8: Learning

CHAPTER OVERVIEW

"No topic is closer to the heart of psychology than learning, a relatively permanent change in an organism's behavior due to experience." Chapter 8 covers the basic principles of three forms of learning: classical, or respondent, conditioning, in which we learn associations between events; operant conditioning, in which we learn to engage in behaviors that are rewarded and to avoid behaviors that are punished; and observational learning, in which we learn by observing and imitating others.

The chapter also covers several important issues, including the generality of principles of learning, the role of cognitive processes in learning, and the ways in which learning is constrained by the biological predispositions of different species.

NOTE: Answer guidelines for all Chapter 8 questions begin on page 219.

CHAPTER REVIEW

First, skim each section, noting headings and boldface items. After you have read the section, review each objective by answering the fill-in and essay-type questions that follow it. As you proceed, evaluate your performance by consulting the answers beginning on page 219. Do not continue with the next section until you understand each answer. If you need to, review or reread the section in the textbook before continuing.

How Do We Learn? (pp. 313–315)

> David Myers at times uses idioms that are unfamiliar to some readers. If you do not know the meaning of any of the following words, phrases, or expressions in the context in which they appear in the text, refer to page 227 for an explanation: . . . *breeds hope; mugged; Japanese rancher reportedly herds cattle.*

Objective 1: Define *learning,* and identify two forms of learning.

1. A relatively permanent change in an organism's behavior due to experience is called _____ .
2. More than 200 years ago, philosophers such as John Locke and David Hume argued that an important factor in learning is our tendency to _____ events that occur in sequence. Even simple animals, such as the sea snail *Aplysia,* can learn simple _____ between stimuli. This type of learning is called _____ _____ .
3. The type of learning in which the organism learns to associate two stimuli is _____ conditioning.
4. The tendency of organisms to associate a response and its consequence forms the basis of _____ conditioning.
5. Complex animals often learn behaviors merely by _____ others perform them.

Classical Conditioning (pp. 315–326)

> If you do not know the meaning of any of the following words, phrases, or expressions in the context in which they appear in the text, refer to pages 227–229 for an explanation: *For many people, the name Ivan Pavlov . . . rings a bell; drooled; sets your mouth to watering; red-light district; breaking up . . . fire-breathing heartthrob; your heart may race; willy-nilly; the thought that counts; we stand on his shoulders; crack cocaine users often feel a craving; legendary significance.*

Objective 2: Define *classical conditioning* and *behaviorism,* and describe the basic components of classical conditioning.

1. Classical conditioning was first explored by the Russian physiologist _____ . Early in the twentieth century, psychologist _____ urged psychologists to discard references to mental concepts in favor of studying observable behavior. This view, called _____ , influenced American psychology during the first half of that century.
2. In Pavlov's classic experiment, a tone, or _____ _____ , is sounded just before food, the _____ _____ , is placed in the animal's mouth.
3. An animal will salivate when food is placed in its mouth. This salivation is called the _____ _____ .
4. Eventually, the dogs in Pavlov's experiment would salivate on hearing the tone. This salivation is called the _____ _____ .

Objective 3: Describe the timing requirements for the initial learning of a stimulus-response relationship.

5. The initial learning of a conditioned response is called _____ . For many conditioning situations, the optimal interval between a neutral stimulus and the US is _____ _____ .
6. When the US is presented prior to a neutral stimulus, conditioning _____ (does/does not) occur.

Explain why learning theorists consider classically conditioned behaviors to be biologically adaptive.

7. Michael Domjan's sexual conditioning studies with quail demonstrate that classical conditioning is highly adaptive because it helps animals _____ and _____ .
8. Associations that are not consciously noticed _____ (can/cannot) give rise to attitudes.

Objective 4: Summarize the processes of extinction, spontaneous recovery, generalization, and discrimination.

9. If a CS is repeatedly presented without the US, _____ soon occurs; that is, the CR diminishes.
10. Following a rest, however, the CR reappears in response to the CS; this phenomenon is called _____ _____ .
11. Subjects often respond to a similar stimulus as they would to the original CS. This phenomenon is called _____ .

Objective 5: Discuss the survival value of generalization and discrimination.

12. Subjects can also be trained not to respond to _____ stimuli. This learned ability is called _____ .
13. Being able to recognize differences among stimuli has _____ value because it lets us limit our learned responses to appropriate stimuli.

Objective 6: Discuss the importance of cognitive processes in classical conditioning.

14. The early behaviorists believed that to understand behavior in various organisms, any presumption of _____ was unnecessary.
15. Experiments by Rescorla and Wagner demonstrate that a CS must reliably _____ the US for an association to develop and, more generally, that _____ processes play a role in conditioning. It is as if the animal learns to _____ that the US will occur.
16. The importance of cognitive processes in human conditioning is demonstrated by the failure of classical conditioning as a treatment for _____ .

Objective 7: Describe some of the ways that biological predispositions can affect learning by classical conditioning.

17. Some psychologists once believed that any natural _____ could be conditioned to any neutral _____ .
18. Garcia discovered that rats would associate _____ with taste but not with other stimuli. Garcia found that taste-aversion conditioning _____ (would/would not) occur when the delay between the CS and the US was more than an hour.
19. Results such as these demonstrate that the principles of learning are constrained by the _____ predispositions of each animal species and that they help each species _____ to its environment. They also demonstrate the importance of different _____ _____ _____ in understanding complex phenomena.

Objective 8: Summarize Pavlov's contribution to our understanding of learning.

20. Classical conditioning is one way that virtually all organisms learn to _____ to their environment.
21. Another aspect of Pavlov's legacy is that he showed how a process such as learning could be studied _____ .

Explain why the study of classical conditioning is important.

Objective 9: Describe some uses of classical conditioning to improve human health and well-being.

22. Through classical conditioning, drug users often develop a _____ when they encounter _____ associated with previous highs.
23. Research studies demonstrate that the body's immune system _____ (can/cannot) be classically conditioned.

Describe the Watson and Rayner experiment.

Operant Conditioning (pp. 326–340)

If you do not know the meaning of any of the following words, phrases, or expressions in the context in which they appear in the text, refer to pages 229–231 for an explanation: *to pull habits out of a rat; . . . between Bach's music and Stravinsky's; pastes gold stars; snooze button; goofing off; the kick that often comes within seconds; a sale with every pitch; paid on a piecework basis; fly fishing; a choppy stop-start pattern; "You've got mail"; loses a treat; drawbacks; spanking is a hit; backfire; piggy bank; stirred a hornet's nest; rule of thumb.*

Objective 10: Identify the two major characteristics that distinguish classical conditioning from operant conditioning.

1. Classical conditioning associates _____ stimuli with stimuli that trigger responses that are _____. Thus, in this form of conditioning, the organism _____ (does/does not) control the responses.
2. The reflexive responses of classical conditioning involve _____ behavior.
3. In contrast, behavior that is more spontaneous and that is influenced by its consequences is called _____ behavior.

Objective 11: State Thorndike's law of effect, and explain its connection to Skinner's research on operant conditioning.

4. B. F. Skinner used Thorndike's _____ _____ _____ as a starting point in developing a "behavioral technology." This principle states that _____ behavior is likely to _____.
5. Skinner designed an apparatus, called the _____ _____, to investigate learning in animals.

Objective 12: Describe the shaping procedure, and explain how it can increase our understanding of what animals and babies can discriminate.

6. The procedure in which a person teaches an animal to perform an intricate behavior by building up to it in small steps is called _____. This method involves reinforcing successive _____ of the desired behavior.
7. In experiments to determine what an animal can perceive, researchers have found that animals are capable of forming _____ and _____ between stimuli. Similar experiments have been conducted with babies, who also can't verbalize their responses.
8. A situation, event, or signal that a certain response will be reinforced is a _____ _____.

Objective 13: Compare positive and negative reinforcement, and give one example each of a primary reinforcer, a conditioned reinforcer, an immediate reinforcer, and a delayed reinforcer.

