
Psychology From the Standpoint of a Generalist

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ABSTRACT: *This article describes the tenets of a liberalized scientific psychology that all psychologists should find acceptable. Such a science is empirical, deterministic, and analytic. Psychology is the science of behavior. Mentalistic concepts are inferences from behavior, and they play a centrally important role. Intuition, common sense, and personal experience provide hypotheses for this science. The elementist-holist controversy disappears with the understanding that the wholes of science differ at different levels of analysis. Free will can be brought within the scope of determinism. Overt behavior is the product of potentials laid down by nature-nurture interactions and conditions of the moment. Behavior is so complexly determined that individual uniqueness is an expected consequence. In this scheme of things, scientific values control the science of psychology, and humanistic values control the actions of the psychologists who create this science and apply it. Over the years, the process of change in psychology has been evolutionary rather than revolutionary.*

In recent years the question of whether psychology can be a single, general discipline has been the object of considerable discussion and controversy. Although some scholars have been able to see actual (e.g., Matarazzo, 1987) or potential (e.g., Staats, 1981) unity in the field, a greater number (e.g., Furedy & Furedy, 1982; Kendler, 1981; Koch, 1981) have found disunity and chaos. Discussions of this issue sometimes have taken on the quality of a methodological holy war because the disagreements are partly in the realm of values. Psychology is a house divided. One group of psychologists sees the field in terms of scientific values and accepts the concepts of objectivism, elementism, and nomothetic lawfulness. The group opposed sees psychology in terms of humanistic values and accepts the concepts of intuitionism, holism, and idiographic lawfulness. The positions seem irreconcilable, and the war goes on (Kimble, 1984).

Meanwhile, this epistemic jihad has encouraged the impression in some quarters that our recent family squabbles are a scientific revolution of the type that Kuhn (1970) referred to as a "paradigm shift." The time has come, however, to put that myth to rest. There has been no revolution in psychology, just a series of tribal wars that have brought a new look to the battlefield. In particular, the concepts, methods and subject matter of both cognitive and humanistic psychology, although very different, have gained legitimacy. As a result, the appearance of psychology now is not at all like what it was less than half a century ago. The major assertion of this article, however, is that the altered appearance of psychology is

just a change in surface structure. At a deeper level, the structure of psychology is what it always was. The purpose of this article is to describe that structure in the belief that all psychologists may possibly find it acceptable because it will show that intuition, holism, and idiographic lawfulness are now included in the science of psychology and that this science operates within limits set by human values. In this article, I present a series of assertions that define what I take to be the major commitments and styles of thought that characterize scientific psychology. Each of these assertions is followed by explanatory text.

Determinism, Empiricism, and the Definition of Psychology

Two of the basic tenets of traditional science are those of determinism and empiricism. In psychology, those assumptions decide such fundamental issues as the definition of the field.

1. *Behavior is determined by genetic endowment and environmental circumstances. The understanding, prediction and control of behavior are reasonable scientific ambitions.*

All psychologists accept these statements but in somewhat different ways. For the purely scientific psychologists, the emphasis is on abstract understanding. *Prediction* and *control* are terms that apply to theory and research. For the applied psychologists, the emphasis is on practical understanding. Prediction and control are concepts related to the goal of improving the lives of people. Although there are some psychologists who regard some human actions as otherwise uncaused voluntary expressions of "free will" (Kimble, 1984), I doubt that such a compromise is necessary.

For some time now it has been clear that voluntary acts are amenable to investigation by the methods of science. In an early article, Kimble and Perlmutter (1970) identified five hallmarks of volition. Voluntary behavior is learned, motivated, planned, attended to, and guided to completion by a comparator process. At one level, this analysis solves the problem of volition by reducing it to accepted scientific concepts. At another level, however, the solution creates problems of its own, because terms like *motivation*, *attention*, and *comparator process* require objective definition. Without it, they violate the second basic tenet of science, the principle of empiricism.

2. *The data of science are the publicly confirmable facts of observation. Psychology is the science of behavior.*

Although they are an important part of psychology, inner phenomena like thought, emotion, and ambition are not a part of the basic definition because they are not observable. They are concepts, inferences from behavior.

They play a key role in the science of psychology, which I will describe after I develop the required foundation, beginning with a correction of some possible misunderstandings of the definition just presented.

