

Behaviorism and Unity in Psychology

Gregory A. Kimble¹

Department of Psychology, Duke University, Durham, North Carolina

Abstract

The defining feature of behaviorism is that it works with publicly observable stimuli and responses. One version, stimulus-response behaviorism, predicts responses from stimuli or situations. Another version, response-response behaviorism, predicts targeted responses from other responses. Unobservable mental states are intervening variables—hypothetical constructs if they have postulated material existence—that mediate these relationships. Cognition, affect, and reaction tendency are the major conceptual categories in this psychology. Its basic axioms state that behavior is (a) a function of enduring potentials for and temporary instigation to action, (b) controlled by excitation and inhibition, and (c) a blend of coping in situations in which organisms have control and adaptation in situations in which control is lacking. This view offers the hope of bringing unity to psychology.

Keywords

behaviorism; theory; lawfulness

Psychology today is struggling

with fundamental questions: Should subjectivism (“cognitivism”) replace behaviorism as the discipline’s orienting outlook? What are the basic categories of psychology? Are the only acceptable concepts those with biological reality? Is there any way to remedy the splintered condition of psychology? In this article, I take advantage of the lofty perch to which my years of experience have lifted me and offer answers that possibly everyone can accept.

BEHAVIORISM

Behaviorism is any psychology that sees its mission as the explanation of behavior and accepts stimuli (more generally, situations) and responses as its basic data. If psychology wants to be a science—an ambition that humanistic psychology sometimes rejects (Kimble, 1984)—it must adopt some form of that approach. Science aims at understanding publicly observable happenings in the world, and the only such events available to psychology are responses and the situations in which they occur.

Varieties of Behaviorism

Behaviorism is not an ideology set in stone. Two different major versions deserve recognition.

Stimulus-response behaviorism is experimental psychology, one of Cronbach’s (1957) two scientific disciplines of psychology. It treats behavior in terms of stimuli (S), responses (R), and stimulus-response (S-R) relationships. *Classical S-R behaviorism* (Watson, 1913) limited itself to those materials. It excluded mental states, rejected theory, and cautioned against physiological speculation. A more recent *methodological S-R behaviorism* (Tolman, 1922) accepts mental states when they have satisfactory definitions, encourages theorizing, and allows physiological hypotheses about the foundations of its concepts.

Response-response behaviorism is a variety of correlational psychology, the second of Cronbach’s two scientific disciplines. Instead of the S-R laws, correlational psychology seeks R_1 - R_2 laws, in which one response, R_1 , is a predicted-from independent variable and a second response, R_2 , is a predicted-to dependent variable. The relationship between test performance (R_1) and school performance (R_2) is an example.

Recent history shows that these two sciences are complementary. S-R behaviorism borrows R-R conceptions when it treats such traits as intelligence and anxiety as moderator variables that modify the effects of such independent variables as task complexity. R-R behaviorism borrows S-R conceptions when it deals with trait-by-situation interactions, noting, for example, that people may be honest or dishonest, tranquil or troubled, cowardly or courageous depending on the situation.

Subjectivism Versus Behaviorism

The major enemy of behaviorism is subjectivism, which takes mental states (e.g., cognition) instead of stimuli and responses as the raw materials of psychology. This was the conception that launched the so-called cognitive revolution. Originally, that insurrection was a liberating force because it legitimated the study of the mind and consciousness that behaviorism passively ignored or actively rejected. Eventually, however, it corrupted the science of psychology. Too frequently, subjectivism's evidence for cognition came from nonempirical sources like reason, common sense, and intuition. Its practitioners neglected the distinction between private and public events. They dismissed biology, evolution, and animal psychology as irrelevant to the human condition. Some of them with social, clinical, and humanistic interests joined the cognitive revolution because they thought that behaviorism disallows those topics. In fact, however, psychology can be as social, clinical, or humanistic as it chooses, once it understands that the science and its concepts must be grounded in public observation.

