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From Behaviorism to New Behaviorism: A Review Study

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Abstract: Neo-behaviorism bridges the gap between behaviorism and cognitivism. Like Thorndike, Watson, and Pavlov, the neo-behaviorists believe that the study of learning and a focus on rigorously objective observational methods are crucial to a scientific psychology. Unlike their predecessors, however, the neo-behaviorists are more self-consciously attempting to formalize the laws of behavior. Neo-behaviorism is associated with a number of scholars such as Tolman, Hull, Skinner, Hebb, and Bandura. Neo-behaviorists demand formalizing the law of behavior. Neo-behaviorism takes into consideration abstraction and hidden variables; it represents a holistic approach to behavior. It can be claimed that all neo-behavioristic theories have been proposed in order to put some cognition within the mechanistic nature of traditional behaviorism.

INTRODUCTION

According to Weidman (1999) "the second phase of behaviorism, Neo-behaviorism, was associated with Edward C. Tolman, Clark Hull, and B. F. Skinner. In another attempt to introduce neobehaviorists Simon (1999) introduces Hebb, Hull, and Bandura as the major neobehaviorists. Like Thorndike, Watson, and Pavlov, the neobehaviorists believed that the study of learning and a focus on rigorously objective observational methods were the keys to a scientific psychology. Unlike their predecessors, however, the neobehaviorists were more self-consciously trying to formalize the laws of behavior. They were also influenced by the Vienna Circle of logical positivists, a group of philosophers led by Rudolph Carnap, Otto Neurath, and Herbert Feigl, who argued that meaningful statements about the world had to be cast as statements about physical observations. Anything else was metaphysics or nonsense, not science, and had to be rejected. Knowledge, according to the logical positivists, had to be built on an observational base, and could be verified to the extent that it was in keeping with observation (Weidman, 1999).

Behaviorism was intended to make psychology a natural science. During the years when behaviorist ideas were being developed, they were in harmony with the philosophical position of logical positivism being championed in physics and elsewhere. Concepts should be defined by the operations used to measure them, to keep science tightly grounded to observable data and to remove flights of speculative fancy.

The decades that followed revealed behaviorism in ascendancy, and the animal learning laboratory was the hotbed of study, the white rat and the pigeon the organisms of choice (with an

assumption that all organisms and all behaviors obey similar laws).

Edgar Chace Tolman championed the methodology of behaviorism and contributed important work. Some of his concepts (latent learning, cognitive maps) still appear today, even in the cognitive literature. Pavlov's books were translated in the 1920s, and Clark Hull began publishing his important series of Psychological Review papers in the late 20s and early 30s. Hull's most famous student, Kenneth Spence, also began his important work in the 1930s. Edwin Guthrie published his ideas on the role of contiguity in learning and the notion of one-trial learning. In 1938, B. F. Skinner published *The Behavior of Organisms* and launched his operant approach, which became the most famous behaviorist position and today, among many, seems to represent behaviorism. One of my favorite courses as an undergraduate was *The Psychology of Learning*, taught by my undergraduate mentor, David G. Elmes, using a book by James Deese and Stuart Hulse of John Hopkins University with that title.

THEORETICAL SUPPORT

Behaviorism was the dominant movement in American psychology in the first half of the twentieth century, culminating in the radical movement of B.F. Skinner—the most influential psychologist since Freud. This book begins with a brief history of behaviorism and goes on to explain and criticize radical behaviorism, its philosophy and its applications to social issues. The mission of the book is to help steer experimental psychology away from its current undisciplined indulgence in "mental life" toward the core of science, which is an economical description of nature (Staddon, 2014). The author argues that parsimony, the elementary philosophical distinction between private and public events, and even biology, evolution and animal psychology are all ignored by much contemporary cognitive psychology . The failings of a theoretical radical behaviorism as well as a philosophically defective cognitive psychology point to the need for a new theoretical behaviorism, which can deal with problems such as "consciousness" that have been either ignored, evaded or muddled by existing approaches (Staddon, 2014). This second edition, which will be published nearly fifteen years after the first edition, surveys what, if any, changes have occurred within behaviorism and whether it has maintained its influence on experimental cognitive psychology or other fields. Since publication of the first edition, John Staddon has published extensively in journals and magazines, offering insightful commentary on everyday events, usually exposing how our preconceptions are often illogical and inaccurate, yet have become deeply entrenched in our collective conscience. In 2012, he published a successful trade book called The Malign Hand of the Markets, which exposed the insidious forces affecting our financial markets. John has used his developed writing skills to make the second edition of The New Behaviorism richer and more accessible, with illuminating and engaging examples to illustrate his points (Staddon, 2014; Baum, 2011).