Most important, perhaps, the definition does not exclude personal experience, common sense, or intuition from the science of psychology. Although private, they are important sources of hypotheses for the science. The principle of empiricism does not apply to the discovery of ideas but to the establishment of their validity. How one arrives at an idea has no bearing on its truth. It is its acceptance into science that requires objective evidence. Thus, if a man dreams that he was hiking in the mountains, and your intuition tells you that he had the dream because he unconsciously loves his mother, there is nothing in the tenet of empiricism to prevent your thinking that way. No one should take you very seriously, however, until you produce some type of evidence that the hypothesis is not false. If it turns out that such evidence is logically impossible to obtain, as is true of Marxist theory, "scientific" creationism, and some parts of psychoanalytic theory, the hypothesis is not part of science. Falsifiability is the criterion that marks the boundary line between science and nonscience.

Although personal experience plays the same legitimate role as intuition in psychology, it cannot provide the basic data of the science for reasons that become very clear in cases where the experiences of people differ. Suppose that my experience tells me that learning always is sudden and insightful, that men are more intelligent than women, and that people have dependable traits like honesty and sociability that appear in every situation. Suppose, by contrast, that your experience tells you that learning is always gradual, that women are more intelligent than men, and that traits like honesty and sociability are situation specific. Whose experience (if either) shall we accept as valid? You get the point: We cannot decide without a public test. The only alternatives appear to be (a) the creation of an epistemological elitist class whose personal experiences would define the truth for all the rest of us, or (b) the democratic decision that the experiences of everyone have been created equal. Neither of these alternatives is acceptable to science, however, because both of them violate the criterion of falsifiability.

The great problem with a reliance on common sense as evidence of psychological truths is that these truths are so defective (Kohn, 1988). Some of them are wrong ("Genius is closely related to insanity"). Some of them are contradictory ("Every individual human being is unique" versus "People are about the same the whole world over"). Most of the explanations appeal to essences

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("People seek the company of others because they are gregarious by nature"). Probably without exception, the truths of common sense are oversimplifications.

Complexity and Analysis

Almost nothing important in behavior results from a single gene or from a single environmental influence. Behavior and its determinants are both complex. Multiple causes produce multiple psychological effects. Moreover, causes interact, and the influence of any single variable depends on the values of other variables in the situation. The need to unravel the threads of such complex causality has a fundamental implication.

3. *Psychology must be analytic. A nonanalyzing science is an inarticulate science. Even to talk about a subject requires that it be analyzed into elements.*

All science analyzes. Lewinian field theory (e.g., Lewin, 1931), which psychology now recognizes as possibly the most constructive holistic theory in its history (Jones, 1985), was very analytic. Lewin's fields contained boundaries, barriers, goals, and paths to goals, along with the individual. The individual was full of separate psychic regions, in various states of tension, separated by more or less permeable boundaries. Acted on by attracting and repelling vectors derived from objects with positive and negative valences, the individual moved within the field, sometimes reorganized it, and sometimes left it for the greener pastures of another level of reality. Lewinian theory was holistic in the sense that it treated behavior as dependent on the totality of many interacting variables, but that feature did not distinguish it from any other well-developed theory, for example that of Hull, one of Lewin's great rivals. The important difference between these theories was a difference in the level of analysis.

The products of analysis are the elements of a science. Because all science is analytic, it is also elementistic at some level. Different levels of analysis, and therefore different elements, are appropriate for different purposes. For example, the psycholinguists have been quite convincing on the point that the communicative functions of language involve overarching plans that control the production of sentences. It is impossible to understand the creation of an utterance in terms of strung-together linguistic units. Mistakes in language are another matter. They are only partly understandable in such holistic terms. I still write longhand, and every sentence that I write is the realization of a linguistic plan. The mistakes I make, however—the slips of the pen—almost always occur when some fragment of a word that should come later sneaks forward and occurs too early. The explanation of such linguistic behavior requires the use of elements that are smaller than a word.

In the history of psychology the elementist-holist argument centered on the question of whether the units of perception are attributes of sensations or organized perceptual patterns. The most important thing that has happened to that question is that it has become a question of fact rather than an item of faith. Research has now produced a blueprint of the answer to the question. The

peripheral nervous system is equipped to handle only very elementary inputs: primary qualities, intensities, frequencies, durations, and extents of stimulation. By the time these neural messages reach the brain, however, they have given rise to organizations that endow such patterns of stimulation as those produced by phonemes, psychologically primary colors, visual angles, and the human face with the status of perceptual units. These particular organizing processes appear to be inborn, but experience also contributes to the creation of such units. Anyone who has tried the Stroop test (Stroop, 1935) has had a firsthand demonstration of the fact that words (learned organizations of letters) are extremely powerful perceptual units.

Nature–Nurture Interaction

Except in the minds of a few radical nativists and empiricists, the nature–nurture issue has long since been settled. The methods of behavioral genetics give quantitative meaning to the now-accepted statement that heredity and environment both contribute to human psychological characteristics but that they contribute to different degrees for different traits. Social attitudes and values are mostly learned (environmental), whereas height and weight are mostly inherited. Intelligence and introversion are somewhere in between. Whatever the proportions, however, the pattern of joint influence always seems to be the same.

