

# Punished by Rewards? Application and Misapplication of the Principles of Operant Conditioning

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## Abstract

Breakthroughs in the psychological study of human learning can have direct application that benefits people in their work, education, and other aspects of life. However, misapplication based on the misunderstanding of key concepts can also abound. In this article, some basic principles of Skinnerian operant conditioning are explained and contrasted with examples of its misapplication detailed in the book, *Punished by Rewards: The Trouble with Gold Stars, Incentive Plans, A's, Praise and other Bribes* (Kohn, 1993). From this analysis, an initial plan for those who wish to more skillfully apply Skinnerian techniques is drawn forth and explained.

“Do this and you’ll get that”—is the most frequent and successful application of the behaviorist principles of B. F. Skinner in the world today, isn’t it? Actually no, it is not, but people try to apply this principle all the time in everyday life and may even think they are using their knowledge of psychology by doing so. In his book, *Punished by Rewards: The Trouble with Gold Stars, Incentive Plans, A's, Praise and other Bribes* (1993), Kohn’s main point is that this very idea, what he calls “pop-behaviorism,” the promising of rewards and incentives to people in order to increase a desired behavior, does not often yield the results intended. He cites multiple examples throughout the 430-page book to support his claim. He then places the blame for what he perceives as behaviorism’s failure on Skinner. However, when we look carefully at his examples and arguments as to the reasons why he thinks “pop-behaviorism” does not work and continues to be emitted despite its apparent lack of desired effect, his critique itself

actually demonstrates his own misunderstanding of key concepts from behaviorism.

Moreover, it must first be pointed out that Kohn's very use of the term "pop-behaviorism" is misleading. The layperson may indeed sometimes use the promise of a reward to entice another person to act in a certain way, but without an understanding of the subtleties and complexities of behaviorist principles. This action is uninformed, therefore, it has nothing to do with applying Skinnerian methods. There are also cases of those who misunderstand or are misinformed about the basic principles of behaviorism. They misapply such principles and subsequently may obtain less than desired results for their efforts. Hence, there is no such thing as "pop-behaviorism." Instead there is either uninformed behavior emitted by the layperson that may or may not produce the desired result, the skillful application of behaviorist principles that should lead to predictable outcomes, or the misapplication of such principles.

Behaviorist language itself can actually be used to describe more clearly and succinctly the very observations Kohn is attempting to explain. For these reasons, his work has been specifically chosen for analysis in this article. Thus, by examining Kohn's arguments we have the opportunity to clarify our own understanding of behaviorism, and Skinnerian operant conditioning in particular. From this, several key points emerge for a more skillful application of Skinnerian methods. But before proceeding, a brief review as to what behaviorism entails and the impact it has had and continues to have upon the field of psychology is given.

## **Behaviorism**

If one asks an educated layperson today for their definition of psychology, the person might respond with something such as, "It is the study of how people think, why they think that way, and how their thinking affects their life." Indeed, much of the study of psychology in the past and today has been to study human beings' mental processes as one way of attempting to understand human nature. With this in mind a person can clearly see how different and significant behaviorism was and continues to be in psychology. For behaviorists do not even deal with mental events at all. Instead, their sole focus is on what people do or how they behave.

When certain psychologists shifted their focus from investigating how people *think* to observing what people *do* it put the study of psychology for the first time on a firm scientific footing. For while mental processes are hidden from other people, and

even the trained psychologist is forced to *infer* what the other person thinks; psychologists that investigate how people behave have the advantage that the observational evidence they procure is open to anyone and their experiments can be replicated by others. Moreover, behavior is not only observable but also measurable. Thus, behaviorism puts psychology on a sound scientific base alongside fields such as chemistry, a physical science. Though there has been criticism of behaviorist methodology, the fact remains that what people actually do and say (verbal behavior) is undisputable; whereas what or how people think must always be inferred and thus open to different interpretations and disputes.

