The Behaviorist Perspective on Learning

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Abstract

Behaviorist and cognitivist perspectives have been at odds with each other for forty years -- nearly one hundred years if one generously includes the introspective analysis of structuralist psychology as an early precursor to cognitive psychology. In the early 1960s, cognitive psychology emerged to overshadow behaviorism as the dominant school of psychological theory and analysis. This paper provides an overview of the behaviorist perspective on learning, and, to a lesser extent, that of cognitive psychology. Although one can argue convincingly that there are several subtypes of both behaviorism and cognitive psychology, there is a dichotomy of overarching theoretical premises that delineate the former from the latter. It is this dichotomy of theory and analysis that provides the foundation from which to conduct a brief treatment of learning theory from the standpoint of behaviorism. In addition to the broader theoretical considerations, the phenomenon of transfer will be considered as an illustration of how behaviorism differs from cognitive psychology in its approach to the processes of learning.
The Behaviorist Perspective on Learning

Introduction

This paper is a broad overview of the behaviorist perspective on learning, and, to a lesser extent, that of cognitive psychology. It is important to provide the caveat that there is not a single view shared by every theorist who claims inclusion in the behaviorist ranks. The same holds true for those who consider themselves to be cognitivists. There is, however, a dichotomy of broad, overarching perspectives, one or the other to which the vast majority of learning theorists subscribe. It is this dichotomy of theory and analysis that provides the foundation from which to conduct a brief treatment of learning theory from the standpoint of behaviorism.

During the course of this paper, focus will be given to the general aspects of behaviorist theory, first looking briefly at its theoretical underpinnings, then highlighting the more substantial principles of learning advanced by this perspective. Cognitivist learning theory will be presented primarily as a contrast to the behaviorist perspective. In addition to broader theoretical considerations, the phenomenon of transfer will serve to exemplify how behaviorists differ from cognitivists in their approach to the processes of learning.

Trying to Define Learning

Since the main subject of this paper is the behaviorist view of how learning occurs, it makes sense to first operationalize the term *learning*. This endeavor, however, quickly becomes convoluted, as one attempts to navigate the plethora of definitions of learning proffered in the literature. Efforts of coalescing disparate perspectives into a single, viable definition soon give way to a cataloging of the various definitions.
For all of its undisputed importance in present day psychology and education, the phenomenon of learning is a very difficult concept to define (Catania, 1992; Hergenhahn, 1988; Mazur, 1990). According to the On-Line Merriam-Webster dictionary (1999), learning means “to gain knowledge or understanding of or skill in by study, instruction, or experience”. Because of its vagueness, however, such a definition does not satisfy most scholars and professionals concerned with how humans learn. Terms often used to define learning, such as “knowledge”, “understanding”, “mastery”, and “comprehension”, are nebulous, lacking the type of clarity to which true science aspires. While the literature contains many attempts at a solid definition of learning, none can claim unanimous acceptance.

In Learning (1992), Catania asserts that, although it can be studied by examining behavior, learning can not be satisfactorily defined. Even though he, too, offers a definition of learning, he also warns that the term learning “has been used in so many different ways in both technical and colloquial vocabularies that it may be of limited usefulness” (p. 381). He suggests the determination that learning has occurred and what exactly has been learned is sometimes a function of the experimenter’s focus. He uses as an example a rat’s increased speed in negotiating a maze after an initial exploratory trial, followed by successive food-reinforced trials. The experimenter might say that this is a demonstration of latent learning. According to Catania, however, the problem with this conclusion is that the rat’s performance is a result of more than a single set of contingencies, contingencies that are harder to get at than those involving the food reinforcers.

Nonetheless, a search of the literature reveals a tendency to define learning in terms of changes in observable behavior (Amsel, 1989; Bower and Hilgard, 1981; Catania, 1992;

Others who have sought to define learning have encompassed the same behaviorist perspective, if not the actual language of behaviorism. Johnston and Pennypacker (1993, p. 1) define learning as “the relatively enduring changes in behavior that result from conditioning processes”, while Sulzer-Azaroff and Mayer (1991, p.2) refer to learning as “any enduring change in behavior produced as a function of the interaction between the behavior and the environment.” B. F. Skinner, perhaps the most well known of the behaviorists, defines learning specifically as “a change in probability of response” (Epstein, 1982, p. 50).

