Module 28
Operant Conditioning's Applications, and Comparison to Classical Conditioning

Module Learning Objectives

28-1 Identify some ways to apply operant conditioning principles at school, in sports, at work, at home, and for self-improvement.

28-2 Identify the characteristics that distinguish operant conditioning from classical conditioning.

Applications of Operant Conditioning

How might Skinner's operant conditioning principles be applied at school, in sports, at work, at home, and for self-improvement?

Would you like to apply operant conditioning principles to your own life—to be a healthier person, a more successful student, or a high-achieving athlete? Reinforcement technologies are at work in schools, sports workplaces, and homes, and these principles can support our self-improvement as well (Hara, 2004).

AT SCHOOL
Fifty years ago, Skinner envisioned a day when "teaching machines and textbooks" would shape learning in small steps, immediately reinforcing correct responses. He believed that such machines and tests would revolutionize education and free teachers to focus on each student's special needs. "Good instruction demands two things," Skinner said. "Students must be told immediately whether what they do is right or wrong and, when right, they must be directed to the step to be taken next."

Computer-assisted learning
Computers have helped realize Skinner's goal of individually paced instruction with immediate feedback.

Skinner might be pleased to know that many of his ideas for education are now possible. Teachers use them to find it difficult to pace material to each student's rate of learning, and to provide prompt feedback.

Electronic adaptive quizzing does both. Students move through quizes at their own pace, according to their own level of understanding. And they get immediate feedback on their effort.

IN SPORTS
The key to shaping behavior in athletic performance, as elsewhere, is first reinforcing small successes and then gradually increasing the challenge. Golf students can learn putting by starting with very short putts, and then, as they build mastery, eventually stepping back farther and farther. Novice batters can begin with half swings at an oversized ball pitched from 20 feet away, giving them the immediate pleasure of smacking the ball. As the hitter's confidence builds with their success and they achieve mastery at each level, the pitcher gradually moves back—to 15, then 22, 30, and 40.5 feet—and eventually introduces standard baseball. Compared with children taught by conventional methods, those trained by this behavioral method have shown faster skill improvement (Simsek & Olton, 1981, 1988).

In sports as in the laboratory, the accidental timing of rewards can produce superstitions. If a Skinner box food dispenser gives a pellet of food every 15 minutes, whatever the animal happened to be doing just before the food arrives (perhaps scratching itself) is more likely to be repeated and reinforced, which occasionally can produce a persistent superstition. Likewise, if a baseball or softball player gets a hit after tapping the plate with the bat, he or she may be more likely to do so again. Over time the player may experience partial reinforcement for what becomes a superstition.

AT WORK
Knowing that reinforcers influence productivity, many organizations have invited employees to share the risks and rewards of company ownership. Others focus on reinforcing a job well done. Rewards are most likely to increase productivity if the desired performance has been well defined and is achievable. The message for managers? Reward specific, achievable behaviors, not vaguely defined "merit."

Operant conditioning also reminds us that reinforcement should be immediate. IBM legend Thomas Watson understood. When he observed an achievement, he wrote the employee a check on the spot (Peterson & Waterman, 1982). But rewards need not be material or lavish. An effective manager may simply walk the floor and sincerely affirm people for good work, or write notes of appreciation for a completed project. As Skinner said, "How much richer the whole world be if the reinforcers in daily life were more effectively contingent on productive work?"

AT HOME
As we have seen, parents can learn from operant conditioning practices. Parent-training researchers remind us that by saying, "Get ready for bed" but crying in to protests or defiance, parents reinforce such whining and arguing (Wolenson & Forehand, 1994). Exasperated, they may then yell or gesture menacingly. When the child, now frightened, obey, that reinforces the parents' angry behavior. Over time, a destructive parent-child relationship develops.

AP® Exam Tip
Notice how useful operant conditioning is. People with an understanding of the principles of operant conditioning possess a tremendous tool for changing behavior. If you don't like the way your friends, teachers, coaches, or parents behave, pay attention to the uses of operant conditioning.
To disrupt this cycle, parents should remember that basic rule of
shaping. Notice people doing something right and affirm them for it. Give chil-
dren attention and other reinforcers when they are behaving well. Target a
specific behavior, reward it, and watch it increase. When children misbehave
or are defiant, don't yell at them or hit them. Simply explain the misbehavior
and give them a time-out.