THEORETICAL CONCEPTS IN A SCIENTIFIC WORLD OF FACTS

From the relationships between independent and dependent variables, behaviorism (except for classical behaviorism) infers intervening variables (I) that mediate these connections. This postulated mediating function translates the S-R and R-R formulae of stimulus-response and response-response psychology into S-I-R and R-I-R, respectively. For example, in experimental psychology, presented

information (S) produces a memory (I) that is expressed in subsequent recall (R). In correlational psychology, responses (R_1) on the Thematic Apperception Test, in which participants create stories suggested by a series of ambiguous pictures, reveal the strength of an individual's achievement motivation (I), which becomes manifest in personal accomplishments (R_2).

Biological Reality?

A controversial question about the concepts of psychology concerns their "thingness," the issue that MacCorquodale and Meehl (1948) discussed in their article on hypothetical constructs and intervening variables. *Hypothetical constructs* are concepts with potentially observable physical reality. *Intervening variables* are abstractions without material existence.

Some psychologists think that only hypothetical constructs are acceptable in science because only they are "real." That belief has heavy implications. Until psychologists with such ideas find the corresponding neurobiological mechanisms, a concept remains abstract and immaterial, and finding these mechanisms is not an easy task, as the history of the search for the engram (the physiological basis of memory) has demonstrated. Although establishing the physical reality of concepts is difficult, that undertaking has an important benefit. It creates a symbiotic relationship between behavioral and biological psychology. Behavioral concepts tell biological psychology what to look for in experiments. Successful outcomes provide powerful demonstrations of the validity of the concepts that stimulated the research. Moreover, the details of data often suggest refinements of the behavioral concepts, thus initiating a new cycle of behavioral and biological investigation.

A Useful Taxonomy

Whether hypothetical constructs or intervening variables, the concepts of psychology are a disorderly array that cries out for meaningful categories. Elsewhere (Kimble, 1996), I have suggested that Plato's human faculties—knowing, feeling, and doing—are suited to this purpose. "Knowing" is what psychology calls cognition. It refers to such mental acts as thinking, reasoning, and problem solving. "Feeling" is another name for affect. It includes such energizing forces as arousal, tension, and excitement. "Doing" might be called reaction tendency. It denotes such dispositions as habit, set (a readiness for certain actions), and perseverance. This classification applies broadly in psychology. Self-concept is an amalgam of self-knowledge (cognition), self-esteem (affect), and self-efficacy (reaction tendency). Psychopathology combines faulty thinking, troubled feelings, and inappropriate behavior. Ethnic prejudice is a malignant combination of warped opinion, hostile emotion, and tendencies toward destructive action against racial groups.

FUNDAMENTAL AXIOMS OF BEHAVIORISM

When James (1893) complained a century ago that psychology "is no science, it is only the hope of a science," he justified that judgment with the observation that, in psychology, there is "not a single law in the sense that physics shows us laws, not a single proposition from which anything of consequence causally can be deduced" (p. 468). Perhaps presumptuously, I now present three such laws, together with some of their implications for behavior.

Behavior Is the Result of Instigation Acting on Potential

Potentials are an organism's relatively permanent capacities. The extent to which potentials become manifest in action depends on instigation, the transient forces—stimulation, motivation, inhibition—that facilitate the expression of potentials or suppress it. Listing potential, instigation, and behavioral expression in that order, examples from S-R psychology are habit-stimulus-performance and memory-cue-recall. Examples from R-R psychology include IQ-training-school grades in educational psychology and predisposition-precipitating stress-symptom in clinical theory.

Genetics endows organisms with a host of (often opposite) potentials that help determine such traits as physical quickness, intelligence, introversion-extraversion, and susceptibility to clinical depression. Learning and maturation decide the extent to which these latent "potential potentials" become "realized potentials." The underlying idea here resembles the geneticists' view of the interaction between heredity and environment. In different environments, inherited tendencies (potential potentials) find many different manifestations (realized potentials). Thus, depending on their situations, people with genes for very high intelligence vary all the way from intellectual mediocrity to genius.

The emergence of realized potentials follows the pattern that Werner (1957) called an orthogenetic principle: Psychological development moves from undifferentiated global processes to those that are increasingly specific, and then to an integration of these components. The sequence finds expression in all of Plato's categories. Lewin (1935) described it for the cognitive "regions" of an individual; Bridges (1932) proposed it

for the unfolding of emotion; Coghill (1929) observed it in the motor development of the salamander tadpole.

