced by many teachers. However, before the twentieth century had been under way long, a new form of associationism had become popular. This was a nonmentalistic, or physiological, associationism. Its chief exponents during the first third of the century were John B. Watson (1878-1958) and

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Edward L. Thorndike (1874-1949). Watson's psychology was known as behaviourism. Thorndike's was called connectionism, but it too, in the broadest sense of the term, was "behaviouristic." Although the psychological systems of Thorndike and Watson no longer are advocated in their original form, many contemporary psychologists have a sufficiently similar orientation properly to be termed "neobehaviourists". The psychological theories supported by these persons may be identified as stimulus-response associationisms.

The second major family of contemporary learning theories originated in Germany. In 1912 a German psychologist-philosopher, Max Wertheimer, presented a body of theory which came to be known as Gestalt psychology.

Gestalt is a German noun for which there is no English word equivalent, so the term was carried over into English psychological literature. The nearest English translation of Gestalt is "configuration." Various other persons who had been thinking along similar lines contributed to this new school of thought. As Gestalt psychology evolved, other names such as field, phenomenological, and organismic psychology became associated with it. In this book, we refer to related theories which originated from Gestalt psychology as Gestalt-field or cognitive-field psychology. Gestalt-field psychology was introduced into the United States in the middle 1920s. It has gathered a large number of exponents and now can be considered the leading rival of S-R associationism. However, a great many psychologists are eclectic in the sense that they borrow elements from both schools of thought and identify themselves with neither.

Students should be aware of the fact that within each of the two families of psychological theory there is considerable diversity. For example, in the S-R family, followers of Clark Hull and B. F. Skinner would be in disagreement on many points. Likewise, in the Gestalt-field family, followers of Kurt Lewin differ considerably in outlook from followers of Kurt Koffka or G. W. Hartmann. The situation in psychology is somewhat like that in politics; many persons gravitate toward one or the other of our two political parties, but in spite of some common interests, both Democrats and Republicans exhibit a wide range of views. In final analysis, however, S-R associationists have certain key ideas in common, just as do the Gestalt-field psychologists. It is proper

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to consider each category as a definite grouping which can be discussed in terms of the ideas common to its members.

If students are aware that in spite of variance within each family the two families differ sharply, they will understand the ensuing chapters on learning better. To fundamental issues in psychology the two families provide answers which are often quite incompatible. In dealing with the following questions, a person oriented toward S-R associationism is likely to give a significantly different answer from that given by a Gestalt-field theorist. What is intelligence? What happens when we remember and when we forget? What is perception? What is motivation? What is thinking? What is the role of practice in learning? How does learning transfer to other situations? These and many other questions are controversial in the sense that psychologists with different learnings will offer diverse answers.

Before a student adopts the orientation of one family of psychology or the other, he should recognize that objections may be made to any position one takes in psychology and to any currently available theory of learning. However, although the evidence is not clear enough to warrant dogmatic assertions about learning, he may emerge with the feeling that the ideas central to one family of psychological theory are more tenable and have fewer disadvantages than the ideas central to the other.

Although all modern psychologists, irrespective of their orientation, generally accept the methods and results of experimentation, there is wide divergence in interpretation of experimental results and equally wide divergence on how a given interpretation should be applied in solution of a concrete learning problem. These differences appear to stem from disagreement over the fundamental nature of man, the relationship of man to his environment, and the nature of perception and motivation. In spite of disclaimers by some psychologists, it also appears impossible to detach a number of issues in psychology from related issues in philosophy. A psychologist's philosophical learning may not only determine the kinds of experiments he conducts but also influence the conclusions he draws from experimentation.

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WHAT ARE THE ORIGINS OF S-R ASSOCIATIONISM?

Early associationists were interested primarily in mental phenomena; their concern was the association of ideas in minds. Modern associationism is rooted in a different kind of interest—the physiology of bodies.

Nineteenth-century forerunners of modern experimental psychology tended to be philosophical dualists; they considered men to consist of minds and bodies, each genuinely real. There was a good deal of speculation in regard to the nature of the relationship of minds and bodies, but seldom denial of the reality of either. In the transition period between Herbart (1776-1841) and Watson (1878-1958) much vacillation took place between emphasis upon the workings of biological organisms and the functions of minds.

During the first half of the nineteenth century, experimental psychology got its start within experimental physiology. The physiologists Bell and Muller became occupied with testing the workings of the nervous system in seeing and hearing. Thus they became psychologists even though they did not call themselves such.

Wilhelm Wundt (1832-1920) was trained in medicine. He turned from medicine to physiology and from physiology to psychology. In 1879 he established the first psychological laboratory of modern history. His method was introspection; he and his students observed the workings of their respective minds. Students from various parts of the world went to Wundt's laboratory at Leipzig to study introspection. But many became psychological heretics; they turned to study of observable behaviour of other persons and animals.

Interest in bodily functioning became apparent among many psychologists late in the nineteenth century. This group of "physiological psychologists" argued that psychology could become a true science only if it switched its focus to bodily processes. In a century which placed ever increasing emphasis upon experimental science, introspection came more and more to appear a highly unreliable procedure. A person could reflect upon the workings of his own mind, but what did this

prove? Scientists were ceasing to be concerned with any kind of evidence

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which was not "publicly verifiable"—that is, subject to public observation and tests. Thus they began to focus their attention on objects or events which could be observed with the "five senses" and studied in the same manner by any number of trained investigators and lead to uniform conclusions.

To a growing number of psychologists, the only logical alternative to the method of introspection was to focus on observable forms of behaviour. Such behaviour includes not only bodily movement as seen by an observer watching a subject but also the internal physical processes related to overt bodily behaviour. Why adrenalin is secreted and how long it takes a person to react to a pinprick are equally proper to a physiological psychologist. Both can be measured objectively, described in terms of definite mechanical sequences or quantities, and reported statistically. Before the twentieth century was very far along, a large number of psychologists has come to feel that psychology, in time, could be made as "scientific" as physics.

We shall name only a few of the persons who contributed to the development of physiological psychology. Marshall Hall (1790-1857) did pioneering work on the neural basis of reflex behaviour. Pierre Flourens (1794-1867) demonstrated that different parts of the nervous system have different functions and he took important steps toward identifying the function of each part. Flourens also proposed that conclusions drawn from animal experimentation should be equally applicable to man. This notion gained wide acceptance and greatly simplified the work of experimental psychologists: after all, it is much cheaper and more convenient to experiment with rats than with human beings.

Some of the most notable animal experiments of the late nineteenth and early twentieth centuries were conducted by the Russian physiologist Ivan Petrovich Pavlov (1849-1936). Pavlov put food before a hungry dog and sounded a bell or tuning fork. He found that, if this procedure was repeated enough times, the sound alone would cause the dog to salivate. As we shall see, Pavlov's work was extremely influential, and nowhere more so than among the growing group of S-R associationists in the United States. Thorndike's animal experiments, making use of chicks, dogs, and cats, were possibly even more comprehensive than Pavlov's and, over the long run, more influential in the United States. His famous "laws of learning" were derived mainly from

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his interpretation of how cats behave when placed in a cage from which they do not know how to escape—until they learn. Since Thorndike was a dominant figure in psychology for almost half a century, we describe some of his ideas in detail.

Thorndike's Connectionism

Thorndike was an eclectic in the sense that he retained in his thinking certain elements of Herbartian "idea associationism." At the same time, he was strongly influenced by the new physiological psychology. In his writings he talks of both physical and mental units. He assumed that there are both physical and mental events, and that learning is a process of linking the two in various combinations. A mental unit was something sensed or perceived; a physical unit was a stimulus or a response. Specifically, he saw learning as a process of connecting a mental with a physical unit, a physical with a mental unit, a mental with a mental unit, or a physical with a physical unit.

Thorndike's theory of learning is called S-R bond theory or connectionism. It assumes that, through conditioning, specific responses come to be linked with specific stimuli. These links, bonds, or connections are products of a biological change in a nervous system. Thorndike thought that the chief way in which S-R connections were formed was through random trial and error (or selecting and connecting). It is probably because of Thorndike's influence that the term trial and error became popularized and found its way into the vocabularies of many Americans.

In a typical trial-and-error experiment, Thorndike would place a cat in a cage which could be opened from inside only by striking a latch or button. The cat would claw, bite, and scurry wildly about until it accidentally touched the release and was freed. The experiment would be repeated and the animal would behave the same except that over the course of a number of successive "trials" the total time required by the cat to get out would decrease. Eventually the cat would learn to escape immediately without random activity. Thorndike inferred from the timed behaviour of his cats that learning was a process of "stamping in" connections in the nervous system and had nothing to do with insight or "catching on."