FOR SELF-IMPROVEMENT

Finally, we can use operant conditioning in our own lives (see Close-up:
Training Our Partners). To build up your self-control, you need to reinforce your own
desired behaviors (perhaps to exercise more often) and extinguish the undesired ones
(to stop texting while studying, for example). Psychologists suggest taking these steps:

1. State your goal in measurable terms, and commit to it. You might, for example, aim to
boost your study time by an hour a day and share that goal with some close friends.

2. Monitor how often you engage in your desired behavior. You might log your current study
time, noting under what conditions you do and don't study. (When I began writing
book tours, I logged how I spent my time each day and was amazed to discover how
much time I was wasting.)

3. Reinforce the desired behavior. To increase your study time, give yourself a reward (a
snack or some activity you enjoy) only after you finish your extra hour of study. Agree
with your friends that you will join them for weekend activities only if you have met
your realistic weekly studying goal.

Close-up

Training Our Partners

For a book I was writing about a school for exotic animal
trainers, I started commuting from Maine to California, where
I spent my days watching students do the seemingly impos-
sible: to the sound of command, cougars to offer their paws for a nail clipping, and baboons to skate-
boards.

I listened, as professional trainers explained how they
taught dolphins to flip and elephants to paint. Eventually it hit
me that the same techniques might work on that stubborn but
lovable species, the American husband.

The central lesson I learned from exotic animal trainers
is that I should reward behavior I like and ignore behavior
I don't. After all, don't you get a sea lion to balance a ball
on the end of its nose by nagging? The same goes for the
American husband.

Back in Maine, I began thanking Scott if he threw one
dirty shirt into the hamper. If he threw in two, I'd kiss him.
Meanwhile, I would step over any soiled clothes on the floor
without a sharp word, though I did sometimes kick them
under the bed. But as he basked in my appreciation, the piles
became smaller.

I was using what trainers call approximations, rewarding
the small steps toward learning a whole new behavior; . . . Once
I started thinking this way, I couldn't stop. At the school in Cali-
fornia, I'd be scribbling notes on how to walk an emu or have a
wolf accept you as a pack member. Out I'd be thinking, "I can't
wait to try this on Scott . . . ."

After two years of exotic animal training, my marriage is
to smoother. My husband much less anxious. Or at least
his anxiety in the absence of a towel is an affair, a symbol of how he didn't care enough about
me. But thinking of my husband as an exotic species gave
me the distance I needed to consider our differences more
objectively.

Excerpted with permission from Sutherland, A. (2000, June 25). What
Shamu taught me about a happy marriage, New York Times.

Contrasting Classical and Operant Conditioning

How does operant conditioning differ from classical conditioning?

Both classical and operant conditioning are forms of associative learning. Both involve acquisition,
estinction, spontaneous recovery, generalization, and discrimination. But these two forms of learning
differ. Through classical (Bodexian) conditioning, we associate different stimuli we do
not control, and we respond automatically (respondent behaviors). Respondent behavior behavior
that occurs as an automatic response to some stimulus.

Operant behavior behavior that operates on the environment, producing consequences.

"Oh, this learning, what a thing it is." - William Shakespeare, The
Tempest or the Shakes, 1567.

Biofeedback

Knowing the damaging effects of stress, could we train people
to counteract stress, bringing their heart rate and blood
pressure under conscious control? When a few psychologists
first experimented with this idea, many of their colleagues
thought them foolish. After all, these functions are controlled
by the autonomic (" involuntary") nervous system. Then, in the
late 1960s, experiments by respected psychologists made
the skeptics wonder. Neal Miller, for one, found that rats
could modify their heartbeat if given pleasurable brain stimu-
lation when their heartbeat increased or decreased. Later
research revealed that some paralyzed humans could also
learn to control their blood pressure (Miler & Brucker, 1979).

Miller was experimenting with biofeedback, a system of
recording, amplifying, and feeding back information about
subtle physiological responses. Biofeedback instruments mir-
ror the results of a patient's own efforts, thereby allowing the
person to learn techniques for controlling a particular physi-
ological response (Figure 28.1). After a decade of study,
however, researchers concluded that the initial claims for biofeedback were
overstated and oversold (Miller, 1985). A 1995 National
Institutes of Health panel declared that biofeedback works
best on tension headaches.

Biofeedback systems Biofeedback systems - such as the one, which records tension in the
frontalis muscle of a headache sufferer - allow people to
monitor their subtle physiological responses. As this man
relaxes his forehead muscle, the pointer on the display
screen (or a tone) may go lower.