4. *For all psychological characteristics, inheritance sets limits on, or creates, a range of potentials for development. Environment determines how near the individual comes to developing the extremes of these potentials.*

Inheritance provides different people with the intellect required to become a chess master, with a vulnerability to schizophrenia, or with the physical gifts required to compete in the Olympic Games. Environment determines whether these potential outcomes are realized. Questions about the relative importance of heredity and environment in the determination of such outcomes are questions for research, some of which is now available. For example, coefficients of heritability have been calculated for intelligence, various traits of personality, and the major forms of psychopathology. These coefficients usually ascribe less than half the variance in psychological traits to inheritance. Such data indicate that, although a biological basis for human diversity exists, the most powerful influences are environmental.

Potential Versus Performance

Turning to the short-term dynamics of individual behavior, one encounters a similar pattern. Just as genetic factors put limits on the range of traits a person can develop, these developed traits define the limits of a person's behavior at the moment. Other factors determine whether this behavior reaches the limits of an individual's potential.

5. *Individual behavior is the joint product of more or less permanent underlying potentials and more or less temporary internal and external conditions.*

The distinction between trait- and state-anxiety shows how this idea works. A person may have a long-lasting potential for becoming anxious, a high level of trait-anxiety. The trait will lie dormant, however, until some threat occurs to throw this person into a state of anxiety. The distinctions in psychological theory between availability and accessibility of memories, linguistic competence and linguistic behavior, and sensitivity and bias provide additional examples. One may possess the memory of a certain person's name, but the memory may escape because of an interfering set. A little boy may know that the correct pronunciation of the word is "fish" although the best that he can do is "fis." Given the same sensory evidence, one subject in an experiment may report the presence of a signal and another may not because of their different criteria for making a positive response.

As in the case of nature and nurture, performance can never exceed the limits set by the underlying potential. Suppose that the anxious person described above has the potential to score 130 on an IQ test. In an anxious state, the person's performance may be much lower than that, but never higher. These statements are inherent in the definition of potential.

Mentalistic Concepts

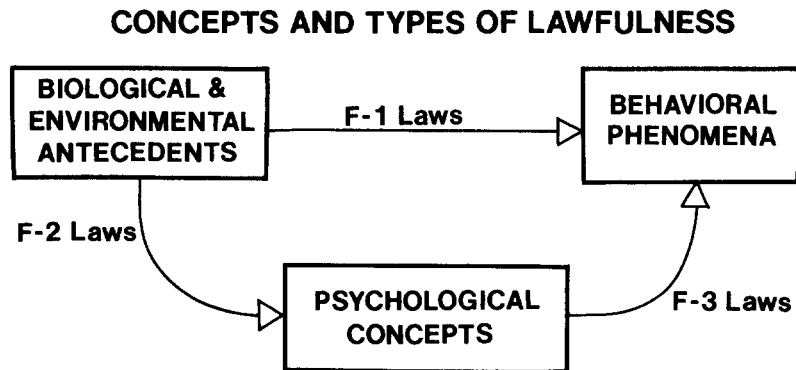
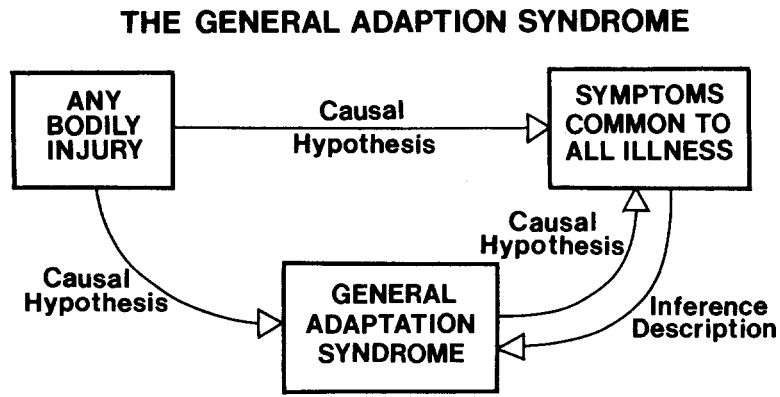
For the radical behaviorists, from Watson (1913) to Skinner (1987), all of this talk about anxiety, criteria, and potentials is offensive because these terms refer to phenomena that are subjective, mentalistic, and unobservable. They are not the raw materials that sciences are made of. In the final analysis, they hold (and I agree) that the only observables available to psychology are the behavior of organisms (responses) and the environmental circumstances (stimuli) in which behavior occurs. Everything else, they say, (but I do not agree) must be excluded if psychology is to be a science. The problem with this radical position is that it sacrifices everything of interest and importance in psychology by its exclusion of mentalistic concepts. Who can possibly care about a psychology that is silent on such topics as thinking, motivation, and volition? What has happened to human experience and the mind in this strangely unpsychological psychology? Do mentalistic concepts have no scientific role at all to play in a behavioristic world of facts? The answers to these questions take us back to a point that came up in connection with the definition of psychology.