### Operant Conditioning

If we again bother the layperson and ask them to define *learning* for us they might say something like, “It is the act of acquiring knowledge.” Though not disputed, this definition is normally not precise enough for the psychologist. A psychologist might describe learning as, “a relatively permanent change in response potentiality which occurs as a result of reinforced practice” (see explanation in Reber & Reber, 2001). This definition may be confusing at first to the layperson, but in examining it further, they will uncover the essence of the behaviorist’s work. Conditioning is a general term describing the specific conditions in which associative learning (for example, when a behavior is linked with an event in the environment), takes place. This is learning that also happens to be observable and measurable. There are two main categories of conditioning that have been studied extensively, *classical conditioning* and *operant conditioning*.

Classical conditioning was first identified and studied by the Russian physiologist, Ivan Pavlov (1849-1946). He believed that psychological states were identical to physiological states and processes of the brain, and in the course of his investigations noticed what is now called classical conditioning. In his famous experiments an initially neutral stimulus (the ringing of a bell) is presented together with an unconditioned stimulus (meat powder) — a stimulus that normally elicits a measurable unconditioned response (salivation). After several such trials Pavlov observed that merely ringing the bell in absence of the meat powder would elicit salivation. In this way the dog had become *conditioned*. The new change in behavior that was learned was for the dog to salivate after only hearing the bell. By measuring the drops of saliva at each trial he

also had evidence of predictable patterns of the strengthening or weakening of that new behavior under various conditions, especially over time. The first behaviorists, namely John Watson (1878-1958), adapted Pavlov's experimental method from physiology to develop their own psychological study of certain behavioral acts.

B. F. Skinner (1904-1990), however, had a different focus. He concerned himself with the effects that behavioral acts can have on the environment and how the different consequences that immediately *follow* an action may change the probability of that particular action being emitted in future situations. He used the term operant conditioning to describe this kind of learning—which involves learning that our responses (in other words, *operating* upon the environment) can cause environmental change. One of the consequences of emitting a particular response can be reinforcement. Reinforcement is any event that causes the immediately preceding response (a specific instance of behavior) to be emitted more frequently in similar situations in the future.

For example, in many of Skinner's experiments an animal was placed in a special box that contained a lever. This lever was attached to an apparatus that delivered a food pellet immediately after the lever was pressed. In other words, first the response of lever pressing was emitted. Then, closely following this response the food pellet, or reinforcement, was delivered. Lever-pressing behavior was observed to increase in frequency in a predictable pattern after such reinforcement. By setting the apparatus to deliver a food pellet only after a certain number of responses or after the response when a set period of time had elapsed, the different effects of such conditions on the animal's rate of response could also be investigated and measured.

In sum, the key difference between classical conditioning and operant conditioning is that classical conditioning occurs whether or not the organism makes a response. The stimulus is repeatedly presented to the organism despite their responding or lack of response. In operant conditioning, however, a response must be emitted *before* any reinforcement is given. So reinforcement is contingent upon the organism emitting a response. In very simple terms, the difference in sequencing could be illustrated thus:

Pavlov: Stimulus → Response → Conditioned

Skinner: Response → Reinforcement → Conditioned

### Use of Terminology

Skinner concerned himself solely with the study of observable behavior, as he believed this was the most reliable source of evidence available to him. Furthermore, this evidence was open to anyone and it was possible for others to replicate his experiments. He developed ingenious experimental techniques to record changes in the rate of emission of selected instances of behavior under different conditions. He chose specific words, such as *operant conditioning*, *contingencies of reinforcement*, *shaping*, and *punishment*, to describe the various aspects of his work and gave these words distinct meanings when used in this scientific context. The language of Skinnerian behaviorism, therefore, is deliberately exact and precise.

Despite this, certain terms have developed alternate, often media-driven popular meanings and usages. Kohn gives us a good example of this by choosing to use the term *reward* in place of the Skinnerian term *reinforcement* throughout the book (1993, p. 5, for example). Furthermore, the term *promised rewards* (also called *incentives* by Kohn) is substituted for the Skinnerian term, *reinforcement*. Though they may appear to be the same, they are not. The difference is subtle.