There are, however, other definitions of learning that refer to non-behavioral indices. Gagné (1985, p. 2) states that learning is “change in human disposition or capability that persists over a period of time and is not simply ascribable to processes of growth.” Mayer (1982, p.1040) provides a further elaboration of this concept:

“Learning” is the relatively permanent change in a person’s knowledge or behavior due to experience. This definition has three components: (1) the duration of the change is long-term rather than short-term; (2) the locus of the change is the content and structure of knowledge in memory or the behavior of the learner; (3) the cause of the change is the
learner’s experience in the environment rather than fatigue, motivation, drugs, physical
condition, or physiological intervention.

Citing Kimble’s definition of learning, Hergenhahn (1988, p. 12) adds a caveat that echoes
the third component of Mayer’s definition above when he states that learning “cannot be
attributed to temporary body states such as illness, fatigue, or drugs”. Interestingly, however,
Hergenhahn also substitutes the term “experience” for Kimble’s “reinforced practice.” This
substitution of terms may seem (or even be) innocuous, but its effect is to have softened
Kimble’s more behavioristic terminology in favor of a term more inclusive of non-behavioral
(i.e., cognitive) processes. “Experience” can easily encompass processes that, from a behaviorist
standpoint, can only be intimated, not observed.

Skinner considered terminology very important when talking about learning, declaring
that the field of education “has long suffered from efforts to analyze teaching and learning in lay
terms” (1974, p. 247). His insistence on more precise terminology to talk about behavior and
learning was fueled by his pursuit of a science of behavior, a pursuit that is a major underpinning
of behaviorism itself. The following section will elaborate on the themes of behaviorism.

**Behaviorism and Cognitive Psychology**

The rift between behaviorist and cognitivist theory on and analyses of behavior and
learning is four decades old (it is almost hundred years if one generously includes the
introspective analysis of structuralist psychology as an early precursor to cognitive psychology).
Abram Amsel (1989, p. 1) presents this theoretical and analytical struggle using a parliamentary
metaphor, pointing out that “the S-R psychologists [i.e., those that adhered to a stimulus-
response behavioristic approach], who at one time formed the government, are now in the loyal
opposition, the cognitivists being the new government.” He went on to characterized the eventual rise of cognitive psychology as “the cognitive revolution [that] swept into power even those for whom invertebrates are taken to be cognitive” (p.1). While a recounting of the history of learning theory is beyond the purpose of this short paper, a closer examination of how the two perspectives differ is warranted.

At the core of the differences between behaviorism and cognitive psychology is the question of subject matter (Amsel, 1989; Catania, 1992; Hergenhahn, 1988; Mazur, 1990). What is the purview of the discipline: behavior, mind or both? The first realization one might have is that the only thing accessible to us for examination is what an organism does; that is, its behavior. While a human subject in an experiment might describe his or her feelings and thoughts, these descriptions are still only (verbal) behavior. So one concludes that no matter what phenomenon psychologists study, the observations, terminology, and theory employed and/or produced must necessarily derive from behavior; that is, what organisms do (Catania, 1992).

However, one might also posit that there is much more to an organism than what it demonstrates through its behavior. Present behavior is not indicative of what an organism has the potential to do. For some, such potentiality raises questions that lead to propositions of knowledge, of understanding, of remembering, and of creativity; in other words, of mind. Catania (1992) provides a good example of this:

Two students may sit silently through a lecture, and yet it may be clear to the instructor that one is able to answer certain questions and solve certain problems while the other cannot. Although the students might be distinguished on the basis of past performance, it remains that they are not currently behaving differently. The difference is in what each
potentially can do; we might say simply that one student knows more than the other.

When we study this knowledge, it is tempting to say that we study the student’s mind.

(p. 7)

Behaviorism holds that the proper subject matter of psychology is behavior and only behavior (Amsel, 1989; Catania, 1992; Epstein, 1982; Hergenhahn, 1988; Klein and Mowrer, 1989; Mazur, 1990; Richelle, 1993). B. F. Skinner insisted throughout his career that psychology was (or at least should be) the “science of behavior”, a primary aim of which was the creation of a “technology of behavior” that could be used to design a problem-free society (Richelle, 1993; Skinner, 1971, 1974). In 1948, he published his highly controversial Walden Two wherein he devised a fictional utopia based upon this technology of behavior and maintained through applied behavioral analysis.

Skinner, a tenacious proponent of the most radical branch of behaviorism (Amsel, 1989; Catania, 1992; Epstein, 1982; Hergenhahn, 1988; Klein and Mowrer, 1989; Mazur, 1990; Skinner, 1974), stated that traits and states of mind “offer no real explanation” of human behavior and “stand in the way of a more effective analysis” (Skinner, 1963, p. 952). His take on the mind is that private events can be considered part of behavior itself and can be interpreted in terms of what we know about public events in behavior (Epstein, 1982; Skinner, 1963).