6. *Mentalistic concepts enter psychology as inferences from behavior. The observations that define them often suggest causes.*

For as long as there has been a human species, people have noted that members of the species vary. All languages came to include such terms as "intelligence," "introversion," and "industriousness" to describe such variation. In the history of psychology, applications of this descriptive process have been important. They led Pavlov to the concept of the conditioned reflex, Piaget to the idea of developmental stages, and Selye to a recognition of the General Adaptation Syndrome.

In his very first classes in internal medicine as a

Figure 1
Intervening Variable Theorizing



Note. Psychological concepts are conceived as standing logically between independent variables on the left-hand side of the diagram and dependent variables on the right. The upper panel provides a concrete example and shows how inferences and causal hypotheses figure in the creation of intervening variables. The lower panel presents the more general case and shows how Tolman's (1938) F-1, F-2, and F-3 laws fit into the picture.

young medical student, Selye (1976) was impressed with the fact that patients who were supposed to have different diseases shared many of the same symptoms: "They felt and looked ill, had a coated tongue, complained of more or less diffuse aches and pains in the joints, and of intestinal disturbances with loss of appetite" (p. 15). The symptoms that were supposed to help in differential diagnosis, "were absent or, at least, so inconspicuous that I could not distinguish them" (p. 16). This led Selye to the conception of a "general syndrome of disease," which later on became the "General Adaptation Syndrome" and then "stress." Selye hypothesized that the General Adaptation Syndrome was caused by any form of illness or injury to the body and that it was expressed in the symptoms common to all illness.

Selye was thinking in terms that came to be called "intervening variable theorizing." The construct, General Adaptation Syndrome, intervenes conceptually between a determining independent variable (any bodily injury) and a dependent variable (symptoms common to all ill-

ness). Figure 1 presents two diagrams of this kind of theorizing. The upper diagram based on the Selye example shows that processes of inference and hypothesis lead to the identification of psychological concepts and the postulation of possible lawful connections. The lower diagram presents the status of these connections as they were seen by Tolman (1938), the most important advocate of intervening variable theorizing. Tolman identified relationships among variables that are of different kinds, depending on whether the system includes intervening variables. Those that he called F-1 laws describe the direct dependence of behavioral phenomena on their determining antecedents. Those that he called F-2 and F-3 laws enter the picture with the introduction of intervening variables. The F-2 laws relate intervening variables to their antecedents. The F-3 laws describe the dependence of psychological phenomena on the intervening constructs.

The great usefulness of the intervening variable approach is that it provides objectivity for unobservable

mentalistic concepts. The F-2 and F-3 laws tie them to observable antecedents and behavioral consequences. This permits entry into psychology of the topics that the radical behaviorists would banish. It allows psychology to deal with such conceptions as "attitude," "plan," and "purpose," which most of us take to be important items in the subject matter of the science.

By now, of course, the cat is out of the bag. The approach that I am recommending is the logical-empiricist method that has received strong criticism from the philosophers of science (e.g., Spector, 1966). Public observability as the criterion of scientific truth is harder to pin down than first thoughts might suggest. What is observable to people with one type of physiology or personal history may not be observable to others. This criticism, however, only leads to another important point of understanding. Before abandoning any significant commitment, it is always a good idea to consider the options that would remain in the absence of what one is planning to give up. In this case, the most frequently offered alternatives are to accept personal experience or linguistic practice as the criterion of truth. These are alternatives that science must reject for reasons presented earlier in this article.

At the same time that we recognize the value of intervening variables, we must also recognize and avoid two abuses to which they are commonly subjected. First, concepts are reified too often. They are captured by the mistaken outlook that Stuart Chase (1938) once called "the tyranny of words." According to that misguided view, if there is a word for it in the dictionary, a corresponding item of physical or psychological reality must exist, and the major task of science is to discover the a priori meanings of these linguistic givens. On the current psychological scene, this foolish assumption gives rise to ill-conceived attempts to decide what motives, intelligence, personality, and cognition "really are." It also legitimates unproductive debates over such questions as whether alcoholism is a disease. Those involved in such disputes never seem to recognize that the controversies are always about definitions and not facts. This first misunderstanding is related to the second one.