This small discrepancy is where Kohn's argument first becomes unclear. *Reinforcement* and Kohn's use of the term *promised rewards* cannot always be substituted for each other. Skinner was concerned with an operant (the emission of an instance of behavior) and in what manner and with what schedule this operant was reinforced and the subsequent effect of reinforcement on its frequency of emission. Thus, by definition, reinforcement is anything that *follows* a particular operant that increases the probability of it being emitted in similar situations in the future. What we give as a reward can be reinforcing but not always. Just because we call something a reward does not guarantee that its presentation is indeed reinforcing. Nor can it be determined from Kohn's examples whether people were promised the rewards immediately after emitting the desired behavior. In the cases of giving *promised rewards* that Kohn describes, his examples show how the desired behavior *did not* increase. Therefore, the behavior simply was not reinforced according to the Skinnerian definition. Such examples have no connection with applying Skinnerian principles or testing them, and should be disregarded.

The difference is slight but crucial. Here is an example to further illustrate the

point. Skinner could not promise his pigeons food if they pecked a disk. They pecked a disk and then received food (reinforcement) and their pecking behavior increased. Nor could his rats be promised a food pellet for having pressed a lever 20 times. When the schedule of reinforcement called for it, they received a food pellet after pressing a lever 20 times and their lever-pressing behavior increased in observable, predictable patterns. Therefore, being paid for piecework when one is told in advance how much work needs to be completed to earn a certain amount of money is similar but not exactly equivalent to getting paid after completing a certain amount (unknown to the person) of work. Naturally, we would expect different results from these two conditions, which would be in accordance with Skinnerian principles.

### **Schedules of Reinforcement and Timing**

Let us clarify other reasons why the central theme of the book, which the author describes as “Do this and you’ll get that” (Kohn, 1993, p. 11), does not seem to get the desired results from his own examples. This can be accomplished by using evidence that Kohn himself cites, explaining it in precise, Skinnerian terms. One important discovery that Skinner made was that different schedules of reinforcement produced distinct and predictable patterns of rates of responding. A response can be reinforced every time it is emitted (continuous reinforcement) or not (intermittent reinforcement). Among the schedules of intermittent reinforcement are the interval schedule where a response emitted after a *period of time* is reinforced, and the ratio schedule where reinforcement occurs after a *number of responses* are emitted regardless of time. The interval or ratio schedule each could be fixed or variable. Skinner found that with continuous reinforcement and with different schedules of intermittent reinforcement, certain patterns of rates of responding and extinction (the gradual cessation of responding when not reinforced), identifiable with each particular schedule consistently emerged.

Kohn’s lack of knowledge of this key concept is demonstrated when he states, “the more rewards are used the more they seem to be needed. The more often I promise you a goody to do what I want, the more I cause you to respond to, and even to require, these goodies,” (1993, p. 17) and then uses this as an example of how operant conditioning does not work. Although we do not know from Kohn’s statement if the promised “goodies” were ever actually given, anyone who has versed themselves

in schedules of reinforcement and their effect on the rate of responding and extinction will spot, implied in Kohn's statement, the usual result of a continuous schedule of reinforcement (a schedule where the operant is reinforced every time it is emitted). This kind of schedule quickly leads to a steady rate of responding, but when reinforcement is discontinued the behavior extinguishes very rapidly.

In fact, it is an intermittent and not a continuous schedule of reinforcement that can produce very high rates of responding and is also the most resistant to extinction. To illustrate this point, in one of Skinner's experiments (Holland & Skinner, 1961) a pigeon whose responses had been maintained on a fixed-ratio schedule of reinforcement emitted 73,000 responses during the first four and a half hours of extinction (a period in which reinforcement is not presented and responses gradually cease altogether). Unfortunately, a most prominent application of this principle in human beings is in gambling. Take for example gamblers, who are not reinforced every time they throw the dice or pull a lever, but instead keep on playing, especially if they occasionally win some of their money back. It is, actually, the uncertainty of whether they will win or lose that gets them to persist, even though they know the odds are against them.

Timing is important in reinforcing a desired response as well. It is reinforcement that occurs immediately ( $\frac{1}{2}$  second) after the response that is most effective. So many of Kohn's examples such as, "We promise bubble gum to a five-year-old if he keeps quiet in the supermarket," (1993, p. 3) are not examples of applying the principles of behaviorism effectively because of the long delay before reinforcement. It is understandable then that examples Kohn cites as evidence of behaviorism's shortcomings do not work as efficiently as the uninitiated might intend.