"Figure 28.1 Biofeedback systems. Biofeedback systems - such as the one, which records tension in the
frontalis muscle of a headache sufferer - allow people to
monitor their subtle physiological responses. As this man
relaxes his forehead muscle, the pointer on the display
screen (or a tone) may go lower."
Table 28.1 Comparison of Classical and Operant Conditioning

<table>
<thead>
<tr>
<th></th>
<th>Classical Conditioning</th>
<th>Operant Conditioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Idea</td>
<td>Organism associates events.</td>
<td>Organism associates behavior and resulting events.</td>
</tr>
<tr>
<td>Response</td>
<td>Involuntary, automatic.</td>
<td>Voluntary, operates on environment.</td>
</tr>
<tr>
<td>Acquisition</td>
<td>Associating events; NS is paired with US and becomes CS.</td>
<td>Associating response with a consequence (reinforcer or punisher).</td>
</tr>
<tr>
<td>Extinction</td>
<td>CR decreases when CS is repeatedly presented alone.</td>
<td>Responding decreases when reinforcement stops.</td>
</tr>
<tr>
<td>Spontaneous recovery</td>
<td>The reappearance, after a rest period, of an extinguished CR.</td>
<td>The reappearance, after a rest period, of an extinguished response.</td>
</tr>
<tr>
<td>Generalization</td>
<td>The tendency to respond to stimuli similar to the CS.</td>
<td>Organism's response to similar stimuli is also reinforced.</td>
</tr>
<tr>
<td>Discrimination</td>
<td>The learned ability to distinguish between a CS and other stimuli that do not signal a US.</td>
<td>Organism learns that certain responses, but not others, will be reinforced.</td>
</tr>
</tbody>
</table>

Before You Move On

ASK YOURSELF
Can you recall a time when a teacher, coach, family member, or employer helped you learns something by shaping your behavior in little steps until you achieved your goal?

TEST YOURSELF
Salivating in response to a tone paired with food is an _______ behavior; pressing a bar to obtain food is an _______ behavior.
Answers to the Test Yourself questions can be found in Appendix E at the end of the book.

Module 28 Review

28-1 How might Skinner's operant conditioning principles be applied at school, in sports, at work, at home, and for self-improvement?

- At school, teachers can use shaping techniques to guide students' behaviors, and they can use electronic adaptive quizzes to provide immediate feedback.
- In sports, coaches can build players' skills and self-confidence by rewarding small improvements.
- At work, managers can boost productivity and morale by rewarding well-defined and achievable behaviors.
- At home, parents can reward desired behaviors but not undesirable ones.
- We can shape our own behaviors by stating our goals, monitoring the frequency of desired behaviors, reinforcing desired behaviors, and gradually reducing rewards as behaviors become habitual.

2. Raul is planning to use operant conditioning to help him reach his self-improvement goal of running in his community's 10-kilometer race in July. Explain four things Raul should include in his self-improvement plan.

Module 28 Review

28-2 How does operant conditioning differ from classical conditioning?

- In operant conditioning, an organism learns associations between its own behavior and resulting events; this form of conditioning involves operant behavior (behavior that operates on the environment, producing rewarding or punishing consequences).
- In classical conditioning, the organism forms associations between stimuli—events it does not control; this form of conditioning involves respondent behavior (automatic responses to some stimulus).

Multiple-Choice Questions

1. What do we call it when the CR decreases as the CS is repeatedly presented alone?
   a. Generalization
   b. Discrimination
   c. Spontaneous recovery
   d. Extinction
   e. Acquisition

2. The basic idea behind classical conditioning is that the organism
   a. associates events.
   b. associates behavior and resulting events.
   c. voluntarily operates on the environment.
   d. associates response with a consequence.
   e. quits responding when reward stops.

3. What do we call the reappearance, after a rest period, of an extinguished response?
   a. Acquisition
   b. Spontaneous recovery
   c. Discrimination
   d. Operant conditioning
   e. Classical conditioning

Practice FRQs

1. Explain two differences between classical and operant conditioning.

   **Answer**
   Any two differences described in Table 28.1 can be used to answer. Examples include:

   1 point: Classical conditioning involves involuntary responses, but operant conditioning involves voluntary responses.
   1 point: In classical conditioning, the learner associates two events (a conditioned stimulus with an unconditioned stimulus). In operant conditioning, the learner associates a behavior with a consequence.

   (4 points)