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Thorndike formulated a number of laws of learning and classified them as either primary or secondary. We describe here

only his three primary laws:

1. The laws of exercise or repetition : According to this law, the more times a stimulus-induced response is repeated, the longer it will be retained. As Thorndike put it, "Other things being equal, exercise strengthens the bond between situation and response." Conversely, a bond is weakened through failure to exercise it.

2. The law of effect : The law of effect states the famous pleasure-pain principle so frequently associated with Thorndike's name. A response is strengthened if it is followed by pleasure and weakened if followed by displeasure. Or, in Thorndike's words, "..... a modifiable connection being made.....between an S and an R and being accompanied or followed by a satisfying state of affairs man responds, other things being equal, by an increase in the strength of that connection. To a connection similar, save that an annoying state of affairs goes with or follows it, man responds, other things being equal, by a decrease in the strength of the connection."

3. The law of readiness : Thorndike termed the neuron (or neurons) and the synapse (or synapses) involved in establishment of a specific bond or connection a conduction unit. He assumed that, because of the structure of a nervous system, in a given situation certain conduction units are more predisposed to conduct than others. And "for a conduction unit ready to conduct to do so is satisfying, and for it not to do so is annoying."

In his later writings Thorndike disavowed his law of exercise or repetition and one-half—the annoyance aspect—of his law of effect. But he seemed not to have had the courage of his convictions. Through implication, he continued to emphasize repetition in learning. His law of effect shifted its emphasis to pleasure, but the pain aspect was not completely discarded.

Students will readily see that Thorndike's laws of learning are closely related and may operate together. For example, if an organism is ready to respond, then response is pleasurable and this fact in itself will tend to fix the response. Students will also see that the laws appear to be exceedingly mechanical. Furthermore, they seem to leave no room for any sort of thought or insight, and they do not appear to require the assumption of any kind of purposiveness of man or lower animals.

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The psychological concept purposiveness has no direct relationship to the problem of cosmic or teleological purpose. Within a purposive psychology, as contrasted with a mechanistic one, we assume that each animal or person, whatever his developmental level, is seeking some end or purpose and that we can predict his behaviour most accurately when we anticipate what it is he is trying to accomplish.

Watson's Behaviourism

Watson felt much more strongly than Thorndike the need to base psychology exclusively on the concepts of physics and chemistry. To his way of thinking, mind and all kinds of mentalistic concepts were not only unsusceptible of scientific inquiry but also irrelevant to the real task of psychology. Watson drew heavily upon Pavlov's work and became convinced that learning was as Pavlov described it, namely, a process of building conditioned reflexes through the substitution of one stimulus for another.

Watson and other "pure behaviourists" came to reject certain of Thorndike's ideas because it seemed impossible to exclude mind and mind-related concepts from them. We have already mentioned that Thorndike talked of "mental units." The pure behaviourists were also bothered by Thorndike's concepts of satisfaction and annoyance. These seemed to behaviourists to be mentalistic concepts and better disregarded in a truly scientific psychology. In the tradition of the earlier physiological psychologists, Watson confined his study to only those aspects of animal life which are sufficiently overt to make possible highly objective observation and measurement.

One of Thorndike's secondary laws of learning, however, seemed very promising to the Watsonians. This was the "law of associative shifting," and it became the keystone for the behaviouristic movement of the 1920s.

According to this law, we may, "get any response of which a learner is capable associated with any situation to which he is sensitive." In other words, any response which is possible can be linked with any stimulus. An animal's "purposes or thoughts" have nothing to do with such learning. In fact, purpose and mentalistic thought supposedly are concepts outside the realm of scientific psychology. We may illustrate this law by using an example

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involving the training of an animal. Suppose we wish to train a dog to sit up at the verbal command "Sit". It is only necessary to induce the dog to sit up repeatedly by dangling a piece of meat or other food above him at the same time the

verbal command is issued. Once this procedure has been repeated enough times, the dog should respond properly—without error—whenever the command is given. In this example, as long as the same "adequate stimulus" is used throughout the experiment, it would not matter if the command were replaced by any other accompanying stimulus to which a dog is sensitive—a light, a bell, snapping the fingers, whistling. Furthermore, by using the same basic procedure, it should be possible to teach a dog to perform any other act of which it is capable—standing on its front legs, rolling over, playing dead, etc. This supposed principle of learning, fundamental to behaviourism, is the principle of stimulus substitution.

Behaviourists defined a living organism as a self-maintaining mechanism. They assumed that the essence of a human machine is a system of receptors (sense organs), conductors (neurons), switching organs (brain and spinal cord), and effectors (muscles) attached to levers (bones)—plus, of course, fueling and controlling organs such as stomach and glands. When an organism is defined in such mechanistic terms, mentalistic concepts can be entirely eliminated. Not only can they be dropped out of the picture but they actually begin to seem rather fanciful. (Can one imagine a machine having "tender sentiments" or "soaring on the imagination"?) Among behaviourists, there developed an attitude toward the earlier mentalistic psychologists similar to that of a modern physician toward a primitive witch doctor.

The position of a Watsonian behaviourist can be illustrated amusingly in a morning conversation. Ordinarily, a conventional greeting would go as follows: "Good morning, how are you?" "I'm fine, and yourself?" "Just fine." But such a greeting implies introspection. Each person is "looking into himself" in order to decide what kind of shape he is in. Presumably (according to a behaviourist) this is scientifically impossible; instead the two persons would need to inspect each other. The proper salutation of a behaviourist would be, "Good morning, you appear to be fine; how am I?"

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The Neobehaviourists

There is a large group of American psychologists today who assume that life can be explained in essentially mechanistic terms but who have adopted positions somewhat different from that of the Watsonian behaviourists. It might be said that Watsonian behaviourism, in its pure form is all but dead. Probably the best term to apply to contemporary S-R associationists is neobehaviourists.

Contemporary S-R associationists do not place nearly as much emphasis upon the operation of brain and nervous system as did their predecessors. Of course, Watson himself had felt that the precise nature of neural mechanisms was largely irrelevant to learning; but Watson's followers, as well as Thorndike, had exhibited a strong interest in neural physiology and the physical mechanics of S-R linkages. Interests of neobehaviourists lie in analyses of behaviour per se rather than in the neural mechanism behind it. They are still concerned with how S's and R's become linked but they are not greatly concerned with the precise operation of the physiological mechanism which lies between.

Neobehaviourists differ from the original behaviourists in another respect. In their experimentation, they have tended to focus attention upon response modification as well as stimulus substitution. Response modification refers to the fate of responses that have already been made—whether they will be strengthened or weakened by subsequent events. In this connection, continual reference is made in the literature of neobehaviourism to conditioning. Conditioning means strengthening of a response. It is achieved by stimulus substitution, i.e., accompanying an adequate stimulus by a new stimulus, or by response strengthening or modification, i.e., following a response with a stimulus which strengthens it.

Since Thorndike's concept of learning as a process of "stamping in" a response which was originally accidental is a form of response modification, one might say that many neobehaviourists have returned to Thorndike's conception of learning. However, most neobehaviourists are better systematizers than Thorndike. This is, they are more consistent, largely by virtue of their building systems, which do not at any point require

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as assumption of conscious behaviour. Thorndike tried to be highly mechanical, but the neobehaviourists have developed psychological theories which are more consistently mechanical than Thorndike's.

Another feature of neobehaviourism is its attempt to explain behaviour which appears purposive. Purposiveness has always bothered psychologists who are behaviouristically oriented because they have felt that purpose is difficult to explain without slipping into a mind-body dualism. However, what seems purposive must be explained in some way. Neobehaviourists tend to develop mechanical explanations for apparent purposiveness. Purposiveness is regarded as a product of a pattern of stimulation, in which certain stimuli are more potent than the rest and thus lead an organism in one way rather than another. Much purposiveness would be interpreted as "drive reduction," that is, a relieving reaction to the stimulation induced by organic drives such as hunger or sex. Neobehaviourists remain careful to explain apparent

purposiveness in a way which does not require the assumption of conscious behaviour or intelligent experience.

We shall mention but one more difference between the contemporary neobehaviourists and old-line pure behaviourists. Historically, behaviourism was "atomistic" in the sense that it focused on the elements of a situation. Attempts were made to identify specific stimuli and to describe the behaviour of an organism as a product of numerous discrete and isolable reactions. Today, S-R theorists talk in terms of "stimulus situations," i.e., complex configurations of stimulation, and of "molar behaviour," i.e., the coordinated behaviour of a whole act of an organism.