9. An event that increases the frequency of a preceding response is a _____.
10. A stimulus that strengthens a response by presenting a typically pleasurable stimulus after a response is a _____ _____.
11. A stimulus that strengthens a response by reducing or removing an aversive (unpleasant) stimulus is a _____ _____.
12. Reinforcers, such as food and shock, that are related to basic needs and therefore do not rely on learning are called _____ _____. Reinforcers that must be conditioned and therefore derive their power through association are called _____ _____.
13. Children who are able to delay gratification tend to become _____ (more/less) socially competent and high achieving as they mature.
14. Immediate reinforcement _____ (is/is not) more effective than its alternative, _____ reinforcement. This explains in part the difficulty that _____ users have in quitting their habits, as well as the tendency of some teens to engage in risky, _____ _____.

Objective 14: Discuss the strengths and weaknesses of continuous and partial (intermittent) reinforcement schedules, and identify four schedules of partial reinforcement.

15. The procedure involving reinforcement of each and every response is called _____ _____. Under these conditions, learning is _____ (rapid/slow). When this

type of reinforcement is discontinued, extinction is _____ (rapid/slow).

16. The procedure in which responses are reinforced only part of the time is called _____ reinforcement. Under these conditions, learning is generally _____ (faster/slower) than it is with continuous reinforcement. Behavior reinforced in this manner is _____ (very/not very) resistant to extinction.

17. When behavior is reinforced after a set number of responses, a _____-_____ schedule is in effect.

18. Three-year-old Yusef knows that if he cries when he wants a treat, his mother will sometimes give in. When, as in this case, reinforcement occurs after an unpredictable number of responses, a _____-_____ schedule is being used.

19. Reinforcement of the first response after a set interval of time defines the _____-_____ schedule. An example of this schedule is _____.

20. When the first response after varying amounts of time is reinforced, a _____-_____ schedule is in effect.

Describe the typical patterns of response under fixed-interval, fixed-ratio, variable-interval, and variable-ratio schedules of reinforcement.

Objective 15: Discuss the ways negative punishment, positive punishment, and negative reinforcement differ, and list some drawbacks of punishment as a behavior-control technique.

21. An aversive consequence that decreases the likelihood of the behavior that preceded it is called _____. If an aversive stimulus is administered, it is called _____. If a desirable stimulus is withdrawn, it is called _____.

22. Because punished behavior is merely _____, it may reappear.

23. Punishment can also lead to _____ and a sense of helplessness, as well as to the association of the aversive event with _____.

24. Punishment also often increases _____ and does not guide the individual toward more desirable behavior.

Objective 16: Explain how latent learning and the effect of external rewards demonstrate that cognitive processing is an important part of learning.

25. Skinner and other behaviorists resisted the growing belief that expectations, perceptions, and other _____ processes have a valid place in the science of psychology.

26. When a well-learned route in a maze is blocked, rats sometimes choose an alternative route, acting as if they were consulting a _____ _____.

27. Animals may learn from experience even when reinforcement is not available. When learning is not apparent until reinforcement has been provided, _____ _____ is said to have occurred.

28. Excessive rewards may undermine _____ _____, which is the desire to perform a behavior for its own sake. The motivation to seek external rewards and avoid punishment is called _____ _____.

Objective 17: Explain how biological predispositions place limits on what can be achieved through operant conditioning.

29. Operant conditioning _____ (is/is not) constrained by an animal's biological predispositions.

30. For instance, with animals it is difficult to use food as a _____ to _____ behaviors that are not naturally associated with _____ .

31. Biological constraints predispose organisms to learn associations that are naturally _____ . When animals revert to their biologically predisposed patterns, they are exhibiting what is called "_____ _____ ."

Objective 18: Describe the controversy over Skinner's views of human behavior.

32. Skinner's views were controversial because he insisted that _____ influences, rather than _____ _____ and _____ , shape behavior.

33. Skinner also advocated the use of _____ principles to influence people in ways that promote more desirable _____ .

34. Skinner's critics argued that he _____ people by neglecting their personal _____ and by seeking to _____ their actions.

Objective 19: Describe some ways to apply operant conditioning principles at school, in sports, at work, and at home.

35. The use of teaching machines and programmed textbooks was an early application of the operant conditioning procedure of _____ to education. On-line _____ systems , software that is _____ , and _____-based learning are newer examples of this application of operant principles. Reinforcement principles can also be used to enhance _____ abilities by shaping successive approximations of new skills.

36. In boosting productivity in the workplace, positive reinforcement is _____ (more/less) effective when applied to specific behaviors than when given to reward general merit and when the desired performance is well defined and _____ . For such behaviors, immediate reinforcement is _____ (more/no more) effective than delayed reinforcement.

37. Many economists and psychologists believe that people's spending behavior is controlled by its consequences (its _____ and _____).

38. In using operant conditioning to change your own behavior, you would follow these four steps:

a. _____

b. _____

c. _____

d. _____

Objective 20: Identify the major similarities and differences between classical and operant conditioning.

39. Classical conditioning and operant conditioning are both forms of _____ _____ .

40. Both types of conditioning involve similar processes of _____ , _____ , _____ , _____ , _____ , and _____ .

41. Classical and operant conditioning are both subject to the influences of _____ processes and _____ predispositions.

42. Through classical conditioning, an organism associates different _____ that it does not _____ and responds _____ .

43. Through operant conditioning, an organism associates its _____ _____ with their _____ .

Learning by Observation (pp. 341–346)

> If you do not know the meaning of the following phrases in the context in which they appear in the text, refer to page 231 for an explanation: *those who observed the model's aggressive outburst were much more likely to lash out at the doll; Does the reel world reflect the real world?*

Objective 21: Describe the process of observational learning, and explain the importance of the discovery of mirror neurons.

1. Learning by observing and imitating others is called _____, or _____ _____. This form of learning _____ (occurs/does not occur) in species other than our own.
2. Neuroscientists have found _____ neurons in the brain's _____ lobe that provide a neural basis for _____ learning. These neurons have been observed to fire when monkeys perform a simple task and when they _____. This type of neuron _____ (has/has not) been found in human brains.
3. By age _____, infants will imitate novel play behaviors. By age _____, they will imitate acts modeled on television.

Objective 22: Describe Bandura's findings on what determines whether we will imitate a model.

4. The psychologist best known for research on observational learning is _____.
5. In one experiment, the child who viewed an adult punch an inflatable doll played _____ (more/less) aggressively than the child who had not observed the adult.
6. Bandura believes people imitate a model because of _____ and _____, those received by the model as well as by imitators.
7. These results may help explain why _____ parents might have _____ children. However, _____ factors may also be involved.

Objective 23: Discuss the impact of prosocial modeling.

8. Children will also model positive, or _____, behaviors.
9. Models are most effective when they are perceived as _____, _____, or _____. Models are also most effective when their words and actions are _____.

Objective 24: Explain why correlations cannot prove that watching violent TV causes violent behavior, and cite some experimental evidence that helps demonstrate a cause-effect link.

10. Children in developed countries spend more time _____ _____ than they spend in school.
11. Compared to real-world crimes, television depicts a much higher percentage of crimes as being _____ in nature.
12. Correlational studies _____ (link/do not link) watching television violence with violent behavior.
13. The more hours children spend watching violent programs, the more at risk they are for _____ and _____ as teens and adults.
14. Correlation does not prove _____. Most researchers believe that watching violence on television _____ (does/does not) lead to aggressive behavior.
15. The violence effect stems from several factors, including _____ of observed aggression and the tendency of prolonged exposure to violence to _____ viewers.

PROGRESS TEST 1

Multiple-Choice Questions

Circle your answers to the following questions and check them with the answers beginning on page 221. If your answer is incorrect, read the explanation for why it is incorrect and then consult the appropriate pages of the text (in parentheses following the correct answer).

1. Learning is best defined as:
   a. any behavior produced by an organism without being provoked.
   b. a change in the behavior of an organism.
   c. a relatively permanent change in the behavior of an organism due to experience.
   d. behavior based on operant rather than respondent conditioning.

2. The type of learning associated with Skinner is:
   a. classical conditioning.
   b. operant conditioning.
   c. respondent conditioning.
   d. observational learning.

