Personality Theories

B. F. SKINNER

1904 - 1990

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Biography

Burrhus Frederic Skinner was born March 20, 1904, in the small Pennsylvania town of Susquehanna. His father was a lawyer, and his mother a strong and intelligent housewife. His upbringing was old-fashioned and hard-working.

Burrhus was an active, out-going boy who loved the outdoors and building things, and actually enjoyed school. His life was not without its tragedies, however. In particular, his brother died at the age of 16 of a cerebral aneurysm.

Burrhus received his BA in English from Hamilton College in upstate New York. He didn't fit in very well, not enjoying the fraternity parties or the football games. He wrote for school paper, including articles critical of the school, the faculty, and even Phi Beta Kappa! To top it off, he was an atheist -- in a school that required daily chapel attendance.

He wanted to be a writer and did try, sending off poetry and short stories. When he graduated, he built a study in his parents' attic to concentrate, but it just wasn't working for him.

Ultimately, he resigned himself to writing newspaper articles on labor problems, and lived for a while in Greenwich Village in New York City as a "bohemian." After some traveling, he decided to go back to school, this time at Harvard. He got his masters in psychology in 1930 and his doctorate in 1931, and stayed there to do research until 1936.

Also in that year, he moved to Minneapolis to teach at the University of Minnesota. There he met and soon married Yvonne Blue. They had two daughters, the second of which became famous as the first infant to be raised in one of Skinner's inventions, the air crib. Although it was nothing more than a combination crib and playpen with glass sides and air conditioning, it looked too much like keeping a baby in an aquarium to catch on.

In 1945, he became the chairman of the psychology department at Indiana University. In 1948, he was invited to come to Harvard, where he remained for the rest of his life. He was a very active man, doing research and guiding hundreds of doctoral candidates as well as writing many books. While not successful as a writer of fiction and poetry, he became one of our best psychology writers, including the book ***Walden II***, which is a fictional account of a community run by his behaviorist principles.

August 18, 1990, B. F. Skinner died of leukemia after becoming perhaps the most celebrated psychologist since Sigmund Freud.

Theory

B. F. Skinner's entire system is based on **operant conditioning**. The organism is in the process of "operating" on the environment, which in ordinary terms means it is bouncing around it world, doing what it does. During this "operating," the organism encounters a special kind of stimulus, called a **reinforcing stimulus**, or simply a reinforcer. This special stimulus has the effect of increasing the **operant** -- that is, the behavior occurring just before the reinforcer. This is operant conditioning: "the behavior is followed by a consequence, and the nature of the consequence modifies the organisms tendency to repeat the behavior in the future."

Imagine a rat in a cage. This is a special cage (called, in fact, a "Skinner box") that has a bar or pedal on one wall that, when pressed, causes a little mechanism to release a foot pellet into the cage. The rat is bouncing around the cage, doing whatever it is rats do, when he accidentally presses the bar and -- hey, presto! -- a food pellet falls into the cage! The operant is the behavior just prior to the reinforcer, which is the food pellet, of course. In no time at all, the rat is furiously peddling away at the bar, hoarding his pile of pellets in the corner of the cage.

A behavior followed by a reinforcing stimulus results in an increased probability of that behavior occurring in the future.

What if you don't give the rat any more pellets? Apparently, he's no fool, and after a few futile attempts, he stops his bar-pressing behavior. This is called **extinction** of the operant behavior.

A behavior no longer followed by the reinforcing stimulus results in a decreased probability of that behavior occurring in the future.

Now, if you were to turn the pellet machine back on, so that pressing the bar again provides the rat with pellets, the behavior of bar-pushing will "pop" right back into existence, much more quickly than it took for the rat to learn the behavior the first time. This is because the return of the reinforcer takes place in the context of a reinforcement history that goes all the way back to the very first time the rat was reinforced for pushing on the bar!

Schedules of reinforcement

Skinner likes to tell about how he "accidentally -- i.e. operantly -- came across his various discoveries. For example, he talks about running low on food pellets in the middle of a study. Now, these were the days before "Purina rat chow" and the like, so Skinner had to make his own rat pellets, a slow and tedious task. So he decided to reduce the number of reinforcements he gave his rats for whatever behavior he was trying to condition, and, lo and behold, the rats kept up their operant behaviors, and at a stable rate, no less. This is how Skinner discovered **schedules of reinforcement**!