Well-known contemporary neobehaviourists include Edwin R. Guthrie, B. F. Skinner, K. W. Spence, and D. O. Hebb. All these psychologists and their followers are greatly interested in the psychology of learning. However, at one extreme Spence feels that in its present stage of development psychology has little to offer schools, and at the other extreme Skinner represents his psychology as the means of placing education on an efficient basis. Since Skinner's views are representative and extraordinarily clean-cut, Chapter 5 is devoted to an exposition of a Skinnerian psychology of learning.

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WHAT ARE THE ORIGINS OF GESTALT-FIELD PSYCHOLOGY?

As noted earlier in the chapter, the position of Gestalt psychology was formally stated first by the German philosopher-psychologist Max Wertheimer (1880-1943) in 1912. The central idea of Wertheimer's point of view is expressed in the German word Gestalt, which, as we have seen, means an organized pattern or configuration, or, more simply, an organized whole in contrast to a collection of parts. The notion that a thing cannot be understood by study of its constituent parts, but only by study of it as a totality, is probably very old. Gardner Murphy suggests that it can be found in the literature of pre-Socratic Greece. Various Greek writers proposed that the universe could best be understood through "laws of arrangement" or "principles of order," rather than through study of its basic building blocks, the elements. In contrast, other Greek writers were "atomists," i.e., they sought the key to understanding through a study of individual elements. Just as the former might be called the originators of the Gestalt idea, so might the latter be called the originators of the atomistic idea—which characterized early behaviourism.

Among the nineteenth-century forerunners of Wertheimer we should include Ernst Mach (1838-1916), likewise a German. Although Mach held that the worlds of physics and psychology are essentially the same, he also argued that psychology must take into account those sensations which do not correspond to the physical reality before the viewer. These "nonphysical" sensations are sensations of relationship. For example, a person may see three dots on a sheet of paper and think of them as the points of a triangle. There is nothing in individual dots to suggest this; it is their configuration that, prompts the relationship.

In the 1890s, following Mach, Christian Von Ehrenfels (1859-1932) pursued the same ideas. He stated that, in all perception, qualities appear which represent more than the physical items sensed. A perceiver tends to confer on the physical objects of perception a form, configuration, or meaning. He tries to organize or integrate what he sees. A school of thought began to form along the lines explored by these two men, and a new term came into use—Gestaltqualität, which means approximately "the quality conferred by a pattern."

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Wertheimer and his followers went still farther and formulated a series of "laws" of perception—Pragnanz, similarity, proximity, closure, good continuation, and membership character. According to the basic law of Pragnanz, if a perceptual field is disorganized when a person first experiences it, he imposes order on the field in a predictable way. The "predictable way" follows the other five subordinate laws. Similarity means that similar items (dots, for instance) tend to form groups in perception. Proximity means that perceptual groups are favoured according to the nearness of their respective parts.

Closure means that closed areas are more stable than unclosed ones. Draw a 340° arc and ask a viewer what you have drawn. He very likely will say "a circle." This is an example of closure to achieve closure is satisfying. Closure is an alternative to Thorndike's law of effect. Good continuation is closely related to closure. It means that, in perception, one tends to continue straight lines as straight lines and curves as curves.

According to the law of membership character, a single part of a whole does not have fixed characteristics; it gets its characteristics from the context in which it appears. As Gardner Murphy puts it, "The Gestaltist insists that the attributes or aspect of the component parts, insofar as they can be defined, are defined by their relations to the system as a whole in which they are functioning." For example, a patch of color in a painting derived its quality from its context—the surrounding picture pattern ??? rather than from anything inherent in itself.

In perception, organization of a field tends to be as simple and clear as the given conditions allow. A viewer imposes an organization characterized by stability, simplicity, regularity, and symmetry. He groups individual items in a field so they we have pattern. He relates similar items required for completeness and if present patterns are meaningful he tries to maintain then into the future. Imposing a "good" Gestalt, as happens when the foregoing events occur, is a psychological task. It does not necessarily involve any change in the physical environment. Rather, it represents a change in how a viewer sees his physical environment. However, problem solving often does require a person to manipulate his physical environment in order to make the various elements fall into proper place for a solution.

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Two of Wertheimer's German followers, Wolfgang Kohler (1887—) and Kurt Koffka (1886-1941), were mainly responsible for publicizing Gestalt psychology and establishing it in the United States. Kohler is famous, among other things, for his celebrated study of the learning process in chimpanzees (*The Mentality of Apes.*, 1925). He set out to test Thorndike's hypothesis that learning is a matter of trial and error in which correct responses are gradually stamped in. Kohler observed that, in addition to learning which might appear accidental, his apes displayed a type of learning which appeared insightful. Hence, Kohler concluded that Thorndike's laws of learning were inadequate. Koffka's book *Growth of the Mind* (1924) contained a detailed criticism of trial-and-error learning as conceived by Thorndike. Koffka not only criticized Thorndike; his book also was a critique of the major ideas of behaviourism.

Kurt Lewin (1890-1947), also German born, took the spirit of Gestalt theory, added to it some new concepts, and coined a new terminology. He developed a field psychology usually referred to as topological and vector psychology (deriving these terms from the fields of geometry and mechanics). Lewin spent his later years in the United States, where he acquired a considerable following. Because his psychology appears to be the most advanced and systematic field psychology, Chapter 4 is devoted to its expansion especially with reference to learning theory.

As a result of experimentation by the Gestalt-field psychologists, S-R associationists generally are coming to recognize that the earlier atomistic stimulus-response idea, based as it was on the principle of simple reflex arcs, does not explain human behaviour adequately. As previously indicated, there is a tendency among contemporary S-R psychologists to speak of "molar behaviour," i.e., behaviour of the whole organism in contrast to piecemeal, or "molecular," behaviour. Such psychologists characteristically refer to "total responses to patterns of stimulation." However, because these psychologists continue to think in terms of a mechanical linking of stimuli and responses, they are still within the basic pattern of S-R associationism. In spite of their adoption of the concept of molar behaviour, their point of view tends to be fundamentally different from, and incompatible with, that of Gestalt-field psychologists.

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WHAT IS THE PHILOSOPHICAL THINKING BEHIND THE TWO FAMILIES?

It is the purpose of this part of the chapter to explore some of the philosophical implications of the two families of psychology. When a contrast is drawn between their underlying philosophical premises, differences between the two families are made much clearer. Although psychologists have tried during the past century to divorce psychology and philosophy, it is doubtful that this is possible. There is no science so "pure" that it lacks philosophical implications. Even physicists find it helpful to make assumptions about the basic nature of their materials and processes; they too become involved in philosophical formulations.

Since any psychological system rests upon a particular conception of human nature, psychology is deeply involved with philosophy from the very start. Of the various positions a person may take on the question of the basic nature of man, we have seen that two—good-active and bad-active—are prescientific in the sense that they render judgments on man's hereditary moral nature. The issue among contemporary psychologists is whether man is an active creature of instincts (as exemplified in Freudian or neo-Freudian psychology), an essentially passive creature in a determining environment (as implied in S-R associationism), or a purposive person interacting with a psychological environment (as implied in Gestalt-field psychology). Each of the two latter positions harmonizes with a broad philosophical outlook: S-R associationism with philosophic positivism or realism, and Gestalt-field theory with a systematic relativism, also called pragmatism, experimentalism, or instrumentalism.

Realism and S-R Associationism

What is realism? Space permits only the barest treatment. Realists are convinced that the physical world experienced by human beings is real and essentially what it appears to be when observed through the senses. Furthermore, even if there

were no human beings around to observe it, it would exist in the same state. Existence is independent of a thing's being known. Realists assume that the physical world is governed by natural laws which

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operate inexorably and without change. They further assume that a basic principle of the universe is cause and effect; every event is determined by events that have gone before. The universe is a vast mechanism governed by laws which are essentially mechanical in nature.

A realist is likely to assume that there is a kind of hierarchy of the sciences, some being much more objective and reliable than others. He places at the top of the hierarchy physics and chemistry, aided by mathematics. These sciences are regarded as models, which other sciences should emulate. To a consistent realist, nothing should be asserted to be real or meaningful unless, through observation, it can be subjected to objective study, using only publicly verifiable data. If anything exists, it supposedly exists in some amount; if it exists in some amount, it can be measured.

Let us next see how this over-all point of view was transplanted to psychology. Early in human history, people commonly believed in animism, i.e., that all objects, including even rocks, have minds or spirits. Since primitive man had no other way of explaining most types of natural events, animism provided at least some basis for understanding. As people learned more about natural causation, animism declined in popularity. In other words, when human beings came to understand something about gravity, a person no longer needed to attribute a mind and will to a rock to know why it fell on his head.