3. In Pavlov's original experiment with dogs, the meat served as a(n):
   a. CS.
   b. CR.
   c. US.
   d. UR.

4. In Pavlov's original experiment with dogs, the tone was initially a(n) _____ stimulus; after it was paired with meat, it became a(n) _____ stimulus.
   a. conditioned; neutral
   b. neutral; conditioned
   c. conditioned; unconditioned
   d. unconditioned; conditioned

5. In order to obtain a reward a monkey learns to press a lever when a 1000-Hz tone is on but not when a 1200-Hz tone is on. What kind of training is this?
   a. extinction
   b. generalization
   c. classical conditioning
   d. discrimination

6. Which of the following statements concerning reinforcement is correct?
   a. Learning is most rapid with intermittent reinforcement, but continuous reinforcement produces the greatest resistance to extinction.
   b. Learning is most rapid with continuous reinforcement, but intermittent reinforcement produces the greatest resistance to extinction.
   c. Learning is fastest and resistance to extinction is greatest after continuous reinforcement.
   d. Learning is fastest and resistance to extinction is greatest following intermittent reinforcement.

7. Cognitive processes are:
   a. unimportant in classical and operant conditioning.
   b. important in both classical and operant conditioning.
   c. more important in classical than in operant conditioning.
   d. more important in operant than in classical conditioning.

8. The highest and most consistent rate of response is produced by a _____ schedule.
   a. fixed-ratio
   b. variable-ratio
   c. fixed-interval
   d. variable-interval

9. A response that leads to the removal of an unpleasant stimulus is one being:
   a. positively reinforced.
   b. negatively reinforced.
   c. punished.
   d. extinguished.

10. When a conditioned stimulus is presented without an accompanying unconditioned stimulus, _____ will soon take place.
    a. generalization
    b. discrimination
    c. extinction
    d. aversion

11. One difference between classical and operant conditioning is that:
    a. in classical conditioning the responses operate on the environment to produce rewarding or punishing stimuli.
    b. in operant conditioning the responses are triggered by preceding stimuli.
    c. in classical conditioning the responses are automatically triggered by stimuli.
    d. in operant conditioning the responses are reflexive.

12. In Garcia and Koelling's studies of taste-aversion learning, rats learned to associate:
    a. taste with electric shock.
    b. sights and sounds with sickness.
    c. taste with sickness.
    d. taste and sounds with electric shock.

13. In Pavlov's original experiment with dogs, salivation to meat was the:
    a. CS.
    b. CR.
    c. US.
    d. UR.

14. Learning by imitating others' behaviors is called _____ learning. The researcher best known for studying this type of learning is _____ .
    a. secondary; Skinner
    b. observational; Bandura
    c. secondary; Pavlov
    d. observational; Watson

15. Punishment is a controversial way of controlling behavior because:
    a. behavior is not forgotten and may return.
    b. punishing stimuli often create fear.
    c. punishment often increases aggressiveness.
    d. of all of the above reasons.

16. Classical conditioning experiments by Rescorla and Wagner demonstrate that an important factor in conditioning is:
    a. the subject's age.
    b. the strength of the stimuli.
    c. the predictability of an association.
    d. the similarity of stimuli.

17. Which of the following is an example of reinforcement?
    a. presenting a positive stimulus after a response
    b. removing an unpleasant stimulus after a response
    c. being told that you have done a good job
    d. All of the above are examples.

18. Which of the following is a form of associative learning?
    a. classical conditioning
    b. operant conditioning
    c. observational learning
    d. all of the above

19. For the most rapid conditioning, a CS should be presented:
    a. about 1 second after the US.
    b. about one-half second before the US.
    c. about 15 seconds before the US.
    d. at the same time as the US.

20. Mirror neurons are found in the brain's _____ and are believed to be the neural basis for _____ .
    a. frontal lobe; observational learning
    b. frontal lobe; classical conditioning
    c. temporal lobe; operant conditioning
    d. temporal lobe; observational learning

Matching Items

Match each definition or description with the appropriate term.

Definitions or Descriptions

_____ 1. presentation of a desired stimulus
_____ 2. tendency for similar stimuli to evoke a CR
_____ 3. removal of an aversive stimulus
_____ 4. an innately reinforcing stimulus
_____ 5. an acquired reinforcer
_____ 6. responses are reinforced after an unpredictable amount of time
_____ 7. the motivation to perform a behavior for its own sake
_____ 8. reinforcing closer and closer approximations of a behavior
_____ 9. the reappearance of a weakened CR
_____ 10. presentation of an aversive stimulus
_____ 11. learning that becomes apparent only after reinforcement is provided
_____ 12. each and every response is reinforced
_____ 13. a desire to perform a behavior due to promised rewards

Terms

a. shaping
b. punishment
c. spontaneous recovery
d. latent learning
e. positive reinforcement
f. negative reinforcement
g. primary reinforcer
h. generalization
i. conditioned reinforcer
j. continuous reinforcement
k. variable-interval schedule
l. extrinsic motivation
m. intrinsic motivation

PROGRESS TEST 2

Progress Test 2 should be completed during a final chapter review. Answer the following questions after you thoroughly understand the correct answers for the section reviews and Progress Test 1.

Multiple-Choice Questions

1. During extinction, the _____ is omitted; as a result, the _____ seems to disappear.
   a. US; UR
   b. CS; CR
   c. US; CR
   d. CS; UR

2. In Watson and Rayner's experiment, the loud noise was the _____ and the white rat was the _____.
   a. CS; CR
   b. US; CS
   c. CS; US
   d. US; CR

3. In which of the following may classical conditioning play a role?
   a. emotional problems
   b. the body's immune response
   c. helping drug addicts
   d. all of the above

4. Shaping is a(n) _____ technique for _____ a behavior.
   a. operant; establishing
   b. operant; suppressing
   c. respondent; establishing
   d. respondent; suppressing

5. In Pavlov's studies of classical conditioning of a dog's salivary responses, spontaneous recovery occurred:
   a. during acquisition, when the CS was first paired with the US.
   b. during extinction, when the CS was first presented by itself.
   c. when the CS was reintroduced following extinction of the CR and a rest period.
   d. during discrimination training, when several conditioned stimuli were introduced.

6. For operant conditioning to be most effective, when should the reinforcers be presented in relation to the desired response?
   a. immediately before
   b. immediately after
   c. at the same time as
   d. at least a half hour before

7. In distinguishing between negative reinforcers and punishment, we note that:
   a. punishment, but not negative reinforcement, involves use of an aversive stimulus.
   b. in contrast to punishment, negative reinforcement decreases the likelihood of a response by the presentation of an aversive stimulus.
   c. in contrast to punishment, negative reinforcement increases the likelihood of a response by the presentation of an aversive stimulus.
   d. in contrast to punishment, negative reinforcement increases the likelihood of a response by the termination of an aversive stimulus.

8. The "piecework," or commission, method of payment is an example of which reinforcement schedule?
   a. fixed-interval
   b. variable-interval
   c. fixed-ratio
   d. variable-ratio

9. Putting on your coat when it is cold outside is a behavior that is maintained by:
   a. discrimination learning.
   b. punishment.
   c. negative reinforcement.
   d. classical conditioning.

10. On an intermittent reinforcement schedule, reinforcement is given:
    a. in very small amounts.
    b. randomly.
    c. for successive approximations of a desired behavior.
    d. only some of the time.

11. You teach your dog to fetch the paper by giving him a cookie each time he does so. This is an example of:
    a. operant conditioning.
    b. classical conditioning.
    c. conditioned reinforcement.
    d. partial reinforcement.

12. In promoting observational learning, the most effective models are those that we perceive as:
    a. similar to ourselves.
    b. respected and admired.
    c. successful.
    d. any of the above.

13. A cognitive map is a(n):
    a. mental representation of one's environment.
    b. sequence of thought processes leading from one idea to another.
    c. set of instructions detailing the most effective means of teaching a particular concept.
    d. biological predisposition to learn a particular skill.

14. After exploring a complicated maze for several days, a rat subsequently ran the maze with very few errors when food was placed in the goal box for the first time. This performance illustrates:
    a. classical conditioning.
    b. discrimination learning.
    c. observational learning.
    d. latent learning.

15. Leon's psychology instructor has scheduled an exam every third week of the term. Leon will probably study the most just before an exam and the least just after an exam. This is because the schedule of exams is reinforcing studying according to which schedule?
    a. fixed-ratio
    b. variable-ratio
    c. fixed-interval
    d. variable-interval

16. Operant conditioning is to _____ as classical conditioning is to _____ .
    a. Pavlov; Watson
    b. Skinner; Bandura
    c. Pavlov; Skinner
    d. Skinner; Pavlov

17. On-line testing systems and interactive software are applications of the operant conditioning principles of:
    a. shaping and immediate reinforcement.
    b. immediate reinforcement and punishment.
    c. shaping and primary reinforcement.
    d. continuous reinforcement and punishment.