The organization achieved in the final stage in this sequence is one of hierarchical integration. Overarching plans control the expression of participating units. These integrated organizations have what Lashley (1951) called a "syntax of action." In cognition, consider what happens in a conversation. An idea that you want to express provides a structure that governs the words you use to make a sentence. In the case of affect, emotion occurs within the framework of a characteristic personal mood that varies among individuals and determines their typical reactions. Reactive plans can be so strong that, when an integrated act is interrupted, it is necessary to start over to complete the interrupted sequence. The interruptions produced by typing errors provide numerous examples.

With practice, these integrated skills become automatic. Once a well-learned sequence is initiated, it moves on to completion without deliberate intent or purposeful attention. Usually such automaticity is beneficial. It frees the mind to deal with more important matters. Every weekday morning, on your way to work or school, you put your car on automatic pilot and devote your thoughts to the problems you will face when you get there. But, sometimes, automaticity works against you. Driving automatically, with your mind on other things, you run a stop sign and cause an accident.

Behavior Is Under the Simultaneous Control of Excitatory and Inhibitory Instigation

Whether a response occurs, and its strength if it does, depends on

the difference between excitation and inhibition. These processes are slaves to one another. A stimulus that elicits one of them also evokes the other. This interaction applies in all the major categories of mind.

In cognition, inhibition excludes irrelevant excitations from attention. The cocktail-party phenomenon is an example. Recall some noisy gathering where several conversations were going on around you. Attention to one of them made it easy to exclude the others. The excluded conversations were in some sense "there," however. If, in one of them, talk turned to a topic of importance—if someone dropped your name—you were apt to shift attention and focus on that conversation.

Solomon and Corbit (1974) described the natural history of affect, using a model patterned after the opponent-process theory, which explains why visual afterimages have colors that are opposite to the color that produced them. In this theory, hues are represented by physiological processes that are linked together in opponent pairs—red is tied to green and blue to yellow. If you inspect a blue stimulus for half a minute, and then look at a white field, you will see a yellow afterimage there. This is because looking at the blue stimulus inhibited the blue half of the blue-yellow process, and white, which normally excites both blue and yellow, can only evoke yellow. Solomon and Corbit introduced their application of such thinking to affect with the following example. A woman's fear, created by her physician's report that she has breast cancer, quickly rises to a maximum and then decreases slightly. Later on, when she learns that the report was in error—the lump in her breast was a nonmalignant cyst—her response is not emotional grayness, but euphoria. Opponent-process theory explains this sequence this way: An emo-

tional stimulus turns on (excites) both an appropriate emotion (fear) and, with some delay, an opposite inhibiting state (euphoria), which gradually increases in strength. With time, the initial emotion, dampened by the increasing strength of the opponent process, weakens, and the woman becomes slightly less fearful. When the fearful stimulus disappears, that happening removes the fear and leaves the opposite emotion (euphoria) in control.

For reaction tendencies, Sherrington (1906) had the insight that the entire nervous system operates on a system of checks and balances involving excitation and inhibition, making, for example, the knee-jerk reflex possible. James (1890) put it more dramatically: "We should all be cataleptics and never stop a muscular contraction once begun, were it not that other processes simultaneously going on inhibit the contraction (Vol. II, p. 583).

Behavior Is a Blend of Adaptation and Coping

In real life, important objects and events differ in their significance for behavior. Some, like food and praise, are things that organisms seek to obtain. Others, like pain and criticism, are things that organisms avoid. The situations in which these positive and negative happenings occur differ in the extent to which behavior is effective in promoting the desired outcomes. In some situations, reward or punishment is inevitable no matter what you do—at least a little pain is inevitable once the dentist picks up the drill. In others, what you do has consequences—work a little harder and you solve the problem that, so far, you have not mastered. Profiting from such experience, organisms learn to adapt in situations in which they cannot control what happens to

them, and to cope when control is possible.