As time went on, mechanical explanations began to be applied to all sorts of physical events involving nonliving objects. Increasingly the nonliving parts of the universe were believed to consist of atoms in motion, each inert by itself, but subject to the push and pull of lawful forces external to itself.

Living matter, particularly human beings, did not appear to conform to the mechanical concepts applied in the world of nature. Human beings seemed, on the surface at least, to be willful and unpredictable. Thus some kind of mind force was attributed to them. Some persons assumed that all living things have such a nonmaterial life force—a belief referred to as vitalism. Belief in a nonmaterial mind force as applied to human beings (body-mind dualism) led. The idea that learning is a process of disciplining or training minds gave us the classical tradition in education. Although actual teaching under the mind-training

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approach may appear highly mechanical, the conception of human nature underlying it definitely is nonmechanistic. It assumes a mind substance capable of free will and other spontaneous and "uncaused" behaviour.

All associationist psychologies tend to be mechanistic, in the sense that they describe man and thought in the same physicalistic terms as are used by natural scientists. All four psychologies—apperception, connectionism, behaviourism, and reinforcement began as mechanistic theories of learning. Thus, with their coming there was an accompanying move toward rejection of vitalism or any other conception of life inconsistent with realists' interpretation of the universe. Consequently, with the advent of associationistic psychology, psychologists found themselves in increasing sympathy with the tenets of realistic philosophy.

Mechanistic-realistic psychology was an outgrowth of the attempt by S-R theorists to make psychology as "scientific" as physics. The issue between mechanistic and nonmechanistic psychology is nowhere stated more clearly than by the contemporary neobehaviourist D. O. Hebb. Hebb says flatly that psychology's only hope of remaining scientific is to assume that man is basically a mechanism. He says that there are only two alternatives so far as the basic outlook of a psychologist is concerned—mechanism and vitalism. "Psychology," he says, "is the study of the more complex forms of organization in behaviour, and of the processes such as learning, perception or emotion which are involved in the organization.....Behaviour is the publicly observable activity of muscles or glands of external secretion as manifested in movements Of parts of the body or in the appearance of tears, sweat, saliva and so forth. The organization of behaviour is the pattern or combination, of separate items in relation to each other and to environmental stimulation."

Furthermore, with respect to the type of study which psychologists can undertake, he says, "All one can know about another's feelings and awareness is an inference from what he does—from his muscular contractions and glandular secretions." To a psychologist such as Hebb, Gestalt-field psychology would appear to be nothing more than "confusionism." The philosophical orientation of a mechanistic psychologist is so thoroughly realistic that any other outlook seems untenable.

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Among S-R theorists, much use is made of the concepts reflexes, reactions, objective measurement, quantitative data,

sequence of behaviour, and reinforcement schedules. They have used these and similar expressions in an attempt to be rigidly scientific. To them, stimulus and response in psychology are equated with cause and effect in physics.

In his approach to education a realist, and likewise an S-R associationist, is very much an environmentalist and determinist in the sense that he assumes that the surrounding environment should, and inescapably will, control closely the behaviours and learnings of students. Thus, teaching practices advocated by S-R psychologists are closely in tune with the realistic outlook. Such psychologists tend to recommend that subject matter be selected by qualified adults prior to the teaching act, that it reflect facts and skills which are useful in contemporary society, and that it be inculcated into students. There is an implicit assumption that, if a given item of subject matter impinges upon a student, there will be a definite and predictable effect. Only secondary, if any, mention is made of such concepts as student goals, motives, or problem solving.

Relativism and Gestalt-Field Psychology

Relativism has emerged during the past 70 or 80 years and is, in a sense, a reaction against the absolutistic ways which have characterized many facets of man's thinking throughout history. Relativism contrasts sharply with realism. The latter is absolutistic in that its exponents assume the existence of an ultimate reality which consists of fixed natural laws and they define truth as that which corresponds to natural law and consequently is unchanging. Relativists do not assert or deny absolute existence. Rather they define psychological reality as that which we make of what comes to us. They then deal with reality, so defined, in achieving truth and designing behaviour.

Probably the central idea of relativism is that a thing derives its qualities from its relationship to other things. A person may look at a patch of grass which is in shadow. Compared with grass in the full rays of the sun, the patch appears dark; but compared with grass at night, it appears light. A homely girl, in the company of girls even more homely, appears pretty. The way we perceive

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any object or event is colored by the total situation. This principle is actually one with which everyone is familiar. Relativistic philosophy does little more than explore and develop the numerous ramifications and implications of this central idea.

It might appear that if relativism were a valid concept a person could never make a definitive statement about anything, except to say that it "is closer than something else," "is to the left of something else," "is redder than something else," "is smaller than something else."

However, this is not an insurmountable problem. In order to view something relativistically, one simply determines a convenient vantage point—a frame of reference. A man can say that his automobile has 200 horsepower and such an assertion can be quite confident. The unit of measure, one horsepower, is an arbitrary measure—contrived by man and susceptible to future change—but it has definite usefulness as a point of reference. Such relatively fixed points of reference are relatively absolute. The word absolute, so used, is an adjective; it means no more than that the point of reference is one of relative fixity or stability.

If one assumes that things have to be dealt with relationally, rather than as things-in-themselves, a distinctive method of defining truth, or knowledge, and an equally distinctive method of arriving at truth are required. A relativist rejects the notion that man is able to find and use final or ultimate truth. Consequently, he has little, if any, interest in "eternal verities." Relativists regard knowledge as insights developed and held by human beings using human methods. As Bayles points out, the development of the notion that knowledge is a matter of human interpretation, and not a literal description of what exists external to man, reflects a shift from a realistic to a relativistic view of science. In physical science, it is no longer commonly said that an atom has certain properties; rather, one says that it acts as if it has these properties.

A scientific law (including a principle of psychology) is a statement which seems true to all or most of those who are competent to study the matter. The relativistic test of truth is anticipatory accuracy, not correspondence to ultimate reality. Thus, in a sense, a scientific law is a generalization about which there is considerable agreement among those scientifically competent in its areas; it is a matter of consensus. Its test, however,

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is not the consensus but its predictive accuracy. Relativists assume that no scientific law is "sacred"; any law may change, and indeed, over the course of time most will. A significant aspect of the thinking of relativists is their expectancy of change. They are much more likely than realists to think of both nature and culture as undergoing continuous modification.

But what grounds does a relativist have for judging anything true? To quote Bayles, an insight is considered true "if, and only if, the deduced behaviour pattern, when tested experientially or experimentally, produces the results which were anticipated." Thus, an insight is true if it proves to be reasonably accurate—if what one supposes will follow from its application actually follows. To put it colloquially, a statement is true if it "pans out." Truth, to a relativist, is not based upon "eternal and universal principles". It is man made, and man will change it as need be. This does not mean that truth is unimportant or ephemeral. It does mean that truth tends to evolve as human experience evolves. It also means that truth sometimes is quite personal and individualistic; what is true for me may not be true for you, even in situations which on the surface look quite similar. However, many relativistic truths are widely agreed upon within groups of various sizes; they are social truths.

Both realists and relativists assume that the most valid method of inquiry is scientific in nature; it is based on testable evidence. But they define scientific method in different ways and, as the foregoing discussion has indicated, seek different ends from it. To a relativist, scientific method is not merely a sequence of steps such as a physicist supposedly uses. Scientific thinking is any form of intellectual pursuit which is based on testable evidence and is productive in relation to the goals of the thinker. To be sure, there are some measuring sticks or criteria of scientific truth; these criteria Bayles has encompassed under the headings of adequacy and harmony. A conclusion, to be properly scientific, must harmonize all the data, i.e., it must make the data "jibe," or "add up." If a single pertinent fact seems to "point the other way," if it remains unexplained, then the conclusion is not to be trusted. According to the principle of adequacy, all known pertinent facts must be taken into consideration. None may be ignored— no matter how unpalatable it might seem.

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A relativist construes science much more broadly than does a realist. He assumes that the scientific way can be applied in a wide range of situations. A relativist does not think in terms of a hierarchy of sciences, with physics, chemistry, and mathematics at the top. He is also more flexible with respect to the kinds of data he will consider. A realist in psychology is likely to admit only data of observable physical objects or substances. Conversely, a relativist in psychology will consider all the data of human experience, including that which may seem introspective.

Why is a relativistic outlook in philosophy in harmony with Gestalt-field psychology? This school of psychology contains strong relativistic elements which naturally align it with relativistic philosophy, as will become clear during our examination of certain aspects of Gestalt-field theory.