2.1. Theoretical behaviorism

According to Reisman (2003) John Staddon has advocated an approach to psychological theory called *theoretical behaviorism*. Theoretical behaviorism must be considered as *behaviorism* since, like the behaviorism of earlier figures such as J.B. Watson and B.F. Skinner, it holds that psychological theory should be restrained by behavioral data and behavioral data alone. Theoretical behaviorism is *theoretical* since, unlike

the behaviorism presented by such former characters, it introduces hidden states into psychological theory. Watson and Skinner refute hidden states and maintain that all theory needs to be framed in terms of observable variables, such as stimulus and response. In contrast, Staddon argues that the "theory phobia" of the behaviorists is a historical misfortune and that a thoroughly thought behaviorism should welcome the introduction of hidden variable.

What theoretical behaviorism adds to behaviorism are abstract computational processes in place of underlying psychological mechanisms or cognitive states.

"For Staddon, the most satisfying explanations of behavior are not given in terms of underlying physiological mechanisms, nor in terms of cognitive states, but in terms of abstract computational processes. What makes these claims especially contentious is that Staddon often suggests that theoretical behaviorism should replace, rather than complement, other approaches to explaining behavior" (Reisman, 2003, p. 716).

Rather than a bottom-up-approach, Neo-behaviorism takes a top-down approach through employing abstract rules of operation. Hidden variables are the major concern in theoretical behaviorism achieved through behavioral modeling.

"Theoretical behaviorism is not directly concerned with the relation between behavior and its physiological underpinnings (bottom-up approach), but with the relation between behavior and 'its rules of operation' (top-down approach). Staddon presents behavioral modeling as an effective way to discover hidden variables that are implicated in behavior, but are not apparent from neurophysiological studies" (Reisman, 2003, p. 718).

Keijze (2005) considers the explanatory capabilities of internal mechanisms as the main reason to call Staddon's behaviorism theoretical.

"In contrast to Skinner [radical behaviorism], theoretical behaviorism explicitly embraces the use of unobservable, hypothetical internal mechanisms to account for the experimental findings of behavior. This commitment to postulating and evaluating the explanatory capabilities of internal mechanisms makes Staddon's behaviorism theoretical" (Keijzer, 2005, p. 126).

Keijzer, (2005) maintains that theoretical behaviorism resembles the pre-Skinnerian behaviorism advocated by Clark Hull, since it shares with Hullian behaviorism, the belief that the basic goal of behavioral study is the elicitation of mechanisms. However, while Hull conceives of his 'intervening variables' in terms of physiology, Staddon more advocates the abstract 'black box' mechanisms. Staddon takes internal conditions as completely theoretical constructions on the basis of information from taken from historical investigations. In Adaptive dynamics particularly, Staddon asserts a distance from neuroscience. He does, of course, not reject the existence of the neural machinery underlying behavior, but he fervently persists that a crucial step in appreciating how all this machinery functions is 'dynamic black box modeling,' and that such models will always yield the most concise outline of behavior.

2.2. Tolman's Neo-behaviorism And Purposive Behavior

According to Weidman (1999) Tolman's ideas are different from other behaviorists in that it takes a more holistic

approach to behavior which involves an integration with the environment.

"A professor of psychology at the University of California at Berkeley, Tolman focused his experimental work largely on white rats learning their way through mazes. He differed from his behaviorist predecessors by taking a more holistic approach to behavior than they had. Rather than talking in terms of atomistic, isolated stimuli and responses, Tolman emphasized their integration with the environment by referring to them as "stimulating agencies" and "behavior acts" (Weidman, 1999; Meyer, 1922; Campbell, 1984).

According to Shakian (1976) Tolman named his system of psychology "purposive behaviorism" as it satisfied one of his basic notions that organism produce behavior for some adaptive goals. He starts out as a behaviorist but gains an interest in Gestalt theories from Kurt Lewin, and adapted some Gestalt concepts into his work. He develops a dislike for Watson's behaviorism since he despises "mechanistic behaviorism's reductionistic perspectives. He believes individuals are engaged in more than merely respond to stimuli, rather they act on beliefs, attitudes, changing conditions, and they strive toward goals. Tolman is virtually the only behaviorist who considered the Stimulus-Response theory unacceptable, because reinforcement was not essential for learning to occur. He feels that behavior is holistic, purposive, and cognitive. Tolman's views can be summarized by saying that behavior is not a response to a stimulus but is cognitive coping with a pattern of stimuli. Tolman is similar to the behaviorists in his emphasis on objectivity and measurement. He differs in that he does not believe reinforcement is necessary for learning to take place. Problems with his work are that he poorly defines many terms that he uses in his basic theories, and that is difficult to make predictions from an expectancy point of view due to the lack of determining the nature and strength of expectations a priori and when or how expectations may change.