18. Which of the following is the best example of a conditioned reinforcer?
    a. putting on a coat on a cold day
    b. relief from pain after the dentist stops drilling your teeth
    c. receiving a cool drink after washing your mother's car on a hot day
    d. receiving an approving nod from the boss for a job well done

19. Experiments on taste-aversion learning demonstrate that:
    a. for the conditioning of certain stimuli, the US need not immediately follow the CS.
    b. any perceivable stimulus can become a CS.
    c. all animals are biologically primed to associate illness with the taste of a tainted food.
    d. all of the above are true.

20. Regarding the impact of watching television violence on children, most researchers believe that:
    a. aggressive children simply prefer violent programs.
    b. television simply reflects, rather than contributes to, violent social trends.
    c. watching violence on television leads to aggressive behavior.
    d. there is only a weak correlation between exposure to violence and aggressive behavior.

True–False Items

Indicate whether each statement is true or false by placing *T* or *F* in the blank next to the item.

_____ 1. Operant conditioning involves behavior that is primarily reflexive.

_____ 2. The optimal interval between CS and US is about 15 seconds.

_____ 3. Negative reinforcement decreases the likelihood that a response will recur.

_____ 4. The learning of a new behavior proceeds most rapidly with continuous reinforcement.

_____ 5. As a rule, variable schedules of reinforcement produce more consistent rates of responding than fixed schedules.

_____ 6. Cognitive processes are of relatively little importance in learning.

_____ 7. Although punishment may be effective in suppressing behavior, it can have several undesirable side effects.

_____ 8. All animals, including rats and birds, are biologically predisposed to associate taste cues with sickness.

_____ 9. Whether the CS or US is presented first seems not to matter in terms of the ease of classical conditioning.

_____ 10. Spontaneous recovery refers to the tendency of extinguished behaviors to reappear suddenly.

_____ 11. Researchers have discovered brain neurons that fire when a person performs a task *or* when another person is observed performing the same task.

PSYCHOLOGY APPLIED

Answer these questions the day before an exam as a final check on your understanding of the chapter's terms and concepts.

Multiple-Choice Questions

1. You always rattle the box of dog biscuits before giving your dog a treat. As you do so, your dog salivates. Rattling the box is a(n) _____ ; your dog's salivation is a(n) _____ .
   a. CS; CR
   b. CS; UR
   c. US; CR
   d. US; UR

2. You are expecting an important letter in the mail. As the regular delivery time approaches you glance more and more frequently out the window, searching for the letter carrier. Your behavior in this situation typifies that associated with which schedule of reinforcement?
   a. fixed-ratio
   b. variable-ratio
   c. fixed-interval
   d. variable-interval

3. Jack finally takes out the garbage in order to get his father to stop pestering him. Jack's behavior is being influenced by:
   a. positive reinforcement.
   b. negative reinforcement.
   c. a primary reinforcer.
   d. punishment.

4. Mrs. Ramirez often tells her children that it is important to buckle their seat belts while riding in the car, but she rarely does so herself. Her children will probably learn to:
   a. use their seat belts and tell others it is important to do so.
   b. use their seat belts but not tell others it is important to do so.
   c. tell others it is important to use seat belts but rarely use them themselves.
   d. neither tell others that seat belts are important nor use them.

5. A pigeon can easily be taught to flap its wings in order to avoid shock but not for food reinforcement. According to the text, this is most likely so because:
   a. pigeons are biologically predisposed to flap their wings in order to escape aversive events and to use their beaks to obtain food.
   b. shock is a more motivating stimulus for birds than food is.
   c. hungry animals have difficulty delaying their eating long enough to learn *any* new skill.
   d. of all of the above reasons.

6. From a casino owner's viewpoint, which of the following jackpot-payout schedules would be the most desirable for reinforcing customer use of a slot machine?
   a. variable-ratio
   b. fixed-ratio
   c. variable-interval
   d. fixed-interval

7. After discovering that her usual route home was closed due to road repairs, Sharetta used her knowledge of the city and sense of direction to find an alternate route. This is an example of:
   a. latent learning.
   b. observational learning.
   c. shaping.
   d. using a cognitive map.

For questions 8–11, use the following information.
As a child, you were playing in the yard one day when a neighbor's cat wandered over. Your mother (who has a terrible fear of animals) screamed and snatched you into her arms. Her behavior caused you to cry. You now have a fear of cats.

8. Identify the CS.
   a. your mother's behavior
   b. your crying
   c. the cat
   d. your fear today

9. Identify the US.
   a. your mother's behavior
   b. your crying
   c. the cat
   d. your fear today

10. Identify the CR.
   a. your mother's behavior
   b. your crying
   c. the cat
   d. your fear today

11. Identify the UR.
   a. your mother's behavior
   b. your crying
   c. the cat
   d. your fear today

12. The manager of a manufacturing plant wishes to use positive reinforcement to increase the productivity of workers. Which of the following procedures would probably be the most effective?
    a. Deserving employees are given a general merit bonus at the end of each fiscal year.
    b. A productivity goal that seems attainable, yet is unrealistic, is set for each employee.
    c. Employees are given immediate bonuses for specific behaviors related to productivity.
    d. Employees who fail to meet standards of productivity receive pay cuts.

13. Bill once had a blue car that was in the shop more than it was out. Since then he will not even consider owning blue- or green-colored cars. Bill's aversion to green cars is an example of:
    a. discrimination.
    b. generalization.
    c. latent learning.
    d. extinction.

14. After watching coverage of the Olympics on television recently, Lynn and Susan have been staging their own "summer games." Which of the following best accounts for their behavior?
    a. classical conditioning
    b. observational learning
    c. latent learning
    d. shaping

15. Two groups of rats receive classical conditioning trials in which a tone and electric shock are presented. For Group 1 the electric shock always follows the tone. For Group 2 the tone and shock occur randomly. Which of the following is likely to result?
    a. The tone will become a CS for Group 1 but not for Group 2.
    b. The tone will become a CS for Group 2 but not for Group 1.
    c. The tone will become a CS for both groups.
    d. The tone will not become a CS for either group.

16. Last evening May-ling ate her first cheeseburger and french fries at an American fast-food restaurant. A few hours later she became ill. It can be expected that:
    a. May-ling will develop an aversion to the sight of a cheeseburger and french fries.
    b. May-ling will develop an aversion to the taste of a cheeseburger and french fries.
    c. May-ling will not associate her illness with the food she ate.
    d. May-ling will associate her sickness with something she experienced immediately before she became ill.

17. Reggie's mother tells him that he can watch TV after he cleans his room. Evidently, Reggie's mother is attempting to use _____ to increase room cleaning.
    a. operant conditioning
    b. secondary reinforcement
    c. positive reinforcement
    d. all of the above

18. Which of the following is an example of shaping?
    a. A dog learns to salivate at the sight of a box of dog biscuits.
    b. A new driver learns to stop at an intersection when the light changes to red.
    c. A parrot is rewarded first for making any sound, then for making a sound similar to "Laura," and then for "speaking" its owner's name.
    d. A psychology student reinforces a laboratory rat only occasionally, to make its behavior more resistant to extinction.

19. Lars, a shoe salesman, is paid every two weeks, whereas Tom receives a commission for each pair of shoes he sells. Evidently, Lars is paid on a _____ schedule of reinforcement, and Tom on a _____ schedule of reinforcement.
    a. fixed-ratio; fixed-interval
    b. continuous; intermittent
    c. fixed-interval; fixed-ratio
    d. variable-interval; variable-ratio

20. Nancy decided to take introductory psychology because she has always been interested in human behavior. Jack enrolled in the same course because he thought it would be easy. Nancy's behavior was motivated by _____ , Jack's by _____ .
    a. extrinsic motivation; intrinsic motivation
    b. intrinsic motivation; extrinsic motivation
    c. drives; incentives
    d. incentives; drives

Essay Question

Describe the best way for a pet owner to condition her dog to roll over. (Use the space below to list the points you want to make, and organize them. Then write the essay on a separate piece of paper.)