Gestalt-field psychology is essentially an emergent synthesis which developed from conflict between the tenets of Rouscellian "romantic naturalism" and "scientific realism". As we have seen, Rouscellians contend that psychological development is primarily a matter of natural unfoldment. To them, learning is largely equated with unfoldment and is a product of inner urges. It is not imposed by a child's environment. Realistic psychologists see all development as a product of learning and assume that learning comes from the environment; it is conditioning induced by stimuli which impinge upon a child from without.

The only way of bridging the two positions appears to be assume that a child is what he is because of an interaction between him and his culture. With the emphasis upon interaction, the responsibility for development rests neither with the child alone (as Rousseau would have said) nor with the environment alone (as a realist says). It is person and environment coming together— in a psychological field—where Gestalt-field psychologists find the clue to psychological development.

What has this to do with relativism? Since the number of possible culture patterns is infinite, the possibilities for variety in human development become infinite likewise. Within its biological limits, human nature might become anything. Furthermore, if one accepts the premises of Gestalt-field psychology, he must define reality in a manner entirely different from that of a realist. Reality now consists of the interpretations

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a person makes of himself and his surroundings as he interacts. If reality is to be regarded as interpretations or meanings, rather than pre-existent physical objects, as such, it is obvious that reality will be in a constant state of flux. In 1947, Earl C. Kelley published an extraordinarily provocative little book entitled *Education for What Is Real*. By "what is real" Kelley means our perceptions of physical and social objects. Kelley's book depicts concisely and sharply many aspects of the issue concerning the definition of reality. Because this issue is of prime importance, the following section explores several of its facets.

HOW DO THE TWO FAMILIES DEFINE REALITY?

S-R associationists tend to treat reality and existence as identical. The term existence refers to what exists or "what is there," i.e., physical objects and processes. The chair on which the reader is sitting may be said to exist, and to an

associationist the chair is a good example of reality (not one's impression of the chair, but the chair itself). The chair exists in its own right; the way one perceives it is not relevant to its reality.

Gestalt-field theorists make a distinction between reality and existence. Without denying independent existence of objects, or even of other people's ideas, they insist that each person sizes up or interprets his world in such a way that it will form a meaningful pattern for him, and his interpretation is the reality on which he designs his actions. A Gestalt-field psychologist thinks that a person's knowledge of things is always limited by the impossibility of his ever getting completely "outside himself." He assumes that any perception will be colored to some degree by the purposes and experiences of the observer, as well as by the procedures used in observing the perceived object. None of this should be taken to mean that a person literally makes his world; rather, in any field—science, social relations, morality, even religion—each individual makes, not the world, but his own notions of the world.

In order to understand fully the difference in definitions of reality between the S-R association and the Gestalt-field approaches, it is necessary to explore in some detail the differences

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between their exponents in their definitions of environment, perception, interaction, and experience. We already have suggested some of these differences. We propose now to dig more deeply. Some repetition of what has been said before is necessary.

How is Environment Defined by the Two Groups of Psychologists?

S-R associationists maintain that a person's psychological and physical environments are identical; his environment consists of all his physical and social surroundings. Because environment is defined in objective, physicalistic terms, presumably anyone can see (or hear, smell, feel, or taste) the environment of anyone else.

In contrast, Gestalt-field psychologists think of a person's environment as psychological, and it consists of what he makes of what is around him. It is that portion of a life space or perceptual field which surrounds a person on self. A psychological environment includes impressions of parts of the physical environment but not necessarily all of it. It also extends beyond its physical environment. Sometimes a person's psychological environment includes largely memories or anticipations; in this case he is scarcely aware of the physical world currently around him. In Lewin's terminology, he is operating on an "irreality level."

Since each person's perceptual environment is unique, obviously two persons may appear to be in the same location in space and time (or as nearly so as possible) and yet have very different psychological environments. Furthermore, the behaviours of two equally intelligent persons who are confronted with the same "objective facts" may differ drastically because each is different in his purposes and experiential background. Whenever a person has a new experience, he changes his environment and will never again be able to recapture the old environment in its identical form. The Gestalt-field conception of environment explains why in a particular family one son may become a minister and another turn to crime; their interpretations of their world differ radically, even though to an outsider their social and physical environments would appear quite similar.

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How do the Two Groups Define Perception?

S-R associationists define perception in such a way as to make it analogous with taking photographs. The sense organs in literal fashion "read" a person's social and physical surroundings and record this "reading" in the nervous system. After sensing something, a person may derive a meaning for it. But note that, according to an associationist, sensation comes prior to meaning and the two acts, sensing and finding meaning, are regarded as separate. An S-R associationist assumes that sensation may be indiscriminate, in that a person tends to "take in" all aspects of the physical world to which his sense organs are sensitive. Such a psychologist defines perception, then, as a two-step process (sensing and deriving meaning) which focuses on particular objects of the environment only insofar as previous conditioning directs.

A Gestalt-field psychologist, on the other hand, does not separate sensation of an object from its meaning. In his view, a person will rarely sense an object unless it has relevance to some purpose of the person. It is this relevance to purpose, this instrumental quality, of an object which constitutes its meaning. Unless a person sees some meaning in an object, he will pay little or no attention to it. Thus, a Gestalt-field psychologist sees perception as a unitary process, in which sensation hinges on meaning and meaning on sensation, and sensing and finding meaning occur simultaneously. Perception, to a field psychologist, is highly selective. It is always related to a person's purposes at the time of perception. In his goal-seeking behaviour, a person actively seeks out those aspects of his environment which will help or hinder him,

and usually it is to these that he is primarily sensitive.

Furthermore, to a Gestalt-field psychologist the meaning of a sensation or perception is always related to the total situation. Relationships, and not a summation of individual elements, determine the quality of any event (such as perception). Any psychological event is a result of the interaction of many factors; hence, perception always involves a problem of organization. A thing is perceived as a relationship within a field which includes the thing, the viewer, and a complex background incorporating the viewer's purposes and previous experience. Considering the

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above notions, it is obvious that to a Gestalt-field theorist the senses do not directly mirror physical objects in their geographical environment. The camera analogy which fits the associationist's idea of perception seems to a field psychologist gross oversimplification.

Is Interaction of Person and Environment Alternating or Simultaneous and Mutual?

The term interaction is commonly used in describing the person-environment process through which reality is perceived. Both families of psychology use the term but define it in sharply different ways. Whereas S-R association theorists mean alternating interaction or reaction of organism, then of environment, Gestalt-field psychologists always imply that the interaction of a person and his environment are simultaneous and mutual—both mutually participate at the same time.

Alternating Interaction

Alternating interaction begins with a reaction of a person to a stimulus. The person is regarded as a passive receiver of stimuli; his habitual pose is one of waiting or repose. When he receives a stimulus he reacts in whatever way he must—in accordance with the conditioned or innate reflexes which are called into play. When he reacts, it is likely that he will change his physical or social environment in some way. (The environment is also passive, in the sense that it "waits" for him to do something to it.) To an associationist, the temporal sequence of the interactive process is stimulus-reaction-stimulus-reaction, and so on. The chain of S-R's may continue indefinitely. Consider an example: A dog bites a man; the man kicks the dog. Let us suppose the kick conditions the dog not to bite. The dog is friendly toward the next man he encounters, and the man reacts by patting him on the head. The dog may then react by licking the man's hand. The man may then buy the dog a steak. And so on, ad infinitum.

S-R associationists may think of interaction as involving only physical processes. That is, material objects react to other material objects. Interaction between human being is analogous to the interaction of molecules in a chemical compound. One molecule

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strikes another, which is deflected against another, which hits another, and so on. The interactive process is regarded as a chain of causes and effects; stimuli are causes and responses are effects.

Simultaneous Mutual Interaction

Interaction, when used by Gestalt-field psychologists, refers to a relationship between a person and his environment in which the person in purposeful fashion tries to see meaning in his environment and use objects in his environment in advantageous ways. As he interprets and uses his environment for his own purposes, both are changed. The person's physical environment may be changed in ways which others may observe; or it may not. In any case, its meaning is changed so that it looks different to the person interacting with it. The person changes in the sense that through interaction he achieves new insights which literally transform him, in however minor ways. Gone from this concept of interaction is the idea of the reaction of a passive organism to a stimulus, and an ensuing chain of S-R's running back and forth from organism to environment. Rather, we now have simultaneous mutual change of person and environment, during which we do not make a sharp distinction between the two. In symbolic terms, this concept is simultaneous mutual interaction—the SMI concept.

Parents and siblings usually constitute important aspects of a child's environment. When a second child arrives in a family, the first child sizes up—perceives—the situation. Whether the first child feels rejected depends not upon the physical stimuli he receives from his parents and the sibling but upon what he makes of the relationship of the parents and the second child. The important question is not Do the parents actually favour child number two? but rather Does child number one "see" child number two as favoured over child number one—himself? In this situation, the parents and the other child are key aspects of each child's and parent's environment. The way child number one perceives the situation has

important bearing upon the environments of child number two and the parents. Each person in a situation interacts with the others.