Packard (2003) maintains that Tolman is one of the early advocates of a different theoretical approach to understanding learned behavior. Tolman (1932) claims that S-R theory did not properly explain all learning phenomena, and that animals form expectations about how their behaviors would result in their desired goals. According to Furedy (2003) the advocates of Tolman's S-S expectancy theory claim that the incorporeal construct proposed by advocates of Hull-Spence S-R is a deux ex machine mechanism employed by S-R theorists to smuggle the concept of cognition into their purportedly S-R accounts.

Rosenzweig and Riley (2003) maintain that Tolman believes that knowledge and purpose are inferences from behavior rather than features of behavior. Tolman calls these inferences, intervening variables to convey the fact that knowledge and purpose intervene between the stimulus and behavior and thus guide our behavior.

2.3. Hullian Neo-behaviorism and Mathematic-Deductive Study of Drive

According to Weidman (1999) among the three neobehaviorists, Hull was the most interested one in providing a formal theory of behavior. He maintains that he has discovered the fundamental law of learning or habit-formation, called the law of stimulus generalization, and that this law not only underpins all animals and human's behavior, but also represents a basic principle in unifying all the social sciences. According to the law, a response can be activated by an unconventional stimulus as long as that stimulus is associated, either temporally

or in character, with the stimulus that normally activates the response. As long as the unconventional stimulus is similar enough to the normal one, it can elicit the response. Pavlov found this effect when the dogs in his experiment salivated upon the ringing of a bell. Hull further introduced the theory that learning is continuous, that is, when an animal is trained to respond to a certain positive stimulus (or avoid a negative stimulus), all aspects of that stimulus affecting the animal's sensorium are gradually associated with that response. Thus, the animal learns in an incremental way, not in an all-or-nothing shot (insightfully), and thus planning the form of stimuli can precisely control the animal's ability in forming habits. These laws of behavior explain how all learning happens without employing immaterial concepts such as soul or free will (Weidman, 1999; Barlow, Nock, & Hersen, 2009).).

According to Hineline (2003) a Neo-behaviorism introduced in 1930s, by Clark L. Hull and his student Kenneth Spence, was in vogue until mid-century. Like Watson, Hull believes that behavior is made up of Stimulus-Response parts, but whereas Watson presents S-R analyses as modifiable in regard to scale, the Hull-Spence approach puts emphasis on "molecular building blocks" that are described as shaping sequences of related events between environmental stimuli and the behavior observed. These intervening events include hypothetical (but supposedly physical) stimulus traces, hidden responses, and response-produced stimuli. Learned S-R sections are considered as habits. Hull devised a detailed theory whose theorems and postulates, were related to the formation of habit strength and with the mechanistic transformation of habit strength into explicit action. The theory was published as essentially complete in 1943. Although it was highly cherished, it was considered as pedantic, containing a lot of terms that were not lend themselves easily to evaluation; it lost its own significance within a decade. Nonetheless, Hullian students obtained important positions within academic psychology, and some components of that approach can be distinguished up to this day in theorizing that lays on the metaphor of mechanical associative connections. Hull's concern for formal hypothesis testing, aimed at hypothetical constructs that are attached to manifested events as stipulated by operational definitions, also exists as a ''methodological behaviorism'' that has extended through much of psychology.

Hullian behaviorism is functionalist in the sense that it is concerned with an organism's survival. "Hull, like most functionalist learning theorists, was significantly influenced by Darwin's writings. The purpose of Hull's theory was to explain adaptive behavior and to understand the variables affecting it. In fact, it can be said that Hull was interested in developing a theory that explained how body needs, the environment, and behavior interact to increase the probability of the organism's survival" (Hergenhahn & Olson, 2008, p. 131).

According to Sahakian (1976) Hull is best known for his Drive Reduction Theory which presumes that behavior takes place in response to "drives" such as hunger, thirst, sexual interest, feeling cold, etc. When the goal of the drive is achieved (food, water, mating, warmth) the drive is weakened, at least temporarily. This reduction of drive plays the role of a reinforcer for learning. Thus, learning entails a dynamic interplay between survival drives and their achievement. The attachment of the drive to the goal of the drive is a kind of reinforcement, and his theory is considered as a reinforcement theory of learning. Hull believes that these drives

and behaviors to accomplish the drives are influential in the evolutionary process of Darwin. Movement sequences result in need reduction as survival adaptations. He assumes that learning can only occur with reinforcement of the responses that lead to attainment of survival needs, and that the mechanism of this reinforcement is the reduction of a biological drive (Rachlin, 2012; Zuriff, 1985; Johnston, & Pennypacker, 2008).