In this respect, Skinner’s views epitomize a basic behavioristic tenet: cognitive processes, such as remembering, imaging, and (as will be discussed in further detail later) transfer should be interpreted in terms of what organisms do. When cognitivists refer to or explain a cognitive process in terms that are not explicitly related to behavior, behaviorists become concerned that the language being used is misleading, calling attention away from what should be the
fundamental subject matter: behavior (Catania, 1992). Some behaviorists claim the cognitivists are “psychologizing” (Bostow, 1999), inventing a miraculous cognitive process to explain a private event that can not be directly observed (Bostow, 1999; Catania, 1992; Epstein, 1982; Hergenhahn, 1988; Klein and Mowrer, 1989; Mazur, 1990; Skinner, 1974). Thus, a consistent vocabulary can be developed for a cognitive process only if at some point that process makes contact or *tacts* with the environment (Skinner, 1957). In the same way, consistent tacting of a private event can be developed only if some correlate of that event is publicly available to the verbal community (Catania, 1992, p. 357). For example, a child that learns to say “apple” in the presence of an actual apple is said to tacting with the apple. The tact does not introduce any new process, but is merely a name for stimulus control as it enters into verbal behavior (Catania, 1992).

Behaviorists are particularly concerned when a cognitivist account is accepted an explanation of a phenomenon, fearing that further inquiry into that phenomenon will be discouraged. It is not that behaviorists dispute the existence of phenomena, such as ideas, feelings, hunches, and fantasies. Skinner, himself, allowed that these sorts of things might well exist (Epstein, 1982; Richelle, 1993; Skinner, 1963, 1974). Rather, behaviorists criticize the invocation of these phenomena as causes of behavior (Amsel, 1989; Catania, 1992; Epstein, 1982; Hergenhahn, 1988; Klein and Mowrer, 1989; Mazur, 1990; Skinner, 1957, 1963, 1974). As an example, consider a person who says that she accepted a date with a man because she had a good feeling about him. It is quite easy to accept such an explanation for why she accepted the date. In the view of the behaviorist, it is far too easy to let amorphous feelings or thoughts explain one’s behavior. These types of phenomena have their origins in experiences with the
environment. Through an examination of past behavior, we will find the causes of not only the behaviors in question, but also of the phenomena (e.g., feelings and thoughts) that might have preceded those behaviors. In doing so, we will be able to say that these feelings, ideas, imaginings, etc. are names for certain things that happen to us when we deal with events in the world (Catania, 1992).

Cognitivists, on the other hand, argue that the behaviorist view is too narrow. Psychology must concern itself with processes that, while not observable, must occur as we interact with the environment (Catania, 1992; Hergenhahn, 1988; Klein and Mowrer, 1989; Mazur, 1990). For example, there are events that occur when a person tries to recall an acquaintance’s name that is “just on the tip of his or her tongue.” The cognitivist contends that studying these events and processes is very relevant to psychology, particularly with regard to learning.

Catania (1992) suggests that this traditional distinction between behaviorists and cognitivists is based more often on language and ways of talking about behavior than on the analytical approach employed. Usually, behaviorists and cognitivists are interested in different types of questions that call for different types of analyses; namely, structural and functional. Structural and functional analyses have long been the two prominent methods for studying learning (Catania, 1992; Hergenhahn, 1988). In structural analysis, the relations among stimuli and responses are held constant while critical properties of one or the other are altered, whereas in functional analysis, the relations are altered while the stimuli and responses, themselves, are held constant (Catania, 1992). Cognitivists tend to employ structural analysis to summarize the organization of an organism’s behavior in terms of the structures the organism knows. An example of this would be the hierarchical organizations in the structure of texts, as in the
relations among words, phrases and sentences. The language of the mind is convenient for this
type of analysis. Behaviorists, on the other hand, locate the cause of behavior on the functional
relations among observable events. Their focus is primarily on interactions between behavior and
environment, particularly as they relate to the contingency relations among discriminative
stimuli, responses, and consequences. For these concerns, the language of stimulus and response
is appropriate (Catania, 1992).