Gestalt-field theorists, in their espousal of the concept of SMI, make a sharp distinction between interaction of physical

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objects in a physical environment and (the subject of psychology) interaction of psychological realities in a psychological environment. To a field psychologist, it is only what occurs in a person's life space which, at that moment (or a longer unit of time), is important to that person. A person interacts by relating himself (as he understands himself) to his interpretation of what is around him. Of course, while interacting, he may move his body and manipulate objects in his physical environment in ways conspicuous to observers. But psychological interaction and physical reaction are two different processes. A person can interact within a psychological field while he is seated in an armchair in front of a fireplace. Human experience is synonymous with an interactive event. It does not necessarily require any kind of motion which an observer can detect.

Any idea can be ridden too hard, and the reader has probably already thought of cases in which the concept of SMI does not seem to fit. For example, a man who is not aware of danger may be shot in the back. It seems fairly clear that in such a case the man has been a passive victim of a feature of his environment which was active in relation to him. However, all this example suggests is that there are situations in which a person has no control over what happens to him. Gestalt-field psychology and relativistic philosophy do not deny this; instead, they operate on the not inconsistent assumption that, whenever a person can, he seeks to manipulate purposefully all those aspects of his environment which at the time mean anything to him. He may or may not be successful, but whether or not he is, his life space will be different as a result of the attempt.

What is Experience?

Up to this point, we have used the term experience without really coming to grips with its meaning. Gestalt-field psychologists regard experience as a pivotal concept in any discussion of the interactive process and the meaning of reality. S-R associationists make little use of the term, especially in connection with any investigation or description which is supposed to be scientific. Most charge that Gestalt-field psychologists use the term experience in such a way as to imply a process which does not involve the real physical world but only "mentalistic" copies of it. According

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to associationists, the concept presupposes a special world of consciousness and, if consciousness does exist, it does not lend itself well to scientific study. An associationist may concede that thought appears to exist, but he is likely to insist that, if human beings are to be studied with true scientific objectivity, most kinds of mentalistic concepts must be ruled out of bounds. The well-known neobehaviourist B. F. Skinner express this notion clearly: "...the private event [i.e., thought or consciousness] is at best no more than a link in a causal chain, and it is usually not even that. We may think before we act in the sense that we may behave covertly before we behave overtly, but our action is not an 'expression' of the covert response [i.e., thought] or the consequence of it. The two are attributable to the same variables."

What Skinner appears to be saying is that, even if a person does think, his thoughts are inconsequential; his actions, whether or not he thinks, will be part of a cause-and-effect, (S-R) sequence which originates and ends outside himself. To Skinner, if thought occurs, it is not a cause of action but rather an irrelevant byproduct of stimulation which would have caused the action anyway.

If an S-R associationist were to use the term experience, he would have to define it mechanistically. To him, experience could mean no more than the conditioning process by which a person acquires a new response. If a child touches a hot stove and if a link is formed between the sight of a stove and a withdrawal response, then an associationist might say the child has had an experience. No thought needs to have occurred and no insights need to have been developed.

Gestalt-field psychologists use the term experience extensively but define it in a way consistent with a relativistic outlook. They regard experience as rooted in insightful behaviour. From this point of view, experience is a psychological event which involves acting purposefully with anticipation of the probable or possible consequences of such action. Experience is interaction of a person and his perceived environment. This is what Dewey means when he says, "An experience is always what it is because of a transaction taking place between an individual and what, at the time, constitutes his environment." He states further, in connection with experience and learning, that "To 'learn from experience' is to make a backward and forward connection between what we

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do to things and what we enjoy or suffer from things in consequence." Experience includes an active and a passive element, combined in a peculiar fashion: "On the active hand, experience is trying..... On the passive, it is under-going. When we experience something we act upon it, we do something with it; then we suffer or undergo the consequences. We do something to the thing, then it does something to us in return: such is the peculiar combination. The connection of these two phases of experience measures the fruitfulness or value of the experience. More activity does not constitute experience."

The SMI concept implies a continuity of experience. Every experience both extracts something from experience which have gone before and modifies in some way experiences which follow. Furthermore, to some degree every experience influences the conditions under which future experiences may be had. Thus, in the case of a reasonably normal person, successive perceptual fields or life spaces tend to be similar to, though not identical with, one another.

It is easy to see why the Gestalt-field concept of experience is in tune with a relativistic philosophy. If life consist of a series of experiences through which a person and his environment are continuously changing, then it is obvious that we must regard life as constant change with no fixed limits. Furthermore, since perception is considered a creative act, human experience can never lead to discovery and assertion of a fixed, absolutistic truth.

WHAT DOES MOTIVATION MEAN TO EACH FAMILY?

Motivation refers to the "mainsprings" or instigating forces of behaviour; people do what they do because of motivation. As in the case of concepts treated previously in the chapter, S-R associationists and Gestalt-field psychologists hold contrasting and seemingly incompatible ideas about the nature of motivation. These differences go back to the contrasting conceptions of basic human nature held by the two schools of thought. If one views man and the universe mechanistically, he will prefer a theory of motivation compatible with this opinion; if he views man as a purposeful, reflective, and creative individual, he will have a quite different theory of motivation.

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What is Motivation to S-R Associationists?

As we have seen, associationists tend to regard man as an intricate machine. Machines operate with blind regularity, according to a set of fixed principles. Even a machine as complicated as an electronic brain does not operate purposefully as we usually use the term. An electronic brain does not know what to do until it has been set by a human being. Even electronic brains which can correct their own errors and do other seemingly fantastic things still behave as they do because some person has designed and regulated them. In a sense, a machine has no more purpose than a falling rock; it acts, but it has no thought-out goal. S-R theorists generally attribute this same quality to human nature.

To an S-R psychologist, all motivation is assumed to rise directly from organic drives or basic emotions or from a tendency to respond established upon prior conditioning of the drives and emotions. Organic drives, such as hunger, thirst, and sexual need, and the emotions, fear, anger, and "love," supposedly produce behaviours which are both predictable and irresistible. The drives and emotions are "built into" the machine and it can do nothing to resist them. Conditioning produces a series of learned reflexes which spring into action whenever relevant stimuli appear. These conditioned responses operate more or less automatically; a person makes them because he must. Through conditioning, the machine, i.e., the body, has been regulated to behave in a predictable manner. To an S-R psychologist, then, all behaviour is stimulus directed, whether the stimulus comes from within the organism or without. Motivation is defined as the urge to act which results from a stimulus. Since behaviour is stimulus directed, it is not related to purpose of any kind.

There are certain obvious aspects of the behaviour of men or lower animals which do not appear to be explained by the mechanical concepts of S-R theory. One of these is attention. At any given time, a person pays attention to one thing rather than another. At this moment, the reader of this book is "attending" to this page rather than to a television programme, a poker game, or a pretty girl. So the fact of attention seems to demonstrate that human behaviour is governed by purpose. S-R theorists concede that a person may often respond selectively to one or a small group of stimuli at a time. However, they argue that what

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appears to be selective response can be explained according to S-R principles and that the existence of purpose need not be assumed. A person selects one response rather than another, according to an S-R psychologist, because of the articular combination of prior conditioning and present physiological drives and stimuli which are operating at the moment of perception. To an S-R theorist, to introduce purpose as an explanation of motivation is to risk introducing some kind of supernatural guiding force and to make impossible a truly scientific approach to the study of behaviour.

An associationist's theory of motivation has important implications for education. According to his viewpoint, a child does not have to "want" to learn history in order to learn it. He does have to be persuaded to study it, to repeat the verbal responses which we associate with a knowledge of history—Anyone can learn anything of which he is capable if he will only allow himself to be put through the pattern of activity necessary for conditioning to take place. Thus, an associationist does not talk much about such things as "psychological involvement" or "helping students see the point of learning." Instead, he engages students in activity and assumes that activity with reinforcement automatically produces learning. A teacher carefully plans which learnings (responses) he wants students to develop. He then induces these responses and associates them with stimuli.

What is Motivation to Gestalt-Field Theorists?

Within the Gestalt-field frame of reference, behaviour is a function of a total situation, i.e., a person interacting within a field of psychological forces which includes memories, anticipations, purposes, and interpretation of relevant physical objects and events. Motivation cannot be described as merely an impulse to act triggered by a stimulus. Rather, motivation emerges from a dynamic psychological situation, characterized by a person's desire to do something.