KEY TERMS

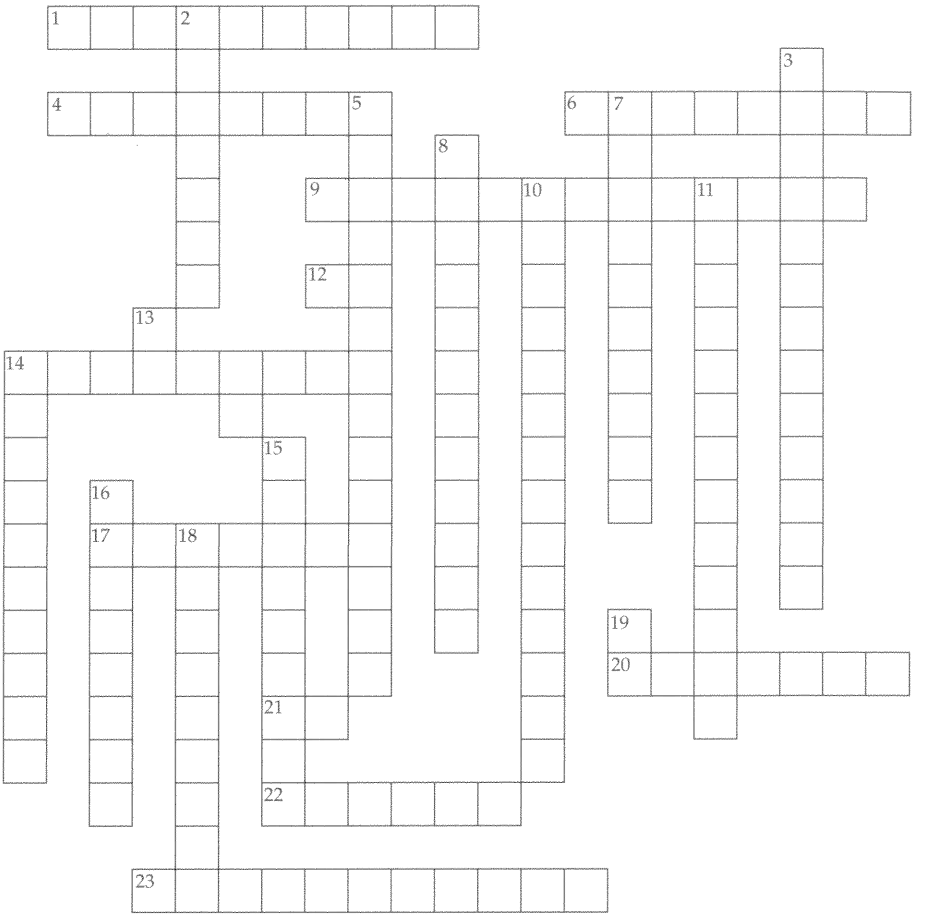
Writing Definitions

Using your own words, on a piece of paper write a brief definition or explanation of each of the following terms.

1. learning
2. associative learning
3. classical conditioning
4. behaviorism
5. unconditioned response (UR)
6. unconditioned stimulus (US)
7. conditioned response (CR)
8. conditioned stimulus (CS)
9. acquisition
10. extinction
11. spontaneous recovery
12. generalization
13. discrimination
14. operant conditioning
15. respondent behavior
16. operant behavior
17. law of effect
18. operant chamber (Skinner box)
19. shaping
20. reinforcer
21. positive reinforcement
22. negative reinforcement
23. primary reinforcers
24. conditioned reinforcers
25. continuous reinforcement
26. partial (intermittent) reinforcement
27. fixed-ratio schedule
28. variable-ratio schedule
29. fixed-interval schedule
30. variable-interval schedule
31. punishment
32. cognitive map
33. latent learning
34. intrinsic motivation
35. extrinsic motivation
36. observational learning
37. modeling
38. mirror neurons
39. prosocial behavior

Cross-Check

As you learned in the Prologue, reviewing and overlearning of material are important to the learning process. After you have written the definitions of the key terms in this chapter, you should complete the crossword puzzle to ensure that you can reverse the process—recognize the term, given the definition.



ACROSS

1. Behavior that occurs as an automatic response to a stimulus.
4. Relatively permanent change in behavior due to experience.
6. Reinforcer that, when removed after a response, strengthens the response.
9. Type of stimulus that naturally triggers an unconditioned response.
12. Unlearned, involuntary response.
14. Type of behavior that is positive and helpful.
17. Behavior that produces reinforcing or punishing stimuli.
20. Procedure that involves reinforcing successive approximations of a behavior.
21. Learned response to a previously neutral stimulus.
22. Learning that occurs in the absence of reinforcement but only becomes apparent when an incentive is introduced.
23. Initial stage of conditioning, in which a new response is established.

DOWN

2. Type of reinforcement in which responding is intermittently reinforced.
3. Schedule in which the first response following a set period of time is reinforced.
5. Tendency for stimuli similar to the original CS to evoke a CR.
7. This occurs when a response is no longer reinforced.
8. Mental picture of the environment
10. Responding differently to stimuli that signal whether a behavior will be reinforced.
11. Learning that involves watching and imitating others.
13. Stimulus that automatically triggers an unconditioned response.
14. The presentation of an aversive stimulus, which decreases the behavior it follows.
15. Type of learning also called Pavlovian conditioning.
16. The process of watching and then imitating a behavior.
18. Motivation to perform a behavior in order to obtain a reward or avoid a punishment.
19. Originally neutral stimulus that comes to trigger a conditioned response.

ANSWERS

Chapter Review

How Do We Learn?

1. learning
2. associate; associations; associative learning
3. classical
4. operant
5. observing

Classical Conditioning

1. Ivan Pavlov; John Watson; behaviorism
2. conditioned stimulus; unconditioned stimulus
3. unconditioned response
4. conditioned response
5. acquisition; one-half second
6. does not

Learning theorists consider classical conditioning to be adaptive because conditioned responses help organisms to prepare for good or bad events (unconditioned stimuli) that are about to occur.

7. survive; reproduce
8. can
9. extinction
10. spontaneous recovery
11. generalization
12. similar; discrimination
13. survival
14. cognition
15. predict; cognitive; expect
16. alcoholism
17. response; stimulus
18. sickness; would
19. biological; adapt; levels of analysis
20. adapt
21. objectively

Classical conditioning led to the discovery of general principles of learning that are the same for all species tested, including humans. Classical conditioning also provided an example to the young field of psychology of how complex, internal processes could be studied objectively. In addition, classical conditioning has proven to have many helpful applications to human health and well-being.

22. craving; cues
23. can

In Watson and Rayner's experiment, classical conditioning was used to condition fear of a rat in Albert, an 11-month-old infant. When Albert touched the white rat (neutral stimulus), a loud noise (unconditioned stimulus) was sounded. After several pairings of the rat with the noise, Albert began crying at the mere sight of the rat. The rat had become a conditioned stimulus, triggering a conditioned response of fear.

Operant Conditioning

1. neutral; automatic; does not
2. respondent
3. operant
4. law of effect; rewarded; recur
5. Skinner box (operant chamber)
6. shaping; approximations
7. concepts; discriminating
8. discriminative stimulus
9. reinforcer
10. positive reinforcer
11. negative reinforcer
12. primary reinforcers; conditioned reinforcers
13. more
14. is; delayed; drug; unprotected sex
15. continuous reinforcement; rapid; rapid
16. partial (intermittent); slower; very
17. fixed-ratio
18. variable-ratio
19. fixed-interval; checking the mail as delivery time approaches
20. variable-interval

Following reinforcement on a fixed-interval schedule, there is a pause in responding and then an increasing rate of response as time for the next reinforcement draws near. On a fixed-ratio schedule there also is a post-reinforcement pause, followed, however, by a return to a consistent, high rate of response. Both kinds of variable schedules produce steadier rates of response, without the pauses associated with fixed schedules. In general, schedules linked to responses produce higher response rates and variable schedules produce more consistent responding than the related fixed schedules.