**Transfer: An Illustration of the Behaviorist Perspective**

To illustrate how behaviorist and cognitivist perspectives differ, consider the phenomenon
of *transfer*. Transfer is arguably easier to define than learning, although behaviorists and
cognitivists often conceive of and talk about it a bit differently. There are those, however, who
claim that transfer, as a distinct phenomenon of learning, does not exist at all, but rather is a
derivative of more basic cognitive processes (Detterman, 1993). In general, though, transfer is
treated as a distinct process whereby something learned in one situation is applied (i.e.,
 transferred) to another situation (Butterfield et al, 1993; Cormier and Hagman, 1987; Detterman,
1993; Hergenhahn, 1988; Merrill, 1994; Gordon, 1994; Greeno, Moore, and Smith, 1993;
Sternberg and Frensch, 1993).

Behaviorists, as has been discussed earlier, are uncomfortable with such broadly defined
phenomena. Phenomena defined in this way appear to be more articles of faith than of true
science. Thus, behaviorists use strict behavioral terminology when defining transfer:

- substituting one set of discriminative stimuli for another (or, as a process, the stimulus
  control maintained after such a substitution). Transfer may be based on common
- properties of two sets of stimuli or on similar correlations of the two sets of stimuli with
differential contingencies. In verbal learning, transfer from one task to another is usually assessed with reference to a control group that did not learn the first task; it is positive if the first task enhances performance on the second and negative if it does the opposite. (Catania, 1992)

Throughout the education and cognitive psychology literature, other terms are prominently employed in the discussion of how a thing once learned becomes applied in new situations. Transfer of learning, transfer of training and generalization are terms often used, if not as synonyms for transfer and each other, then as references to closely-related, but subtly different phenomena (Gordon, 1994; Hergenhahn, 1988; Klein and Mowrer, 1989; Mazur, 1990; Merrill, 1994; Smith and Ragan, 1993; Stevenson and Palmer, 1994). Behaviorists are much more likely to maintain stricter conceptualizations of these terms, again using the language of behaviorism (Catania, 1992; Malott, Whaley, and Malott, 1997; Taber, Glaser, and Schaefer, 1965). The existence and/or the delineation of these differences, however, are quite beyond the scope of this paper.

Transfer as a Metaphor

To a behaviorist, transfer is a metaphor for a mental process that cannot otherwise be observed (Bostow, 1999). As such it is somewhat on the order of the electronic transfer of funds between bank accounts. Funds that supposedly reside in one account are moved (i.e., transferred) from that account into another, in which they are said to now reside. However, the whole process of this transfer occurs at a level and in a manner that is unobservable to the person making the transfer. The only observable aspects of this transfer are a decrease in a number representing the funds in the first account and a corresponding increase in a number representing
the funds in second account. In actuality, however, nothing of physical substance has been transferred, the whole operation having been literally nothing more than a change in conceptualization. One can only assume that a transfer has indeed taken place, as evidenced by the change in numbers that represent the funds in each of the accounts involved. In the context of learning, the situation in which a thing is learned is analogous to the first account, the thing learned is analogous to the funds to be transferred, and the new situation to which the thing is transferred is analogous to the second account. The changes in the respective account balances then would represent the proof that the thing learned had transferred. This entire process could, theoretically, be successfully repeated again and again.

From a cognitivist point of view, the fact that a thing learned in one situation shows up in new situations on a repeated basis gives evidence that transfer has taken place. The transfer phenomenon itself, which might be more than a single process or mechanism, is an assumed internal event that does not require direct observation to be considered valid. Most behaviorists, however, would say that this internal event was an invention to explain something that could not otherwise be explained, let alone demonstrated (Bostow, 1999). That is not to say that behaviorists deny that physiological processes resulting in transfer are taking place. Rather, they contend that the analysis of such processes should be undertaken by physiologists, not psychologists, since these processes occur at a chemical and not a behavioral level.

Bostow (1999) provides further commentary on the behaviorist view of transfer and on behaviorists’ objections to its use in explaining behavior:

A behavioral translation of “transfer” is the tendency for a response to occur to stimuli that were not present during conditioning. This is called generalization. A child is reinforced
for saying “daddy” in the presence of daddy. But then the child may have some weaker
tendency to call all men “daddy.” For the cognitivist, this is “transfer.” For the
behaviorist, this is stimulus generalization. Behaviorists do not use the term “transfer”
because what is actually observed is a high rate of behavior in the other environments
(than present during conditioning). Nothing has been “transferred.” We simply observe
that the behavior has a tendency to be emitted. Transfer implies that something has been
transferred, but since the objective scientist cannot actually see it, he does not infer it, nor
does he use this hypothetical process in his explanations of behavior... Concept formation
for the behaviorist does not occur in the head. It is the tendency to generalize within a
class of stimuli, and discriminate between that class of stimuli and other classes. The
cognitivist would say a person transfers within a class of stimuli, but does not transfer
between other classes... The behaviorist's objection to the mentalistic notion of “transfer”
is that it refers to a process that is not directly observable and can not be directly
measured. Discussion that uses the term has not led to more effective methods of
instruction.