A Gestalt-field psychologist regards motivation as a product of dis-equilibrium within a life space. A life space includes goals and often barriers to the achievement of these goals. A goal may be either positive or negative—something one wants to achieve, or something he wants to avoid. When a barrier, i.e., any obstacle

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to the direct and immediate achievement of a goal, whether physical or psychological, appears, a person feels tension. He tries to relieve tension by surmounting the barrier. The tendency to release tension by proceeding toward a goal, including the overcoming of whatever barriers are in the way, is motivation.

The particular form which motivation takes and its intensity are functions of a field of psychological forces in which no distinction can be made between "inner" and "outer." That is, one cannot identify a category of forces which stems exclusively from physiological drives and another category which stems from the outside environment. Hence, a Gestalt-field psychologist objects to the manner in which an associationist attributes motivation to independently acting organic drives and stimuli which originate wholly from outside an organism.

S-R theorists in the Thorndikean tradition make much of pleasure and pain, or satisfaction and annoyance, as instigators of behaviour. An organism presumably is so put together biologically that it seeks to achieve pleasurable states and to avoid painful ones. Gestalt-field psychologists are more likely to talk about success and failure as motivators, the former being the "reward" for completing an act. Success and failure are not merely achievements as such but represent the relationship between a person's ambitions and his achievements. If he has a certain level of aspiration and is able to achieve this level, he feels good about it. If he attains success at one level of aspiration, he is likely to raise the level, and to continue doing so as long as he is able to perform successfully. Thus, goals tend to be self-set and to change in dynamic fashion with each new experience.

Another feature of the Gestalt-field theory of motivation which sets it apart from S-R theory is the emphasis placed on the present situation. Motivation, to the Gestalt-field theorist, grows out one's contemporary life space—the psychological forces which are operating right then. In contrast, an S-R theorist tends to think of motivation as emerging from an accumulation of historical events, i.e., past conditionings, coupled with currently operating organic drives. An S-R theorist looks backward into a person's life to determine why he behaves as he does now. A Gestalt-field psychologist does not ignore the impact of previous experience on a person's contemporary life space, but in explaining the causes of behaviour he focuses on the present scene as the person

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experiences it. For these reasons, it is common to think of S-R psychology as embodying a historical approach and Gestalt-field psychology as embodying a situational approach.

A teacher who accepts the Gestalt-field concept of motivation and a teacher who operates within an S-R framework are likely to approach teaching in fundamentally different ways. For one thing, a teacher with a Gestalt-field orientation is concerned always with the problem of personal involvement, i.e., helping students see a need to learn. The personal goals of students will always be relevant. This does not mean that he will cater to their every whim. Often he will try to help them rethink their goals and discard those which are trivial and whimsical. Much of the time he will attempt to arrange the teaching-learning situation so that students will adopt goals entirely new to them. He will not forget that, unless a child realizes a need to learn something, the child either will not learn it at all or will learn it only in a transitory and functionally useless way.

2 Theory of Learning Process

This chapter continues the analysis begun in Chapter 1 but centers on some of the more technical aspects of the learning theories developed by S-R associationists and Gestalt-field theorists. Some repetition of ideas stated in Chapter 1 is inevitable, but the focus is quite different.

Do animals, including man, learn simply by being conditioned step by step under the tutelage of a teacher or experimenter, or do they learn by surveying their situation and grasping relationship? Let us set up a hypothetical experiment and speculate on how animals will behave. Our subjects will be rats in an elevated maze (see Fig. 2.1). The alleys are formed of strips of wood without sidewalls. They are raised high enough from the floor so that the rats will not jump off. The gate in the maze is made so that the weight of a rat will cause it to lower and permit the rat to run through.

In order to accustom the rats to the maze and to develop in them preferential tendencies with reference to the three possible pathways to food, we give them some preliminary training. We deprive them of food for 24 hours, then place them in the starting box and permit them to find their way to the food box. They are given 10 such trials per day and soon learn (after trying the various paths) to take the shortest, path 1, to the food. We then

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block path 1 at point A. When this is done, the rats will turn back to the choice point (fork in the road) and almost always (about 93 per cent of the time) take path 2.

Now, what will the rats do when for the first time the block is placed in the common section of paths 1 and 2 (at point B)? They will return toward the starting place on path 1 and turn at

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the intersection of the three paths. But will they take path 2 or path 3? Have they sized up the situation and "seen" that the block is on path 2 as well as path 1? If so, they will take path 3. On the other hand, if the rats are operating mechanistically they will take the second shortest path to the food, path 2, at least half the time.

We will return to our experiment but first let us consider the significance for man of a learning theory based upon experiments with animals. Such experiments occupy a very important place in modern psychological theory. The chief purpose of studying animal experiments in learning is to give us more effective methods of teaching people.

Do Men Learn Like Other Animals?

Use of results of animal experimentation is governed by the assumptions that the learning process is essentially the same throughout the animal kingdom and that what we discover about animal learning is transferable to human situations. These assumptions would have been thought ridiculous, if not heretical, a few centuries back. Until modern times, philosophers took for granted that there was an unbridgeable gulf between man and the animal kingdom. It was thought that human beings possessed a unique quality: they could reason whereas animals could not. This quality was believed to arise from the existence of a substantive mind; i.e., a mind force, relatively independent of a body, which only man, among the earth's creatures, possesses. .

So long as man was considered fundamentally different from other forms of life, animal biology and human psychology remained two sharply separated disciplines. Until a century or so ago, human psychology relied for its source of knowledge solely upon the study of humans—conducted through inspiration, introspection, and intuition, tempered by reason.

There were a few persons of the past who rejected the idea that man and animals are unrelated; of these Rousseau is one of the earliest and most striking. In his book *Emile* (1762) Rousseau strongly implied that a continuity exists between animal and human nature. According to Rousseau's theory of child nature, a human being at birth is a healthy little animal—a creature like other animals of nature.

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During the Romantic period (late eighteenth and early nineteenth centuries) many philosophers and literary figures

believed that mind permeated the entire universe, including all living things. Furthermore, this universal mind substance was believed to be unitary—everywhere the same. Man possessed more of it than did lower animals, but the difference between human mind and animal mind was one of degree rather than kind. Of course, not all scholars accepted this view. The psychologist Wundt, for example, was convinced that consciousness—a product of mind—was unique to human beings.

It was the work of Darwin and other evolutionists of the nineteenth century that most definitely gave man a place in the animal kingdom. Darwin noticed particularly the close similarity of the bodily structures and functions of man and the lower animals. In his *Descent of Man* he also presented much evidence of the existence of psychological, as well as physical, continuity throughout the animal kingdom. He wrote, "There is no fundamental difference between man and the higher animals in their mental faculties." But in a later section he qualified this opinion by writing, "There can be no doubt that the difference between the mind of the lowest man and that of the highest animal is immense." In spite of the qualification, Darwin appears to have maintained consistently that in their fundamental aspects man and the lower animals exhibit a commonality of both physical and mental characteristics.

Antagonists of the theory of evolution defied Darwin to explain why, if there is a continuity between man and the animal kingdom, man can reason whereas lower animals seem to be governed by instinct rather than reason. Darwin countered with the explanation that much human action, too, is to be interpreted as instinctive in origin and that animals, on their level, exhibit a capacity for reason.

During the latter part of the nineteenth century the idea that there is a continuity among animal species, and that behavioural tendencies, including learning, are broadly similar throughout the animal world, rapidly gained in popularity among biologists and psychologists. Pierre Flourens proposed in the nineteenth century that conclusions drawn from animal experimentation should be equally applicable to man. Pavlov made this assumption also, as did his contemporary, Thorndike, in the United States.

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In addition to the cheapness and convenience of using lower animals rather than humans in a psychological laboratory, obviously experiments can be performed on animals which our mores would prevent being tried on people. Furthermore, many persons have felt that it was easier to isolate simple units of behaviour in lower animals than in human beings, although in humans the units may be substantially the same, they are often combined in a manner too complex for ready study. Thus, it was thought that one might learn more about types of behaviour fundamental to the animal kingdom by studying the lower animals than by studying men. For all of these reasons, animal experimentation became extremely popular among psychologists.

In the preceding chapter we describe briefly the general nature of the animal experimentation undertaken by S-R associationists. These psychologists hoped to formulate laws of human learning by observing overt behaviour of laboratory animals placed in various kinds of situations such as puzzle boxes and mazes. By the early 1920s, the manner in which behaviourists conducted their experiments came under the fire of Gestaltists. The nature of the Gestalt criticism is developed in the following section.

Do Other Animals Learn Like Men?

