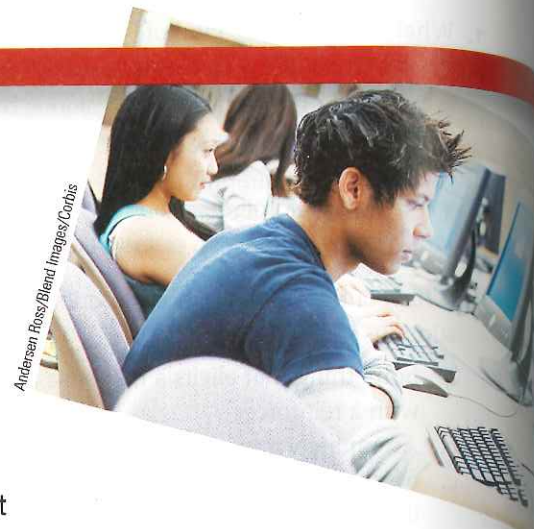


Module 28

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

FYI

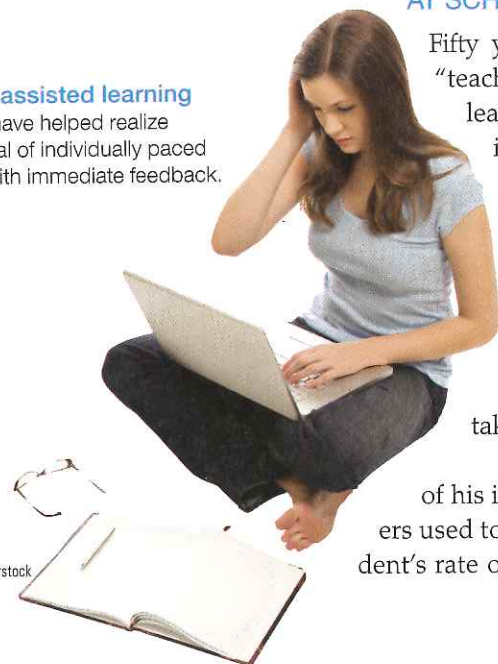
In later units we will see how psychologists apply operant conditioning principles to help people moderate high blood pressure or gain social skills.

- 28-1** 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 (Flora, 2004).

Computer-assisted learning

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



Christopher Halloran/Shutterstock

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 texts 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."

Skinner might be pleased to know that many of his ideals for education are now possible. Teachers used 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 quizzes at their own pace, according to their own level of understanding. And they get immediate feedback on their efforts.

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 10 feet away, giving them the immediate pleasure of smacking the ball. As the hitters' 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 a standard baseball. Compared with children taught by conventional methods, those trained by this behavioral method have shown faster skill improvement (Simek & O'Brien, 1981, 1988).

In sports as in the laboratory, the accidental timing of rewards can produce *superstitious behaviors*. 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 superstitious behavior. 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 superstitious behavior.

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 (Peters & 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 would 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 caving in to protests or defiance, parents reinforce such whining and arguing (Wierson & Forehand, 1994). Exasperated, they may then yell or gesture menacingly. When the child, now frightened, obeys, that reinforces the parents' angry behavior. Over time, a destructive parent-child relationship develops.



© The New Yorker Collection, 1989, Jack Ziegler from cartoonbank.com. All Rights Reserved.

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!



"I wrote another five hundred words.
Can I have another cookie?"

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 announce 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 textbooks, 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.

To disrupt this cycle, parents should remember that basic rule of shaping: *Notice people doing something right and affirm them for it.* Give children 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:

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 impossible: teaching hyenas to pirouette on command, cougars to offer their paws for a nail clipping, and baboons to skateboard.

I listened, rapt, 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, you don't 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 one 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 California, I'd be scribbling notes on how to walk an emu or have a wolf accept you as a pack member, but I'd be thinking, "I can't wait to try this on Scott. . . ."

After two years of exotic animal training, my marriage is far smoother, my husband much easier to love. I used to take his faults personally; his dirty clothes on the floor were an affront, 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., (2006, June 25). What Shamu taught me about a happy marriage, *New York Times*.