## **Punishment**

Punishment might also seem to be a central theme of Kohn's book, as the term appears in its title. But the use of the term in this way is only an attempt by Kohn to attract the uninformed reader's attention to an apparent principle that is in fact self-contradictory. For, people are not punished when they receive a reward. In more precise Skinnerian terms, punishment is either when an operant is emitted and a punishing stimulus follows or when reinforcement is withdrawn. The problem with punishment is that it may temporarily suppress behavior and therefore does not ultimately

convert it into a desired behavior or extinguish it. When the threat of punishment is removed, often the behavior emerges more strongly than before. Additionally, punishment tends to condition other emotional responses. Implied in “do this and you’ll get that” is the threat that if you “don’t do this you won’t get that,” which Kohn does recognize is punishing, and is in line with the Skinnerian definition.

In regard to punishment, Skinner acknowledged that a common practice is to punish behavior that is not desired, but explains:

Here we want to generate behavior, and it is not enough to “suppress not behaving.” Thus, we do not strengthen good pronunciation by punishing bad, or skillful movements by punishing awkward. We do not make a student industrious by punishing idleness, or brave by punishing cowardice, or interested in his work by punishing indifference. (1968, p. 149)

Instead, it is more effective to concentrate on providing conditions that are likely to evoke the desired behavior so it then can be reinforced. Or better yet, simultaneously provide such conditions along with those under which the unwanted behavior is unlikely to ever be emitted.

### **Superstitious Behavior**

One reason for the persistence of behavior that brings less than desired results can be explained by what Skinner calls accidental contingencies of reinforcement, which strengthen the emission of superstitious behavior:

The experimenter places several pigeons in separate experimental boxes. A food magazine delivers a small amount of food to each pigeon every 15 seconds regardless of what the pigeon is doing. When the experimenter returns later, he finds one bird sitting very still, another hopping from one foot to the other, another bowing, another turning around and around, another raising its head, etc. Each bird continues to repeat its own “ritual” between deliveries of food. (Holland and Skinner, 1961, p. 88)

Although we might like to think that everything we do is well thought out and



for a particular reason, Skinner's point is that many of our daily rituals may be habits that we continue for no particular reason or purpose other than that they were accidentally reinforced at some point in our learning history.

### Conclusion

To his credit, Skinner made a bold attempt to explain human behavior by using the most reliable evidence he had available—observable behavior. His contribution to our understanding of human learning is both involved and extensive. Furthermore, Skinner made many attempts during his lifetime to apply the principles he had discovered in ways that might better the lives of people and the social structures that influence us (see Skinner, 1948, 1953, 1968, 1971).

Most significantly, Skinner's evidence gained from rigorous experimental procedures repeatedly reveals one important theme. That is, under certain conditions reinforcement can have a powerful effect on learning. Kohn misleads the reader and also tries to discredit the valuable contribution that Skinner has made to our understanding of human and animal learning. The layman could be forgiven for accepting Kohn's arguments, but anyone who is versed in psychological methods would not be influenced. The author of this paper is one such person.

Instead, to begin to fully take advantage of the key principles of behaviorism, a person must first ask themselves three important questions. What is the specific behavior to be selectively reinforced and why? What, in fact, is actually reinforcing to that particular person? Finally, with regard to timing, when and with what schedule is reinforcement best applied to one's specific case? By first addressing these questions, a person will be on stronger ground, gained from replicable, observable, experimental evidence when attempting to apply the principles of operant conditioning, and will be less likely to fall back on misapplication that is apt to yield less than desired results.

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# 報酬による処罰： オペラント条件付けの原則の応用と誤用

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## 要 旨

人間の学習行動に関して、心理学の領域では、数々の目覚しい発見がなされてきた。そしてそれらは、人々の仕事や教育、また生活での他の側面において、有益となる直接的な応用をもたらすといえる。しかしながら、基礎概念の誤解に基づいた、誤った応用もまた多く見られる。本論文では、B. F. Skinner によって唱えられたオペラント条件付けのキーとなる原則について説明し Alfie Kohn の著書『Punished by Rewards: The Trouble with Gold Stars, Incentive Plans, A's, Praise, and Other Bribes』の中で詳述されているオペラント条件付けの誤用例とそれらを対比させて論じている。