21. punishment; positive punishment; negative punishment
22. suppressed
23. fear; the person who administered it
24. aggressiveness
25. cognitive
26. cognitive map
27. latent learning
28. intrinsic motivation; extrinsic motivation
29. is

30. reinforcer; shape; food
31. adaptive; instinctive drift
32. external; internal thoughts; feelings
33. operant; behavior
34. dehumanized; freedom; control
35. shaping; testing; interactive; Web; athletic
36. more; achievable; more
37. costs; benefits
38. **a.** State your goal.

    b. Monitor the behavior (when and where it occurs).

    c. Reinforce the desired behavior.

    d. Reduce the incentives to perform the undesirable behavior.
39. associative learning
40. acquisition; extinction; spontaneous recovery; generalization; discrimination
41. cognitive; biological
42. stimuli; control; automatically
43. operant behaviors; consequences

Learning by Observation

1. modeling; observational learning; occurs
2. mirror; frontal; observational; observe other monkeys performing the same task; has
3. 9 months; 14 months
4. Bandura
5. more
6. rewards; punishments
7. abusive; aggressive; genetic
8. prosocial
9. similar; successful; admirable; consistent
10. watching television
11. violent
12. link
13. aggression; crime
14. causation; does
15. imitation; desensitize

Progress Test 1

Multiple-Choice Questions

1. **c.** is the answer. (p. 313)
   a. This answer is incorrect because it simply describes any behavior that is automatic rather than being triggered by a specific stimulus.

   b. This answer is too general, since behaviors can change for reasons other than learning.
   d. Respondently conditioned behavior also satisfies the criteria of our definition of learning.
2. **b.** is the answer. (p. 327)
   a. & c. Classical conditioning is associated with Pavlov; respondent conditioning is another name for classical conditioning.
   d. Observational learning is most closely associated with Bandura.
3. **c.** is the answer. Meat automatically triggers the response of salivation and is therefore an unconditioned stimulus. (p. 317)
   a. A conditioned stimulus acquires its response-triggering powers through learning. A dog does not learn to salivate to meat.
   b. & d. Responses are behaviors triggered in the organism, in this case the dog's salivation. The meat is a stimulus.
4. **b.** is the answer. Prior to its pairing with meat (the US), the tone did not trigger salivation and was therefore a neutral stimulus. Afterward, the tone triggered salivation (the CR) and was therefore a conditioned stimulus (CS). (pp. 316–317)
   c. & d. Unconditioned stimuli, such as meat, innately trigger responding. Pavlov's dogs had to learn to associate the tone with the food.
5. **d.** is the answer. In learning to distinguish between the conditioned stimulus and another, similar stimulus, the monkey has received training in discrimination. (p. 320)
   a. In extinction training, a stimulus and/or response is allowed to go unreinforced.
   b. Generalization training involves responding to stimuli similar to the conditioned stimulus; here the monkey is being trained not to respond to a similar stimulus.
   c. This cannot be classical conditioning since the monkey is acting in order to obtain a reward. Thus, this is an example of operant conditioning.
6. **b.** is the answer. A continuous association will naturally be easier to learn than one that occurs on only some occasions, so learning is most rapid with continuous reinforcement. Yet, once the continuous association is no longer there, as in extinction training, extinction will occur more rapidly than it would have had the organism not always experienced reinforcement. (p. 331)
7. **b.** is the answer. (pp. 321, 334)
   c. & d. The text does not present evidence regarding the relative importance of cognitive processes in classical and operant conditioning.

8. **b.** is the answer. (p. 332)
a. With fixed-ratio schedules, there is a pause following each reinforcement.
c. & d. Because reinforcement is not contingent on the rate of response, interval schedules, especially fixed-interval schedules, produce lower response rates than ratio schedules.

9. **b.** is the answer. (p. 329)
a. Positive reinforcement involves presenting a favorable stimulus following a response.
c. Punishment involves presenting an unpleasant stimulus following a response.
d. In extinction, a previously reinforced response is no longer followed by reinforcement. In this situation, a response causes a stimulus to be terminated or removed.

10. **c.** is the answer. In this situation, the CR will decline, a phenomenon known as extinction. (p. 319)
a. Generalization occurs when the subject makes a CR to stimuli similar to the original CS.
b. Discrimination is when the subject does not make a CR to stimuli other than the original CS.
d. An aversion is a CR to a CS that has been associated with an unpleasant US, such as shock or a nausea-producing drug.

11. **c.** is the answer. (p. 326)
a. In *operant* conditioning the responses operate on the environment.
b. In *classical* conditioning responses are triggered by preceding stimuli.
d. In *classical* conditioning responses are reflexive.

12. **c.** is the answer. (pp. 321–322)
a. & d. These studies also indicated that rats are biologically predisposed to associate visual and auditory stimuli, but not taste, with shock.
b. Rats are biologically predisposed to associate taste with sickness.

13. **d.** is the answer. A dog does not have to learn to salivate to food; therefore, this response is unconditioned. (p. 317)
a. & c. Salivation is a response, not a stimulus.

14. **b.** is the answer. (pp. 341, 343)
a. Skinner is best known for studies of *operant* learning. Moreover, there is no such thing as secondary learning.
c. Pavlov is best known for classical conditioning.
d. Watson is best known as an early proponent of behaviorism.

15. **d.** is the answer. (pp. 332–333)

16. **c.** is the answer. (p. 321)
a., b., & d. Rescorla and Wagner's research did not address the importance of these factors in classical conditioning.

17. **d.** is the answer. a. is an example of positive reinforcement, b. is an example of negative reinforcement, and c. is an example of conditioned reinforcement. (p. 329)

18. **d.** is the answer. (p. 314)

19. **b.** is the answer. (p. 318)
a. Backward conditioning, in which the US precedes the CS, is ineffective.
c. This interval is longer than is optimum for the most rapid acquisition of a CS-US association.
d. Simultaneous presentation of CS and US is ineffective because it does not permit the subject to anticipate the US.

20. **a.** is the answer. (p. 342)

Matching Items

1. e (p. 329)
2. h (p. 320)
3. f (p. 329)
4. g (p. 330)
5. i (p. 330)
6. k (p. 332)
7. m (p. 335)
8. a (p. 328)
9. c (p. 319)
10. b (p. 332)
11. d (p. 334)
12. j (p. 330)
13. l (p. 335)

Progress Test 2

Multiple-Choice Questions

1. **c.** is the answer. (p. 319)

2. **b.** is the answer. The loud noise automatically triggered Albert's fear and therefore functioned as a US. After being associated with the US, the white rat acquired the power to trigger fear and thus became a CS. (p. 324)

3. **d.** is the answer. (p. 324)

4. **a.** is the answer. Shaping works on operant behaviors by reinforcing successive approximations to a desired goal. (p. 328)

5. **c.** is the answer. (p. 319)
a., b., & d. Spontaneous recovery occurs after a CR has been extinguished, and in the absence of the US. The situations described here all involve the continued presentation of the US and, therefore, the further strengthening of the CR.

6. **b.** is the answer. (p. 330)
a., c., & d. Reinforcement that is delayed, presented before a response, or at the same time as a response does not always increase the response's frequency of occurrence.

7. **d.** is the answer. (pp. 329, 332)
a. Both involve an aversive stimulus.
b. All reinforcers, including negative reinforcers, increase the likelihood of a response.

c. In negative reinforcement, an aversive stimulus is withdrawn following a desirable response.

8. **c.** is the answer. Payment is given after a fixed number of pieces have been completed. (p. 331)
a. & b. Interval schedules reinforce according to the passage of time, not the amount of work accomplished.
d. Fortunately for those working on commission, the work ratio is fixed and therefore predictable.

9. **c.** is the answer. By learning to put on your coat before going outside, you have learned to reduce the aversive stimulus of the cold. (p. 329)
a. Discrimination learning involves learning to make a response in the presence of the appropriate stimulus and not other stimuli.
b. Punishment is the suppression of an undesirable response by the presentation of an aversive stimulus.
d. Putting on a coat is a response that operates on the environment. Therefore, this is an example of operant, not classical, conditioning.

10. **d.** is the answer. (p. 331)
a. Intermittent reinforcement refers to the ratio of responses to reinforcers, not the overall quantity of reinforcement delivered.
b. Unlike intermittent reinforcement, in which the delivery of reinforcement is contingent on responding, random reinforcement is delivered independently of the subject's behavior.
c. This defines the technique of shaping, not intermittent reinforcement.

11. **a.** is the answer. You are teaching your dog by rewarding him when he produces the desired behavior. (p. 326)
b. This is not classical conditioning because the cookie is a primary reinforcer presented after the operant behavior of the dog fetching the paper.
c. Food is a primary reinforcer; it satisfies an innate need.
d. Rewarding your dog each time he fetches the paper is continuous reinforcement.