Continuous reinforcement is the original scenario: Every time that the rat does the behavior (such as pedal-pushing), he gets a rat goodie.

The **fixed ratio schedule** was the first one Skinner discovered: If the rat presses the pedal three times, say, he gets a goodie. Or five times. Or twenty times. Or "x" times. There is a fixed ratio between behaviors and reinforcers: 3 to 1, 5 to 1, 20 to 1, etc. This is a little like "piece rate" in the clothing manufacturing industry: You get paid so much for so many shirts.

The **fixed interval schedule** uses a timing device of some sort. If the rat presses the bar at least once during a particular stretch of time (say 20 seconds), then he gets a goodie. If he fails to do so, he doesn't get a goodie. But even if he hits that bar a hundred times during that 20 seconds, he still only gets one goodie! One strange thing that happens is that the rats tend to "pace" themselves: They slow down the rate of their behavior right after the reinforcer, and speed up when the time for it gets close.

Skinner also looked at **variable schedules**. Variable ratio means you change the "x" each time -- first it takes 3 presses to get a goodie, then 10, then 1, then 7 and so on. Variable interval means you keep changing the time period -- first 20 seconds, then 5, then 35, then 10 and so on.

In both cases, it keeps the rats on their rat toes. With the variable interval schedule, they no longer "pace" themselves, because they no can no longer establish a "rhythm" between behavior and reward. Most importantly, these schedules are very resistant to extinction. It makes sense, if you think about it. If you haven't gotten a reinforcer for a while, well, it could just be that you are at a particularly "bad" ratio or interval! Just one more bar press, maybe this'll be the one!

This, according to Skinner, is the mechanism of gambling. You may not win very often, but you never know whether and when you'll win again. It could be the very next time, and if you don't roll them dice, or play that hand, or bet on that number this once, you'll miss on the score of the century!

Shaping

A question Skinner had to deal with was how we get to more complex sorts of behaviors. He responded with the idea of **shaping**, or "the method of successive approximations." Basically, it involves first reinforcing a behavior only vaguely similar to the one desired. Once that is established, you look out for variations that come a little closer to what you want, and so on, until you have the animal performing a behavior that would never show up in ordinary life. Skinner and his students have been quite successful in teaching simple animals to do some quite extraordinary things. My favorite is teaching pigeons to bowl!

I used shaping on one of my daughters once. She was about three or four years old, and was afraid to go down a particular slide. So I picked her up, put her at the end of the slide, asked if she was okay and if she could jump down. She did, of course, and I showered her with praise. I then picked her up and put her a foot or so up the slide, asked her if she was okay, and asked her to slide down and jump off. So far so good. I repeated this again and again, each time moving her a little up the slide, and backing off if she got nervous. Eventually, I could put her at the top of the slide and she could slide all the way down and jump off. Unfortunately, she still couldn't climb up the ladder, so I was a very busy father for a while.

This is the same method that is used in the therapy called **systematic desensitization**, invented by another behaviorist named **Joseph Wolpe**. A person with a phobia -- say of spiders -- would be asked to come up with ten scenarios involving spiders and panic of one degree or another. The first scenario would be a very mild one -- say seeing a small spider at a great distance outdoors. The second would be a little more scary, and so on, until the tenth scenario would involve something totally terrifying -- say a tarantula climbing on your face while you're driving your car at a hundred miles an hour! The therapist will then teach you how to relax your muscles -- which is incompatible with anxiety. After you practice that for a few days, you come back and you and the therapist go through your scenarios, one step at a time, making sure you stay relaxed,

backing off if necessary, until you can finally imagine the tarantula while remaining perfectly tension-free.

This is a technique quite near and dear to me because I did in fact have a spider phobia, and did in fact get rid of it with systematic desensitization. It worked so well that, after one session (beyond the original scenario-writing and muscle-training session) I could go out an pick up a daddy-long-legs. Cool.