2.4. Skinner's Neo-behaviorism And Systematicity

According to Hergenhahn and Olson (2008), B. F. Skinner as the third neobehaviorist refused Hull's endeavors in regard to formal theory building and returned to the Watsonian concern in forming a science entirely on the observation of behavior. Skinner contrived an experimental system, known as Skinner box, in which a pigeon or a rat would be rewarded for performing an action, such as raising its head above a certain line, or pressing a lever, by the release of food pellets. In his 1938 *Behavior of Organisms,* Skinner contended that a movement rewarded in this way is reinforced, that is, it is made more probable to happen, while one that is punished is weakened. A behavior that is followed by the repetition of that behavior-a movement selected and continued by its positive consequences- Skinner called the operant. His approach is consequently known as operant conditioning. Both animals and people show certain behaviors due to the positive consequences created by past behavior. For Skinner, all learning is a matter of such reinforcement, and his method is composed of recording sequences of movements that reveals the patterns by which behavior are reinforced. He avoids talking about habit formation, and even about stimuli, restricting his science to the observation of these movement patterns (Skinner, 1944; Staddon, 2014; Bird, 2007).

2.5. Spence's Neo-behaviorism and Incentive Motivation and Anxiety

According to Sahakian (1976) Kenneth Spence was the best-known of Clark Hull's students. A number of contributions to the psychological literature are attributed to Spence.

First, Incentive motivation and its mathematical formulation- Hull's theory was a habit theory of behavior. Spence departed from Hull because he attributed improvement in performance to motivational factors rather than habit factors.

Second, Logic and scientific methodology in psychology - Spence identified four different kinds of theories in psychology. These were "animalistic conceptions", the belief that soul, libido, vital energy, or other vague "forces" within the organism guided behavior; "neurophysiological theories" such as Pavlov and Kohler; "Response-inferred theoretical constructs" such as put forth by Gestaltists such as Kurt Lewin; and "intervening variable" theories of Hull and Tolman.

Third, Distinctions between SS (Sign-significate) and SR (Stimulus Response) learning- SS is more gestalts, emphasizing the perceptual nature of learning, while SR postulates associative connections between stimuli and responses and is thus more along the lines of behaviorist theories.

Fourth, Experimentation in discrimination learning- Spence observed that reinforcement combined with frustration or inhibitors facilitated finding a correct stimulus among a cluster which included incorrect ones. This was a "carrot and stick" model.

Fifth, Absolute stimulus theory and transposition- Trans positional phenomena referred to the tendency of an

organism to select between two NEW stimuli based on learning from a previous relationship of stimulus and response.

Sixth, Importance of secondary reinforcement- a neutral stimulus that becomes coupled with a primary stimulus takes on reinforcing capacity itself and Extinction of behavior in classical learning.

CONCLUSION

Neo-behaviorism bridges the gap between behaviorism and cognitivism. Like Thorndike, Watson, and Pavlov, the neobehaviorists believe that the study of learning and a focus on rigorously objective observational methods are crucial to a scientific psychology. Unlike their predecessors, however, the neobehaviorists are more self-consciously attempting to formalize the laws of behavior. They are also under the influence of the Vienna Circle of logical positivists, a group of philosophers led by Rudolph Carnap, Otto Neurath, and Herbert Feigl, who maintain that meaningful statements about the world need to be formed as statements concerning physical observations. Anything else is metaphysics or nonsense, not science, and must be rejected. Neo-behaviorism is concerned with hidden variables and tries to provide formal theories of behavior and to establish the fundamental law of learning or habit-formation as a unifying factor for all social sciences. Hull-Spence's Neo-behaviorism focuses on molecular building blocks that are described as forming sequences of connecting events between environmental stimuli and behavior. Hull's Neo-behaviorism can be considered as functionalist in that it is interested in an organism's survival. Tolman is almost the only behaviorist who notices the problems in Stimulus-Response theory, since reinforcement is not essential for learning to occur. He feels that behavior is holistic, purposive, and cognitive. Tolman's views can be summarized by saying that behavior is not a response to a stimulus but is cognitive coping with a pattern of stimuli. Tolman is similar to the behaviorists in his emphasis on objectivity and measurement. He differs in that he does not believe reinforcement is crucial for learning to take place.

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