12. **d.** is the answer. (p. 343)

13. **a.** is the answer. (p. 334)

14. **d.** is the answer. The rat had learned the maze but did not display this learning until reinforcement became available. (p. 334)
a. Negotiating a maze is clearly operant behavior.
b. This example does not involve learning to distinguish between stimuli.
c. This is not observational learning because the rat has no one to observe!

15. **c.** is the answer. Because reinforcement (earning a good grade on the exam) is available according to the passage of time, studying is reinforced on an interval schedule. Because the interval between exams is constant, this is an example of a fixed-interval schedule. (p. 332)

16. **d.** is the answer. (pp. 315, 327)
a. Pavlov and Watson are both associated with classical conditioning.
b. Skinner is associated with operant conditioning, and Bandura is associated with observational learning.

17. **a.** is the answer. On-line testing systems apply operant principles such as reinforcement, immediate feedback, and shaping to the teaching of new skills. (p. 337)
b. & d. On-line testing systems provide immediate, and continuous, reinforcement for correct responses, but do not use aversive control procedures such as punishment.
c. On-line testing systems are based on feedback for correct responses; this feedback constitutes conditioned, rather than primary, reinforcement.

18. **d.** is the answer. An approving nod from the boss is a conditioned reinforcer in that it doesn't satisfy an innate need but has become linked with desirable consequences. Cessation of cold, cessation of pain, and a drink are all primary reinforcers, which meet innate needs. (p. 330)

19. **a.** is the answer. Taste-aversion experiments demonstrate conditioning even with CS-US intervals as long as several hours. (pp. 321–322)
b. Despite being perceivable, a visual or auditory stimulus cannot become a CS for illness in some animals, such as rats.
c. Some animals, such as birds, are biologically primed to associate the *appearance* of food with illness.

20. **c.** is the answer. (p. 345)

True–False Items

1. F (p. 326)
2. F (p. 318)
3. F (p. 329)
4. T (p. 330)
5. T (pp. 331, 332)
6. F (pp. 321, 334)
7. T (pp. 332–333)
8. F (pp. 321–322)
9. F (p. 318)
10. T (p. 319)
11. T (p. 341)

Psychology Applied

Multiple-Choice Questions

1. **a.** is the answer. Your dog had to learn to associate the rattling sound with the food. Rattling is therefore a conditioned, or learned, stimulus, and salivation in response to this rattling is a learned, or conditioned, response. (p. 317)

2. **c.** is the answer. Reinforcement (the letter) comes after a fixed interval, and as the likely end of the interval approaches, your behavior (glancing out the window) becomes more frequent. (p. 332)
   a. & b. These answers are incorrect because with ratio schedules, reinforcement is contingent upon the number of responses rather than on the passage of time.
   d. Assuming that the mail is delivered at about the same time each day, the interval is fixed rather than variable. Your behavior reflects this, since you glance out the window more often as the delivery time approaches.

3. **b.** is the answer. By taking out the garbage, Jack terminates an aversive stimulus—his father's nagging. (p. 329)
   a. Positive reinforcement would involve a desirable stimulus that increases the likelihood of the response that preceded it.
   c. This answer would have been correct if Jack's father had rewarded Jack for taking out the garbage by providing his favorite food.
   d. Punishment suppresses behavior; Jack is behaving in order to obtain reinforcement.

4. **c.** is the answer. Studies indicate that when a model says one thing but does another, subjects do the same and learn not to practice what they preach. (p. 344)

5. **a.** is the answer. As in this example, conditioning must be consistent with the particular organism's biological predispositions. (pp. 335–336)
   b. Some behaviors, but certainly not all, are acquired more rapidly than others when shock is used as negative reinforcement.
   c. Pigeons are able to acquire many new behaviors when food is used as reinforcement.

6. **a.** is the answer. Ratio schedules maintain higher rates of responding—gambling in this example—than do interval schedules. Furthermore, variable schedules are not associated with the pause in responding following reinforcement that is typical of fixed schedules. The slot machine would therefore be used more often, and more consistently, if jackpots were scheduled according to a variable-ratio schedule. (p. 332)

7. **d.** is the answer. Sharetta is guided by her mental representation of the city, or cognitive map. (p. 334)
   a. Latent learning, or learning in the absence of reinforcement that is demonstrated when reinforcement becomes available, has no direct relevance to the example.
   b. Observational learning refers to learning from watching others.
   c. Shaping is the technique of reinforcing successive approximations of a desired behavior.

8. **c.** is the answer. Because the cat was associated with your mother's scream, it triggered a fear response, and is thus the CS. (p. 317)

9. **a.** is the answer. Your mother's scream and evident fear, which naturally caused you to cry, was the US. (p. 317)

10. **d.** is the answer. Your fear of cats is the CR. An acquired fear is always a conditioned response. (p. 317)

11. **b.** is the answer. Your crying, automatically triggered by your mother's scream and fear, was the UR. (p. 317)

12. **c.** is the answer. (p. 337)
    a. Positive reinforcement is most effective in boosting productivity in the workplace when specific behavior, rather than vaguely defined general merit, is rewarded. Also, immediate reinforcement is much more effective than the delayed reinforcement described in a.
    b. Positive reinforcement is most effective in boosting productivity when performance goals are achievable, rather than unrealistic.
    d. The text does not specifically discuss the use of punishment in the workplace. However, it makes the general point that although punishment may temporarily suppress unwanted behavior, it does not guide one toward more desirable behavior. Therefore, workers who receive pay cuts for poor performance may learn nothing about how to improve their productivity.

13. **b.** is the answer. Not only is Bill extending a learned aversion to a specific blue car to all blue cars but also to cars that are green. (p. 320)
    a. Whereas discrimination involves responding only to a particular stimulus, Bill is extending his aversive response to other stimuli (green cars) as well.
    c. Latent learning is learning that becomes apparent only after reinforcement becomes available.
    d. Extinction is the weakening of the CR when the CS is no longer followed by the US.

14. **b.** is the answer. The girls are imitating behavior they have observed and admired. (p. 341)
a. Because these behaviors are clearly willful rather than involuntary, classical conditioning plays no role.
c. Latent learning plays no role in this example.
d. Shaping is a procedure for teaching the acquisition of a new response by reinforcing successive approximations of the behavior.

15. **a.** is the answer. Classical conditioning proceeds most effectively when the CS and US are reliably paired and therefore appear predictably associated. Only for Group 1 is this likely to be true. (p. 318)

16. **b.** is the answer. (p. 322)
a., c., & d. Taste-aversion research demonstrates that humans and some other animals, such as rats, are biologically primed to associate illness with the taste of tainted food, rather than with other cues, such as the food's appearance. Moreover, taste aversions can be acquired even when the interval between the CS and the illness is several hours.

17. **d.** is the answer. By making a more preferred activity (watching TV) contingent on a less preferred activity (room cleaning), Reggie's mother is employing the operant conditioning technique of positive reinforcement. (pp. 329, 330)

18. **c.** is the answer. The parrot is reinforced for making successive approximations of a goal behavior. This defines shaping. (p. 328)
a. Shaping is an operant conditioning procedure; salivation at the sight of dog biscuits is a classically conditioned response.
b. Shaping involves the systematic reinforcement of successive approximations of a more complex behavior. In this example there is no indication that the response of stopping at the intersection involved the gradual acquisition of simpler behaviors.
d. This is an example of the partial reinforcement of an established response, rather than the shaping of a new response.

19. **c.** is the answer. Whereas Lars is paid (reinforced) after a fixed period of time (fixed-interval), Tom is reinforced for each sale (fixed-ratio) he makes. (pp. 331–332)

20. **b.** is the answer. Wanting to do something for its own sake is intrinsic motivation; wanting to do something for a reward (in this case, presumably, a high grade) is extrinsic motivation. (p. 335)
a. The opposite is true. Nancy was motivated to take the course for its own sake, whereas Jack was evidently motivated by the likelihood of a reward in the form of a good grade.
c. & d. A good grade, such as the one Jack is expecting, is an incentive. Drives, however, are aroused states that result from physical deprivation; they are not involved in this example.

Essay Question

The first step in shaping an operant response, such as rolling over, is to find an effective reinforcer. Some sort of biscuit or dog treat is favored by animal trainers. This primary reinforcement should be accompanied by effusive praise (secondary reinforcement) whenever the dog makes a successful response.