Classical and instrumental conditioning are laboratory examples. In classical conditioning, neutral (conditioned) and effective (unconditioned) stimuli—the bell and food in Pavlov's well-known experiments with dogs—are presented in a predetermined order no matter what animals do. As a result, they learn to adapt by salivating to the bell in anticipation of the food. In instrumental conditioning, a reinforcer—grain in Skinner's studies of pigeons learning a key-pecking response—is presented only if the animals make a specified reaction. Skinner's pigeons learned to cope by pecking on the key to obtain the grain. Adaptation and coping are passive and active forms of adjustment. Other examples (with adaptation mentioned first in each pair) are thoughtless, reflexive behavior versus creative problem solving; (extrinsic) motivation produced by situations versus self-initiated (intrinsic) motivation; and, in cases of damage to the auditory areas of the brain, receptive aphasia (lost language comprehension) versus expressive aphasia (loss of verbal expression).

It is important to understand, however, that these adjustments work together. Behavior is a blend of adaptation and coping and a mixture of cognition, affect, and reaction tendencies. Thus, excellent students value (affect) academic achievement, know (cognition) that success in school takes work—both adaptation—and acquire the coping skills (reaction tendency) required to reach that end. An individual with claustrophobia shows adaptation with the obsessive knowledge (cognition) that enclosed places bring on unmanageable fear (affect) and coping with the compulsive habit (reaction tendency) of avoiding such locations.

CONCLUSION: HARMONY AND UNITY IN PSYCHOLOGY

The materials I have used to paint a portrait of behaviorism with S-R and R-R faces show that this orientation provides an environment in which the psychology of tests and measures can live in harmony with biological, cognitive, and humanistic psychology. It brings Cronbach's (1957) two scientific psychologies together in a single discipline. It makes cognition, affect, and reaction tendencies parts of the same package. It outlines a research relationship between intervening variables and hypothetical constructs that points the way toward constructive advances in psychology. It softens the antagonism between the academic psychologists and practitioners. It gives subjective concepts scientific legitimacy and may even promote peace between psychology's scientific and humanistic cultures (Kimble, 1984).

Recommended Reading

Kimble, G.A. (1984). (See References)
 Kimble, G.A. (1996). (See References)
 Kimble, G.A. (1999). Functional behaviorism: A plan for unity in psychology. *American Psychologist*, 54, 980-985.

Note

1. Address correspondence to Gregory A. Kimble, Department of Psychology, Duke University, Durham, NC 27708-0086; e-mail: kimble@psych.duke.edu.

References

- Bridges, K.M.B. (1932). Emotional development in early infancy. *Journal of Genetic Psychology*, 49, 229-240.
 Coghill, C.E. (1929). *Anatomy and the problem of behavior*. New York: Macmillan.
 Cronbach, L.J. (1957). The two disciplines of sci-

- tific psychology. *American Psychologist*, 12, 671–684.
- James, W. (1890). *Principles of psychology* (2 vols.). New York: Holt.
- James, W. (1893). *Psychology*. New York: Holt.
- Kimble, G.A. (1984). Psychology's two cultures. *American Psychologist*, 39, 833–839.
- Kimble, G.A. (1996). *Psychology: The hope of a science*. Cambridge, MA: MIT Press.
- Lashley, K.S. (1951). The problem of the serial organization of behavior. In L.A. Jeffress (Ed.), *Cerebral mechanisms in behavior: The Hixon symposium* (pp. 112–146). New York: Wiley.
- Lewin, K. (1935). *A dynamic theory of personality*. New York: McGraw-Hill.
- MacCorquodale, K., & Meehl, P.E. (1948). On the distinction between hypothetical constructs and intervening variables. *Psychological Review*, 55, 95–107.
- Sherrington, C.S. (1906). *The integrative action of the nervous system*. London: Constable & Co.
- Solomon, R.L., & Corbit, J.D. (1974). An opponent-process theory of motivation: I. Temporal dynamics of affect. *Psychological Review*, 81, 119–145.
- Tolman, E.C. (1922). A new formula for behaviorism. *Psychological Review*, 29, 44–53.
- Watson, J.B. (1913). Psychology as the behaviorist views it. *Psychological Review*, 20, 158–177.
- Werner, H. (1957). *Comparative psychology of mental development*. New York: Knopf.