**Is a Reconciliation of the Two Perspectives Possible?**

As has been shown, behaviorism is rooted in the idea that behavior -- and only behavior --
is the proper domain of psychology. The behaviorist perspective demands that learning and
behavior be talked about in scientific terms, which they equate with the language of behaviorism.
Cognitivists argue that such a language and approach, while very useful, is too limited to deal
with all of the unobservable processes they contend must be examined and incorporated into any
analysis of behavior and learning. Among all this contention then, is there room for a reconciliation of these two perspectives?

Catania (1992) provides an interesting account of the evolution of learning theory. He asserts that the psychology of learning evolution can be traced through examinations of the different experimental outcomes of a variety of procedures (Catania 1992). The importance of each procedure was evaluated in accordance with its demonstrated effectiveness. The experimental findings of any given time led to theoretical formulations dominated by laws of association or contiguity, rules of respondent conditioning, or principles of reinforcement and punishment. The domination of a particular process was sometimes so strong that it was assumed to be the fundamental and exclusive basis of all learning. These processes, however, were inevitably challenged because the nature of learning could never be explained by any single process. Thus, according to Catania, the history of learning theory in psychology is often told more in terms of the theorists and their propositions, than in terms of the actual phenomena of learning as revealed through research.

In addressing the long-perpetuated rift between behavioral and cognitive analyses of teaching and transfer, Butterfield et al (1993, p. 194) find “no principled difference between learning and transfer...” and assert that “the fundamental issue is not whether particular changes in behavior illustrate learning or transfer [but rather] the range of circumstances in which particular learning is used.” They go on to suggest that behaviorist and cognitivist analyses of learning are analogous in several ways: 1) both view the effects of subjective characteristics as dependent on learning; 2) both apply to overt (i.e., behavior) and covert (i.e., mental events) responses; 3) both are probabilistic in their predictions, recognizing that practice and feedback
increase learning; 4) each involve considerations of both motivation and abstract operations and reinforcers; 5) both actively investigate the determinants of rule-governed behavior; 6) neither has been determined inadequate; and 7) neither have undesirable formal properties, such as rigidity (pp. 249-250).

Furthermore, Catania (1992) asserts that structure and function are often interrelated and complementary, not mutually exclusive. He gives the example of designing an illustrated reader for an elementary school class. He contends that such an endeavor should employ both a structural and functional approach, analyzing both the reader’s structural features (e.g., text and pictures), as well as its functional features (e.g., how the pictures are related to the sentences they illustrate). Glaser and Bassock (1989) and Butterfield et al (1993) add to this notion of common ground by pointing out that the respective languages of behaviorists and cognitivists are implicit within each other. Relations between the structures of the environment and of knowledge must necessarily include the vocabulary describing the relations between stimuli and responses. By the same token, structure is implicit in the language of behaviorism with regard to properties that define operants and discriminated operants.

While no one disputes that behaviorism and cognitive psychology represent two different perspectives on the analysis of learning, the previous paragraphs in this conclusory section point to the possibility of reconciliation to some degree. Both behaviorism and cognitive psychology appear to offer valued insight into behavior and learning, though it must also be recognized that each has its nagging limitations that have, as yet, not been surmounted. Given their respective strengths and weaknesses, it seems to make sense that behaviorists and cognitivists could achieve much more through a unity of purpose and effort than each is currently achieving separately.
Perhaps, however, this is too much to ask or expect, especially if, as Catania has suggested, the two psychologies are defined and directed more by the ego investments of their respective proponents than by the research findings each produces. After all, history is quite a powerful tyrant.
Footnotes

1 *Behavioral potentiality* is defined by Hergenhahn (1988, p. 12) as:

The ability to perform some act although the act is not being performed at the present time. Learning may result in a change in behavioral potentiality although the learning may not be translated into behavior until some time after the learning has taken place.

2 This discussion of differences between behaviorism and cognitive psychology and, in particular, the major themes of the two camps are admittedly stereotypes. The reader should bear in mind, that with any stereotype, there are undoubtedly many exceptions.

3 Catania (1992, p. 399) defines tact as:

   a verbal discriminative response (as when the verbal response apple is said to tact the apple). The tact captures stimulus control as it enters into verbal behavior. The tact relation includes only responses in the presence of or shortly after a stimulus, and therefore is not equivalent to naming or reference.
References