Whereas the behaviourists assumed that men learn like animals, and more specifically like their own experimental animals in their own types of experiment, Gestalt-field psychologists gave the question a reverse twist: Do animals learn like men? Of course, if there is a continuity between man and the lower animals, both ideas should make equal sense and both should be answerable in the affirmative. But Gestalt-field psychologists had something else in mind. While not denying the likelihood of a fundamental similarity in the behaviour of man and other animals, Gestalt-field theorists were interested in raising questions about the whole approach of the behaviourists.

Gestalt-field psychologists noted that behaviourists usually placed their animals in situations entirely foreign to them. There was no place for them to begin a solution and they were permitted a bare minimum of freedom in which to try. Locks, levers, and mechanical devices used were above the animals' level of

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comprehension. In order for them to achieve the correct procedure it was necessary for them to stumble onto the key by chance. Because lower animals are less discerning of relationships which seem important to men than are human beings, they appear, in a humanly contrived "problem," to make completely random movements. Thus, the nature of their discovery of the relationship between the release mechanism and escaping from a puzzle box, on the surface, appeared to be completely mechanical. Having set the stage against animals displaying genuine problem-solving activity, S-R

associationists concluded that learning is a product of a mechanical trial-and-error process.

One of the sharpest criticisms which a Gestalt-field theorist can make of the behaviouristic conception of learning is directed against the tendency of the latter to deny purpose a central role in learning. To a Gestalt-field psychologist, learning always involves purpose. The tension which motivates an animal to learn is tension toward a goal. Gestalt-field psychologists feel they have abundant experimental evidence to show that learning is purposive even among animals quite low on the phylogenetic scale.

An animal with purpose does not make random motions—even though it may appear so on the surface. It tries everything at its command, but if the problem is too difficult its trial moves will appear to an observer as random. If one eye of a slug or honeybee is blinded, the animal at first glance appears to go through meaningless motions. However, more careful observation reveals that it is demonstrating something other than mere random response. It assumes a posture which orients its body towards the light source; it flexes its legs on one side and extends them on the other as if it wanted to move in relationship to the light.

Gestalt-field psychologists also criticized experimentation of behaviourists on the ground that it was so arranged that, even if animal learning were insightful, the development of insight would not show. The real nature of any psychological process can be concealed if the experimenter designs his experiments in line with predetermined conclusions, and this is precisely what the Gestaltists insist S-R associationists are inclined to do. In an attempt to refute the contention of behaviourists that learning is mechanical—a mere matter of forming the right connections through chance—the Gestaltists designed an entirely different type of animal

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experiment. Their experiments involved creation of problematic situations which animals might conceivably resolve through development of insight. These situations were geared in difficult}' to the presumed potential intelligence of the animals being studied.

Let us now return to the three-path experiment described at the beginning of the chapter. This actually is a classic experiment performed by Tolman and Honzik at the University of California. When the rats backed out of path 1, they did not take path 2 but path 3—the longest path, but the only one now open to the food box. Of the 15 rats, 14 behaved in this way. The rats' backing out of path 1 and taking path 3 was an indication of their having "sized up" the situation—of their having developed insight. Using path 3 was a relatively new and creative solution of what, to the rats, was a real problem.

Kohler's famous experiments with chimpanzees further illustrate the Gestalt-field approach to animal experimentation. Kohler spent four years on the island of Tenerife working with chimpanzees. A typical experiment involved suspending food (usually bananas) from the ceiling of a cage and then providing a chimpanzee with a tool or tools with which to knock down or reach for the fruit. The tool might be a pole of adequate length, a pole in sections which had to be joined, or boxes which could be stacked and climbed. Kohler's chimpanzees, rather than gradually acquiring right responses and eliminating wrong ones, seemed at some point in a problem to develop insight into it—to grasp, often rather suddenly, the relationship involved. The chimpanzees seemed to get the idea of "tool use" and to apply it in new situations calling for tool use.

Kohler also experimented with "stupid" chickens and found considerable evidence that even chickens can see relationships and that it is relationship to which they respond rather than specific stimuli. He taught chickens to expect food only from the darker of two papers placed side by side. For the lighter paper he then substituted one even darker than the original dark one. In 70 per cent of the trials the chickens switched their preference from the originally preferred dark paper to the paper which was still darker, suggesting that they had achieved an insight: "If I go to the darker of two surfaces, I will get food." The chickens had "generalized," i.e., sensed the relationship of darker to lighter as a

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general principle in "food getting."

Two American Gestalt psychologists, Raymond Wheeler and Francis Perkins, performed a great deal of animal experimentation in the 1920s and 1930s. Among their most frequently cited experiments was one with goldfish in which the fish received food after responding properly to a configuration of lighting. The fish learned to pick the light of brightest, medium, or dimmest intensity even though the experimenters kept varying the absolute intensity and the serial arrangement of lights. Wheeler and Perkins report numerous other studies made by themselves and others in which animals ordinarily regarded as not very intelligent learned to respond to relationships in an apparently intelligent way.

The question arises, How far down the phylogenetic scale can an investigator go and still observe animals behaving as if they could generalize, i.e., perceive a relationship? To perceive a relationship one must get the feel of how a thing works.

At first thought it would seem that to do this an animal must have a certain minimum of sensory and neural equipment—perhaps at least a brain, even if only rudimentary. However, one well-known American biologist, H. S. Jennings, writing in the early 1920s, concluded differently. Jennings spent much time observing the behaviour of protozoa—such as euglenae, paramecia, and amoebae. He found that the actions of protozoa are not only highly variable but also readily modified, and he decided that their behaviour could not be explained merely in terms of simple physiochemical reactions. Jennings thought that insofar as their observable behaviour was revealing, it was as reasonable to infer the presence of conscious behaviour among protozoa as it was among men.

What are we to conclude from all this? One possible conclusion is that an animal experimenter, depending upon his orientation, is likely to arrange his experiment so that animal behaviour appears to be either chance like and mechanical or insightful. A famous philosopher, Bertrand Russell, noted before the end of the 1920s that psychologists could demonstrate two fundamentally different types of response in their animal experiments, depending entirely on how they arranged the experimental situation. Russell commented humorously: ".....Animals studied by Americans rush about frantically, with

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an incredible display of hustle and pep, and at last achieve the desired result by chance. Animals observed by Germans sit still and think, and at last evolve the solution out of their inner consciousness."

The state of affairs with regard to experimentation with lower animals is probably not as indecisive as Russell's comment would lead one to think. Once a student sets his orientation in either an S-R associationistic or a Gestalt-field point of view, he benefits by the broadest possible knowledge of all available experimental, as well as other, evidence. However, a student's psychological orientation will largely determine how results of each experiment contribute to his interpretation of human learning.

Behaviourists have clearly shown that animals can be put in experimental situations where they demonstrate overt behaviour which seems trial-and-error, chance like, blind, and mechanical. There seems to be little question but that human experimental subjects could be put in situations which would cause them to appear to demonstrate the same kind of behaviour. The requirement of such experiments seems only to be that the problem presented the learner is one with which his previous experience has in no way equipped him to cope.

On the other hand, the Gestalt-field group of psychologists have demonstrated adequately the one point they wanted to make, namely, that whether one is dealing with the lower animals or man, situations can be arranged in which learning shows an "Aha?" quality. That is, an experimental subject, in learning something, seems to "catch the point" or get the feel of a confronting situation. If man and the lower animals do seem to learn insightfully in situations which permit it, then serious doubt is cast upon the validity of the behaviourist notion that learning is purposeless, mechanical, and chance like.

Gestalt-field psychologists insist that to describe learning throughout the animal kingdom we do well to begin with human examples. As we examine conscious behaviour of ourselves or others, learning often—and perhaps always—appears to be a matter of seeing through things, of gaining understanding. If we start with the assumption that other animals learn in the same way, we devise experiments which will enable them to reveal such learning.

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This does not mean that if we are studying, a dog, we dare anthropomorphize him, i.e., attribute to him human characteristics; it does mean that we must guard against mechanizing him, i.e., making a machine of him. The way to study a dog is to "dogize" him, just as in studying a child we should "childize" him. In short, we must consider each animal as well as each human being on its own level. If we always keep this in mind, we can probably make some generalized statements about learning which will hold true with respect to most or even all forms of animal life.

WHAT ARE THE TWO MAJOR CONTEMPORARY VERSIONS OF THE NATURE OF LEARNING?

In Chapter 1, we open discussion of the two major contemporary versions of the nature of learning. We now treat in detail these two currently competing descriptions of learning. As already noted, neobehaviourists conceive of learning as conditioning or reinforcement; Gestalt-field psychologists think of it as development of insight.

Is Learning Conditioning—Reinforcement?