Concepts are products of definition. They are merely descriptive and explain nothing. If someone says that a man has hallucinations, withdraws from society, lives in his own world, has extremely unusual associations, and reacts without emotion to imaginary catastrophes because he is schizophrenic, it is important to understand that the word *because* has been misused. The symptomatology defines (diagnoses) schizophrenia. The symptoms and the "cause" are identical. The "explanation" is circular and not an explanation at all.

It may be worth the few sentences that it takes to say that circular definitions are not a scientific sin. Definitions must be circular—by definition. They are verbal equations in which the quantity on the left-hand side of the equals sign must be the same as that on the right. The sin is the offering of definitions as though they were explanations, as one can catch the late-night talk show hosts

doing almost any evening on the radio. The following are examples of such statements: "Your eight-year-old son is distractable in school and having trouble reading because he has an attention deficiency disorder"; and "The stock market crash of October 19, 1987, was caused by widespread economic panic." If I could make just one change in what the general public (and some psychologists) understand about psychology, it would be to give them an immunity to such misuses of definitions.

Scientific Structure of Psychology

Figure 2 summarizes much of the previous content of this article. The top part of the figure, labeled "Psychology Without Concepts," makes two points: (a) Defined in terms of observable dependent variables, psychology is the science of behavior; and (b) this science operates on the assumption that behavior is determined. Explanation, prediction, and control are possible. The bottom part of the figure, labeled "Psychology With Concepts," reviews two further points: (a) In the determination of behavior, nature places limits on potentials for development, and environment determines the extent to which these potentials are realized; and (b) the behavior of an individual at any moment is the joint outcome of realized potential interacting with a temporary state.

In its entirety, Figure 2 is a review of the intervening variable approach and the meaning of Tolman's F-1, F-2, and F-3 laws. As an aid to the further development of these ideas, I return now to the concept of stress. Figure 3 presents the current situation of this concept in the general framework shown in Figure 2 and in enough detail to support several interpretative points.

First, the collection of independent and dependent variables has become quite large. Moreover, they are variables. Each of them has an infinite number of possible values, and people's positions on these many different dimensions are largely uncorrelated. Such complexity surrounds every important psychological concept. It provides a way for bringing common sense and science together on an important point: Individual uniqueness is no problem for psychology.

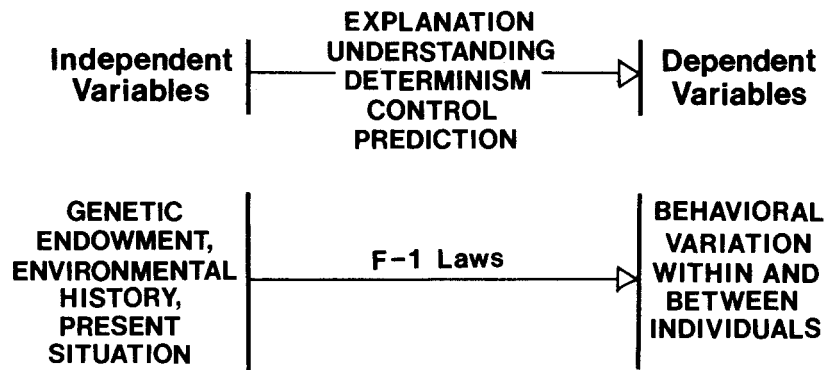
7. *Every individual is a unique expression of the joint influence of a host of variables. Such uniqueness results from the specific (idiographic) effects on individuals of general (nomothetic) laws.*

The contradictory truths of common sense that "every individual is unique" but that "people are the same the whole world over" are really not contradictory. People are the same in that they represent the outcome of the same laws operating on the same variables. They differ in degree and not in kind. People are unique in that the details of those operations differ from person to person.

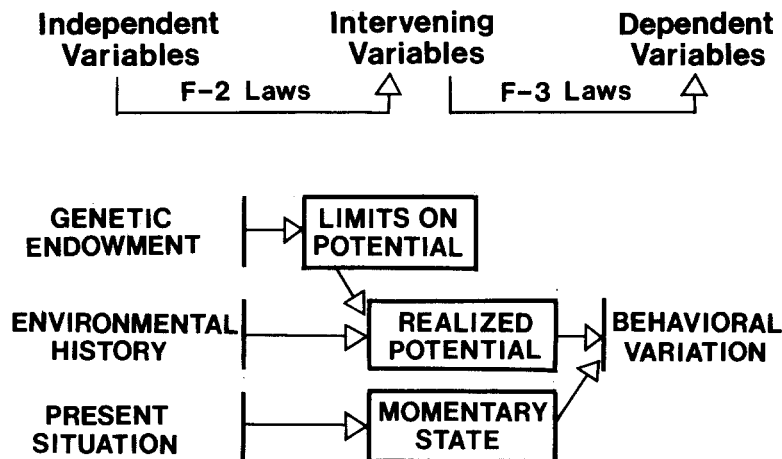
Second, in Figure 2, the arrows connecting independent variables to concepts give objective meaning to these concepts. They are the operational definitions of the concepts. They are also Tolman's F-2 laws. The arrows connecting concepts to dependent variables are Tolman's F-3 laws. These F-2 and F-3 arrows identify the criteria of useful intervening variables.