By Amy Sutherland

4. *Reduce the rewards gradually.* As your new behaviors become more habitual, give yourself a mental pat on the back instead of a cookie.

In addition, we can literally learn from ourselves. There is some evidence that when we have feedback about our bodily responses, we can sometimes change those responses. (See Close-up: Biofeedback.)

Close-up

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 started experimenting 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 stimulation when their heartbeat increased or decreased. Later research revealed that some paralyzed humans could also learn to control their blood pressure (Miller & Brucker, 1979).

Miller was experimenting with **biofeedback**, a system of recording, amplifying, and feeding back information about

subtle physiological responses. Biofeedback instruments mirror the results of a person's own efforts, thereby allowing the person to learn techniques for controlling a particular physiological response (**FIGURE 28.1**). After a decade of study, however, researchers decided the initial claims for biofeedback were overblown and oversold (Miller, 1985). A 1995 National Institutes of Health panel declared that biofeedback works best on tension headaches.

biofeedback a system for electronically recording, amplifying, and feeding back information regarding a subtle physiological state, such as blood pressure or muscle tension.

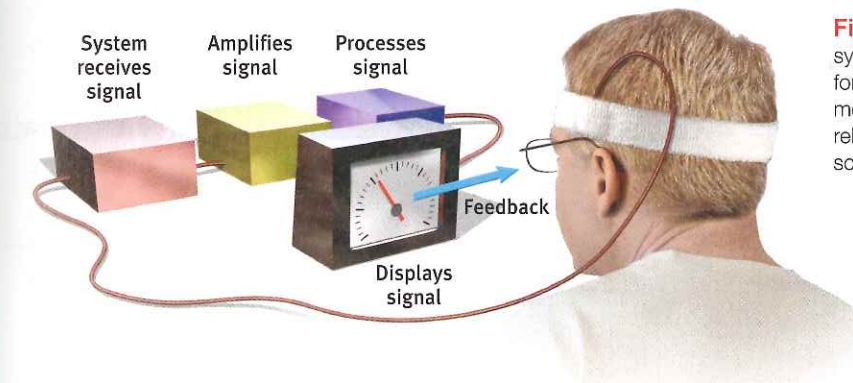


Figure 28.1 Biofeedback systems Biofeedback systems—such as this one, which records tension in the forehead muscle of a headache sufferer—allow people to monitor their subtle physiological responses. As this man relaxes his forehead muscle, the pointer on the display screen (or a tone) may go lower.

Contrasting Classical and Operant Conditioning

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

Both classical and operant conditioning are forms of *associative learning*. Both involve *acquisition*, *extinction*, *spontaneous recovery*, *generalization*, and *discrimination*. But these two forms of learning also differ. Through classical (Pavlovian) conditioning, we associate different stimuli we do not control, and we respond automatically (**respondent behaviors**) (**TABLE 28.1** on the next page). Through operant conditioning, we associate our own behaviors that act on our environment to produce rewarding or punishing stimuli (**operant behaviors**) with their consequences.

As we will see next, our biology and cognitive processes influence both classical and operant conditioning.

respondent behavior behavior that occurs as an automatic response to some stimulus.

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

"O! This learning, what a thing it is." -WILLIAM SHAKESPEARE, *THE TAMING OF THE SHREW*, 1597

Table 28.1 Comparison of Classical and Operant Conditioning

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

Before You Move On

▶ ASK YOURSELF

Can you recall a time when a teacher, coach, family member, or employer helped you learn 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 a(n) _____ behavior; pressing a bar to obtain food is a(n) _____ 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 quizzing 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.

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
4. What do we call behavior that occurs as an automatic response to some stimulus?
 - a. Respondent behavior
 - b. Operant behavior
 - c. Extinguished behavior
 - d. Biofeedback conditioning
 - e. Skinnerian conditioning
5. Superstitious behavior can be produced by
 - a. careful manipulation of a classical conditioning experiment.
 - b. the accidental timing of rewards.
 - c. possession of a large number of traditionally lucky items.
 - d. cognitive awareness of superstitious behavior in others.
 - e. the change in a reinforcement schedule from ratio to interval.

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.

2. Raud 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 Raud should include in his self-improvement plan.

(4 points)