Beyond these fairly simple examples, shaping also accounts for the most complex of behaviors. You don't, for example, become a brain surgeon by stumbling into an operating theater, cutting open someone's head, successfully removing a tumor, and being rewarded with prestige and a hefty paycheck, along the lines of the rat in the Skinner box. Instead, you are gently shaped by your environment to enjoy certain things, do well in school, take a certain bio class, see a doctor movie perhaps, have a good hospital visit, enter med school, be encouraged to drift towards brain surgery as a speciality, and so on. This could be something your parents were carefully doing to you, ala a rat in a cage. But much more likely, this is something that was more or less unintentional.

Aversive stimuli

An **aversive stimulus** is the opposite of a reinforcing stimulus, something we might find unpleasant or painful.

A behavior followed by an aversive stimulus results in a decreased probability of the behavior occurring in the future.

This both defines an aversive stimulus and describes the form of conditioning known as **punishment**. If you shock a rat for doing x, it'll do a lot less of x. If you spank Johnny for throwing his toys he will throw his toys less and less (maybe).

On the other hand, if you remove an already active aversive stimulus after a rat or Johnny performs a certain behavior, you are doing **negative reinforcement**. If you turn off the electricity when the rat stands on his hind legs, he'll do a lot more standing. If you stop your perpetually nagging when I finally take out the garbage, I'll be more likely to take out the garbage (perhaps). You could say it "feels so good" when the aversive stimulus stops, that this serves as a reinforcer!

Behavior followed by the removal of an aversive stimulus results in an increased probability of that behavior occurring in the future.

Notice how difficult it can be to distinguish some forms of negative reinforcement from positive reinforcement: If I starve you, is the food I give you when you do what I want a positive -- i.e. a reinforcer? Or is it the removal of a negative -- i.e. the aversive stimulus of hunger?

Skinner (contrary to some stereotypes that have arisen about behaviorists) doesn't "approve" of the use of aversive stimuli -- not because of ethics, but because they don't work well! Notice that I said earlier that Johnny will maybe stop throwing his toys, and that I perhaps will take out the garbage? That's because whatever was reinforcing the bad behaviors hasn't been removed, as it would've been in the case of extinction. This hidden reinforcer has just been "covered up" with a conflicting aversive stimulus. So, sure, sometimes the child (or me) will behave -- but it still feels

good to throw those toys. All Johnny needs to do is wait till you're out of the room, or find a way to blame it on his brother, or in some way escape the consequences, and he's back to his old ways. In fact, because Johnny now only gets to enjoy his reinforcer occasionally, he's gone into a variable schedule of reinforcement, and he'll be even more resistant to extinction than ever!

Behavior modification

Behavior modification -- often referred to as **b-mod** -- is the therapy technique based on Skinner's work. It is very straight-forward: Extinguish an undesirable behavior (by removing the reinforcer) and replace it with a desirable behavior by reinforcement. It has been used on all sorts of psychological problems -- addictions, neuroses, shyness, autism, even schizophrenia -- and works particularly well with children. There are examples of back-ward psychotics who haven't communicated with others for years who have been conditioning to behave themselves in fairly normal ways, such as eating with a knife and fork, taking care of their own hygiene needs, dressing themselves, and so on.

There is an offshoot of b-mod called the **token economy**. This is used primarily in institutions such as psychiatric hospitals, juvenile halls, and prisons. Certain rules are made explicit in the institution, and behaving yourself appropriately is rewarded with tokens -- poker chips, tickets, funny money, recorded notes, etc. Certain poor behavior is also often followed by a withdrawal of these tokens. The tokens can be traded in for desirable things such as candy, cigarettes, games, movies, time out of the institution, and so on. This has been found to be very effective in maintaining order in these often difficult institutions.

There is a drawback to token economy: When an "inmate" of one of these institutions leaves, they return to an environment that reinforces the kinds of behaviors that got them into the institution in the first place. The psychotic's family may be thoroughly dysfunctional. The juvenile offender may go right back to "the 'hood." No one is giving them tokens for eating politely. The only reinforcements may be attention for "acting out," or some gang glory for robbing a Seven-Eleven. In other words, the environment doesn't travel well!