Figure 2
Summary of the Argument

PSYCHOLOGY WITHOUT CONCEPTS



PSYCHOLOGY WITH CONCEPTS



Note. The upper panel reviews the contributions of the empiricistic and deterministic tenets. The lower panel shows how three major classes of independent variables interact to define intervening variables and how the intervening variables interact in the production of behavior.

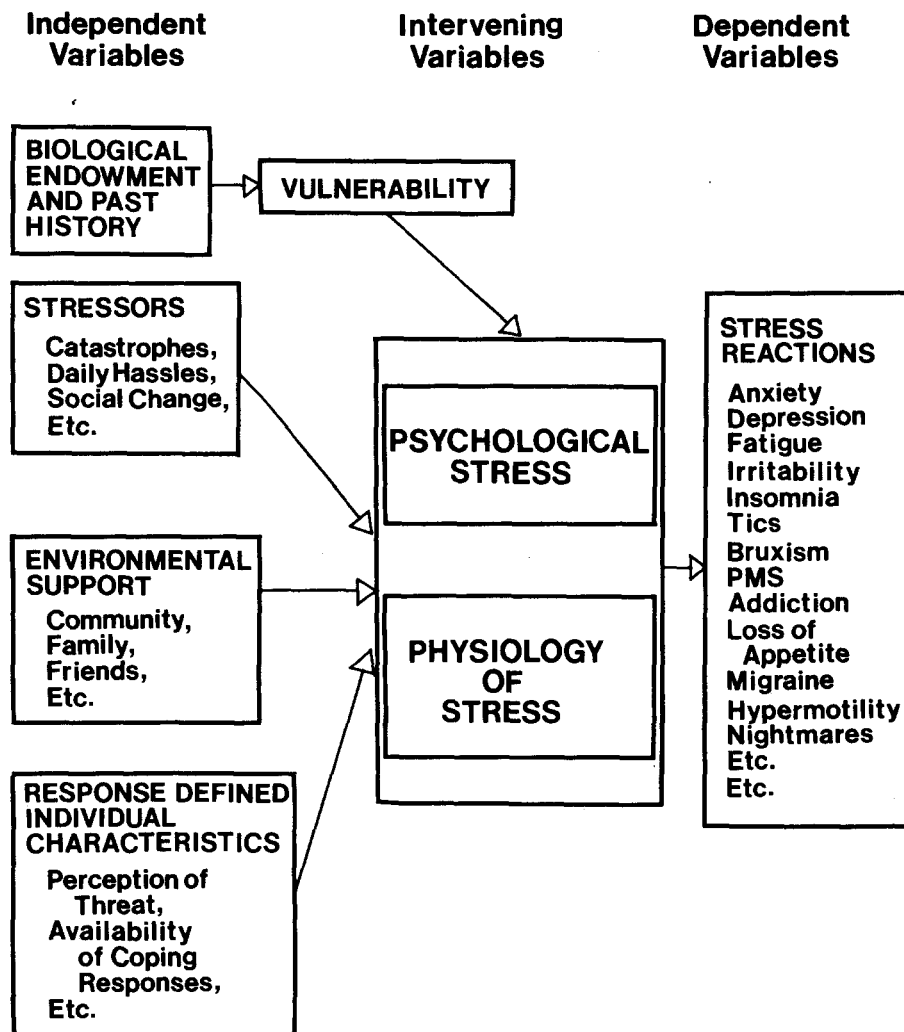
8. *A concept is acceptable to psychology only if it meets both of two criteria. It must be defined operationally and have a relationship to behavior.*

One way in which scientific psychology has become more liberal in recent years is with respect to the requirement for operational definitions of concepts. Although there are still some psychologists who insist on strict and restrictive operational definitions, most of us recognize that our concepts are "open." As knowledge of a concept grows, the number of determining (therefore, defining) variables also increases, as happened with the concept of stress. This state of affairs creates great problems for psychology in the operational realization of its concepts. Such

problems do not justify the abandonment of the operational approach, however. "Psychologists must learn to be sophisticated and rigorous in their metathinking about open concepts at the substantive level" (Meehl, 1978, p. 815).

