

What follows is an email response from William Powers when he was asked about behaviorism.

Hi, Shelley --

Behaviorist study controlled consequences of behavior, not behavior. When a behaviorist says that lever-presses are a measure of an animal's behavior, he doesn't really mean that. Long ago, behaviorists noticed that when a rat in a Skinner Box presses a lever, it may do so with the right front paw or the left front paw, or either of the rear ones. It may sit on the lever, or bite it. In each case, the lever goes down and the apparatus records the event. But there's no way to tell from the data exactly what behavior was recorded.

Skinner claimed that reinforcers like bits of food increase the probability of repeating the behavior that caused the reinforcer to appear. If by behavior you mean the actual physical movements that took place that definition clearly doesn't work. If the animal presses the bar with the left front paw and gets a reinforcer or reward, how can that increase the probability of the next behavior, which may turn out to be sitting on the lever, a completely different kind of action?

Skinner got past this problem by saying that it's not the specific behavior that gets reinforced, but something he called the "operant." The operant is the class of all specific body movements that can create a delivery of the reinforcer. In the Skinner Box, what is reinforced is any action that can make the lever go down. When you think about it, that is quite impossible, because on one occasion the animal might have to reach to the left to press the lever and on the next occasion reach to the right. If all the actions that can produce the lever press are reinforced, what determines the direction in which the next action will take place? Nothing. But how could the action that is going to happen next be reinforced before anyone knows what it will be?

Skinner was proposing, in effect, that the going-down-of-the-lever is what gets reinforced. But since he started with the wrong model, a cause-effect model, there is no way to explain how that could possibly happen. In fact, he correctly identified the problem, but since he was not interested in trying to explain HOW behavior happens, he never realized that what he was proposing was impossible.

What we have to explain, of course, is how behavior can vary so as to produce a consistent effect when environmental conditions change. The lever does indeed go down and food does indeed get delivered, regardless how the animal is oriented relative to the lever. Because of those differences, the animal must do something a little or a lot different every time the lever is to be depressed. And it does. A simple cause-effect system can't do that, so we can conclude that the animal is not that kind of system.

The animal is, of course, a control system, not a stimulus-response system or a system whose behavior can be reinforced. Because reinforcement theory can't in fact explain what actually happens, we have to find a different theory. In PCT it is called reorganization theory.

Skinner's idea was that when the animal's behavior produces some effect that is reinforcing, something somewhere says "There! That's what you need to do. Keep doing that, and you'll be OK." But as we know, organisms live in a variable environment and in changing relationships to it. If they did *exactly and precisely* the same thing they did before with their muscles and limbs, the chances are very small that the same result would occur again. They need to be able to vary what they actually do, in the right way, if they want the same result again. They need to be able to oppose unpredicted disturbances, even if those disturbances came from their own prior activities.

So now we have two difficulties with Skinner's theory (which he didn't even recognize as being a theory). First, there's no point in reinforcing a successful motor activity, because for the same result to occur the next motor activity is going to have to be different. And there's no point in reinforcing a consequence of the behavior that is only partially caused by the actions of the organism when disturbances are also present, as they usually are. So there's no profit in saying "Do that again." What you really need is for the organism to produce the same effect again, by whatever variable means is necessary. Of course that's what is actually observed to happen.

To cut the story short, PCT introduces reorganization theory and control theory to explain how all this can happen, putting a totally different interpretation on the same observations Skinner was dealing with.

The critical fact about reinforcement theory is that before you can use something like a bit of food to reinforce behavior, you need to perform what is euphemistically called an "establishing operation." Oddly enough, it always turns out that for any proposed reinforcer, the required establishing operation is to deprive the organism of it and make sure the organism can't just go get some more of it without behaving the way you want it to. And when an animal is introduced to the conditioning cage after this establishing operation is finished, it very conveniently starts "emitting" a lot of apparently random behavior. It's that random behavior that eventually leads the animal to blunder upon the lever and accidentally press it (or cause the watchful experimenter to trigger some food release). Now that behavior begins varying less, the animal staying longer near the lever and quite likely pressing it again and producing another pellet of food. Inevitably, all the randomness fades out, until the animal is competently pressing the lever and feeding itself.

In PCT we see those same facts differently. The first proposal is that the establishing operation, by creating deprivation of something the animal wants or needs like food or water or a mate, actually *causes* the random variations in behavior. The second proposal is that the observed variations are being caused by changes in the internal organization of the animal's nervous system (or equivalent), not just by switching from one already-learned behavior to another (though that, too, happens). And the third proposal is that when that organization changes enough to reduce the deprivation to some low level, the changes cease, leaving the last organization in effect.

In other words, nothing says "There, do that again." Instead, the message would be "OK, you can stop changing now."

What is learned, in short, is not a behavior at all. It is a kind of organization of the nervous system and muscles, the kind called a negative feedback control system. A negative feedback control system can do all those things that a simple causal system can't do, but that organisms can do.

Best,

Bill