Third, in Figure 3, including "physiology of stress" in the same box as "psychological stress" emphasizes the point that psychological and physiological concepts play identical epistemological roles. The alleged "reality" of physiological concepts may or may not exist. When Mendel proposed the concept of the gene to explain the hereditary transmission of traits, no one had yet observed any corresponding entity. Now we know that genes exist.

Figure 3
Current Status of the Concept of Stress



Note. This figure spells out the details and analyzes the argument of Figure 2. This figure is an explication of concepts in Selye (1976).

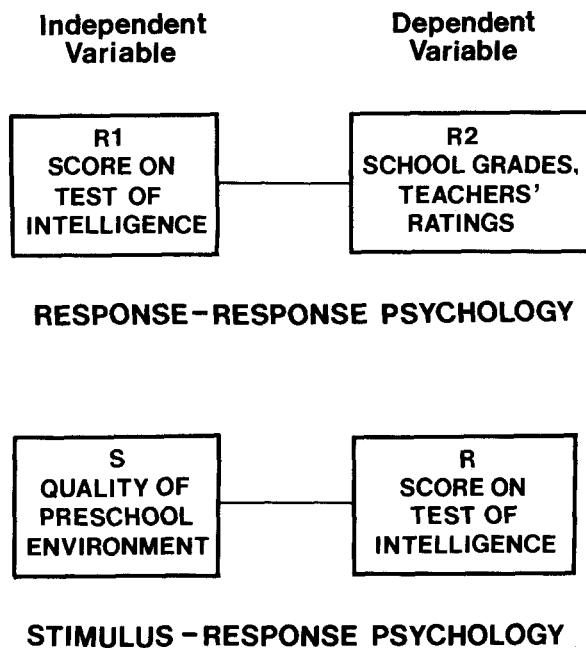
When Pavlov proposed the concept of cortical irradiation to account for the phenomenon of stimulus generalization, no one had observed a corresponding brain process. So far in the history of psychology, no one has. These examples show that psychological concepts with physiological sounding names differ from other psychological concepts only if the physiological concepts acquire additional meaning through separate operations carried out at the level of physiology. Calling them physiological does not give them physical reality, only surplus meaning. As Donald Hebb (1955) once noted, CNS stands for "conceptual nervous system" until such independent observations have been made.

Finally, the appearance of "response defined individual characteristics" as well as "stressors" on the independent variable side of Figure 3 represents the relevance to the study of stress of both of the two sciences of

psychology described by Cronbach (1957). The first science is stimulus-response (S-R) psychology, whose independent variables are situational events. The second science is response-response (R-R) psychology, whose independent variables are the behavior of individuals.

The independent variables of both sciences are independent in the sense that they are the variables from which the scientist makes predictions about behavior. The independent variables of the two sciences differ in that those of stimulus-response psychology can, in principle, be defined without reference to organisms and manipulated directly. Those of response-response psychology lack those properties. Experimental psychology typifies the S-R approach. The effort is to find the laws that relate behavior to environmental variables, for example, amount learned (*R*) as a function of distribution of practice (*S*). Psychometric psychology typifies the R-R approach. The

Figure 4
Psychology's Two Scientific Disciplines



Note. The psychometric (R-R) and experimental (S-R) sciences of psychology differ in their choice of independent variables. The first uses previous behavior to predict performance, and the second uses stimulus events for that purpose. Depending on their functions, performance measures such as scores on tests can be independent variables (upper panel) or dependent variables (lower panel). Neither of the disciplines is more important than the other (Cronbach, 1957).

effort is to find the laws that relate behavior in one situation to behavior in some other situation, most commonly a test, for example, college grades (*R-2*) as a function of SAT scores (*R-1*). The independent variables of R-R psychology sometimes become the dependent variables of S-R psychology. Figure 4 makes this point, using an example based on the concept of intelligence.

Psychological Theory

Networks of the type laid out in Figure 3 represent the present state of theorizing in psychology. They define theoretical concepts, relate these concepts to one another, and identify the laws that connect them to behavior.

9. *A psychological theory puts a collection of concepts and their associated laws into a structure that allows the deduction of behavioral consequences. To show that a fact of behavior is deducible from such a theory is what it means to explain that fact.*

This is the method that Hull (1935) sometimes called the "hypothetico-deductive method." Although that designation has gone out of fashion, it is the method that scientists continue to use whenever they argue that their theories lead to specified predictions. Psychology has made recognizable progress in the sophistication with which it uses the method. Theoretical structures are often expressed in terms of formal logic or mathematics. Many

of our concepts have acquired legitimate physiological meaning. The basic method remains unchanged, however.

The only alternative to hypothetico-deductive theorizing that I can think of is the radical empiricistic approach, sometimes advocated by the Skinnerians. This alternative would rule out intervening variables, replacing them with an assemblage of F-1 laws like those identified at the top of Figure 2. In this view, theory would arise (if at all) inductively as the individual laws accumulated. Knowledge would provide its own theoretical organization.

One problem with this extreme view is that theory-free investigation is impossible. The choice of empirical questions to study and the selection of dependent and independent variables always entail theoretical assumptions. A second problem is that this approach encourages the delusion that facts somehow give unaided rise to scientific theories. In actuality, theories are creative products of scientific minds. Finally, for many of us the most unattractive aspect of the radical empiricistic view is that it takes the joy out of science. The process of making predictions, testing them, and finding out that they are right is the most exciting part of science. The radical empiricistic approach would rob the scientist of this excitement. In addition, that approach would leave the scientist unable to see the forest through the impenetrable tangle of F-1 trees. For all of those reasons it seems unlikely that theorizing will soon go out of style.

Because behavior is so complex and because it is amenable to treatment at so many different levels, an essentially unlimited array of theories is possible. Is there any way to choose among them? Obviously there is. The best theory is the one that survives the fires of logical and empirical testing. An evolutionary metaphor appears to be applicable. Scientific progress will be most rapid when a large pool of theoretical variants exists along with heavy selective pressure in the form of criticism and empirical tests. In the ideal scientific world, psychologists could preach and publish whatever they wanted to, no matter how unpopular, unorthodox, or unlikely to be correct. Physiological, mathematical, behavioristic, and humanistic theories would all participate in the struggle for survival. Freely published criticism would quickly lead to the extinction of the most maladaptive theoretical mutations. Empirical investigations would decide the fate of all the rest. The theories that survived and continued to evolve would be those that were best able to generate and validate behavioral deductions. The great diversity in psychology means that there is a niche for many different theoretical species.

The Question of Values

I have now done most of what I set out to do in this article in showing that the science of psychology is not inimical to the conceptions that characterize the new look in psychology. Intuition and common sense are major sources of ideas for this science. Mental states are concepts without which an acceptable science of behavior cannot exist. The elementism-holism issue disappears because research has

shown that what is whole and what is elementary depends on the level of analysis. Human uniqueness is a factual consequence of the complexity of the determination of behavior. Idiographic and nomothetic lawfulness both make their contributions. Every type of theorizing is allowed its day in court. This leaves the question of values. Should scientific or humanistic values control the science of psychology? What should psychology be doing to solve the human problems of our age?

10. *The values that govern the science of psychology are scientific values. Humanistic values govern the behavior of psychological scientists and of psychologists who apply the knowledge gained by science.*

As a science, psychology is dedicated to discovering facts about behavior and creating theories to explain these facts. In this abstract conception, questions of human values do not arise. The scientific value system requires only that psychology discover the most dependable facts and produce the best theories that it can. Reality is more complex than that, however, because the science of psychology deals with living organisms. Research may require deprivation, concealment, deception, threat, punishment, or the invasion of privacy, and such procedures put scientific values into conflict with human values. For every psychological investigation this conflict raises a question: Is it worth it? Do the potential benefits to science and eventually to animal and human lives justify the costs to be extracted here and now? Psychology has wrestled with this issue for years, and guidelines now exist that protect the welfare of animal and human participants in psychological research. In these guidelines, humanistic values take precedence and form the basis for decisions regarding the acceptability of scientific research. In psychology today most research is in conformity with these codes of ethics.

The ethical acceptability of psychological research does not mean that it will answer the great moral questions of our age or decide which social policy is best. Such questions include the right to bear arms versus handgun control, bans on dirty books versus freedom of literary expression, the public's right to know versus the individual's right to privacy, retribution versus rehabilitation as the aim of criminal codes, affirmative action versus traditional indexes of merit, a verdict of "not guilty by reason of insanity" versus one of "guilty but insane," and freedom of choice versus right to life. Much of what scientific psychology knows is relevant to these important questions, but it cannot supply the answers. They must come from decisions that are made beyond the reach of science, in the court of human values.

The distinction that is implied here is one that should be guarded jealously. If psychology is to have a future as a science, it must obey the scientific rules. These rules define the limits of scientific authority. Science gains its strength and credibility by operating within these limits

and understanding that, in other realms, it has no special power or status. Already in its short history, psychology has made important scientific contributions. The credibility acquired by reason of those accomplishments must not be mistaken for moral authority, however. It is a misuse of the credibility of psychology to use it as a basis to promote social prejudices or political goals, and the use of our status as psychologists for such purposes is an even worse misuse. The potential cost of these misuses is loss of the very credibility and status that allowed the misuse in the first place (Gould, 1987).

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