Rolling over (the goal response) should be divided into a series of simple approximations, the first of which is a response, such as lying down on command, that is already in the dog's repertoire. This response should be reinforced several times. The next step is to issue a command, such as "Roll over," and withhold reinforcement until the dog (usually out of frustration) makes a closer approximation (such as rotating slightly in one direction). Following this example, the trainer should gradually require closer and closer approximations until the goal response is attained. When the new response has been established, the trainer should switch from continuous to partial reinforcement, in order to strengthen the skill.

Key Terms

Writing Definitions

1. **Learning** is any relatively permanent change in an organism's behavior due to experience. (p. 313)

2. In **associative learning**, organisms learn that certain events occur together. Two variations of associative learning are classical conditioning and operant conditioning. (p. 314)

3. Also known as Pavlovian conditioning, **classical conditioning** is a type of learning in which a neutral stimulus becomes capable of triggering a conditioned response after having become associated with an unconditioned stimulus. (p. 315)

4. **Behaviorism** is the view that psychology should be an objective science that studies only observable behaviors without reference to mental processes. (p. 316)

   Example: Because he was an early advocate of the study of observable behavior, John Watson is often called the father of behaviorism.

5. In classical conditioning, the **unconditioned response (UR)** is the unlearned, involuntary response to the unconditioned stimulus. (p. 317)
6. In classical conditioning, the **unconditioned stimulus (US)** is the stimulus that naturally and automatically triggers the reflexive unconditioned response. (p. 317)
7. In classical conditioning, the **conditioned response (CR)** is the learned response to a previously neutral conditioned stimulus, which results from the acquired association between the CS and US. (p. 317)
8. In classical conditioning, the **conditioned stimulus (CS)** is an originally neutral stimulus that comes to trigger a CR after association with an unconditioned stimulus. (p. 317)
9. In a learning experiment, **acquisition** refers to the initial stage of conditioning in which the new response is established and gradually strengthened. In operant conditioning, it is the strengthening of a reinforced response. (p. 318)
10. **Extinction** refers to the weakening of a CR when the CS is no longer followed by the US; in operant conditioning extinction occurs when a response is no longer reinforced. (p. 319)
11. **Spontaneous recovery** is the reappearance of an extinguished CR after a rest period. (p. 319)
12. **Generalization** refers to the tendency, once a response has been conditioned, for stimuli similar to the original CS to evoke a CR. (p. 320)
13. **Discrimination** in classical conditioning refers to the ability to distinguish the CS from similar stimuli that do not signal a US. In operant conditioning, it refers to responding differently to stimuli that signal a behavior will be reinforced or will not be reinforced. (p. 320)
14. **Operant conditioning** is a type of learning in which behavior is strengthened if followed by a reinforcer or diminished if followed by a punisher. (p. 326)

    Example: Unlike classical conditioning, which works on automatic behaviors, **operant conditioning** works on behaviors that operate on the environment.
15. **Respondent behavior** is that which occurs as an automatic response to some stimulus. (p. 326)

    Example: In classical conditioning, conditioned and unconditioned responses are examples of **respondent behavior** in that they are automatic responses triggered by specific stimuli.
16. **Operant behavior** is behavior that operates on the environment, producing consequences. (p. 326)
17. E. L. Thorndike proposed the **law of effect**, which states that behaviors followed by favorable consequences are likely to recur, and that behaviors followed by unfavorable consequences become less likely. (p. 327)
18. An **operant chamber** (*Skinner box*) is an experimental chamber for the operant conditioning of an animal such as a pigeon or rat. The controlled environment enables the investigator to present visual or auditory stimuli, deliver reinforcement or punishment, and precisely measure simple responses such as bar presses or key pecking. (p. 327)
19. **Shaping** is the operant conditioning procedure for establishing a new response by reinforcing successive approximations of the desired behavior. (p. 328)
20. In operant conditioning, a **reinforcer** is any event that strengthens the behavior it follows. (p. 329)
21. In operant conditioning, **positive reinforcement** strengthens a response by *presenting* a typically pleasurable stimulus after that response. (p. 329)
22. In operant conditioning, **negative reinforcement** strengthens a response by *removing* an aversive stimulus after that response. (p. 329)
23. The powers of **primary reinforcers** are inborn and do not depend on learning. (p. 330)
24. **Conditioned reinforcers** are stimuli that acquire their reinforcing power through their association with primary reinforcers. (p. 330)
25. **Continuous reinforcement** is the operant procedure of reinforcing the desired response every time it occurs. In promoting the acquisition of a new response it is best to use continuous reinforcement. (p. 330)
26. **Partial (intermittent) reinforcement** is the operant procedure of reinforcing a response intermittently. A response that has been partially reinforced is much more resistant to extinction than one that has been continuously reinforced. (p. 331)
27. In operant conditioning, a **fixed-ratio schedule** is one in which reinforcement is presented after a set number of responses. (p. 331)

    Example: Continuous reinforcement is a special kind of **fixed-ratio schedule**: Reinforcement is presented after *each* response, so the ratio of reinforcements to responses is one to one.
28. In operant conditioning, a **variable-ratio schedule** is one in which reinforcement is presented after a varying number of responses. (p. 332)

29. In operant conditioning, a **fixed-interval schedule** is one in which a response is reinforced after a specified time has elapsed. (p. 332)
30. In operant conditioning, a **variable-interval schedule** is one in which responses are reinforced after varying intervals of time. (p. 332)
31. In operant conditioning, **punishment** is the presentation of an aversive stimulus, such as shock, which decreases the behavior it follows. (p. 332)

    Memory aid: People often confuse negative reinforcement and **punishment**. The former strengthens behavior, while the latter weakens it.
32. A **cognitive map** is a mental picture of one's environment. (p. 334)
33. **Latent learning** is learning that occurs in the absence of reinforcement but only becomes apparent when there is an incentive to demonstrate it. (p. 334)
34. **Intrinsic motivation** is the desire to perform a behavior for its own sake, rather than for some external reason, and to be effective. (p. 335)

    Memory aid: Intrinsic means "internal": A person who is **intrinsically motivated** is motivated from within.
35. **Extrinsic motivation** is the desire to perform a behavior in order to obtain a reward or avoid a punishment. (p. 335)

    Memory aid: Extrinsic means "external": A person who is extrinsically motivated is motivated by some outside factor.
36. **Observational learning** is learning by watching and imitating the behavior of others. (p. 341)
37. **Modeling** is the process of watching and then imitating a specific behavior and is thus an important means through which observational learning occurs. (p. 341)
38. Found in the brain's frontal lobe, **mirror neurons** may be the neural basis for observational learning. These neurons generate impulses when certain actions are performed or when another individual who performs those actions is observed. (p. 341)
39. The opposite of antisocial behavior, **prosocial behavior** is positive, helpful, and constructive and is subject to the same principles of observational learning as is undesirable behavior, such as aggression. (p. 343)

Cross-Check

ACROSS	DOWN
1. respondent	**2.** partial
4. learning	**3.** fixed interval
6. negative	**5.** generalization
9. unconditioned	**7.** extinction
12. UR	**8.** cognitive map
14. prosocial	**10.** discrimination
17. operant	**11.** observational
20. shaping	**13.** US
21. CR	**14.** punishment
22. latent	**15.** classical
23. acquisition	**16.** modeling
	18. extrinsic
	19. CS

FOCUS ON VOCABULARY AND LANGUAGE

How Do We Learn?

Page 313: Learning breeds hope. The fact that we can change and adapt as a result of experience (*learn*) in so many different areas gives rise to optimism (*breeds hope*) about our future prospects.

Page 314: . . . watching a TV character get *mugged* . . . To be mugged means to be attacked, (sometimes) beaten, and robbed. This example shows how associations are formed between events, such as between the sounds that precede an attack and the *mugging* itself. In movies and on TV, a certain type of music is often played before a frightening event or scene. After a few such associations, the music itself can elicit fear before you actually see the frightening or scary event. This is an example of classical conditioning.

Page 314: A clever Japanese *rancher* reportedly *herds* cattle by outfitting them with electronic *pagers*, which he calls from his cell phone. In this example of conditioning, the cattle farmer (*rancher*) has trained his animals (steers or cattle) to gather together and move (*he herds them*) to the feeding station (*food trough*). They have learned to associate the sound of the tone (*the beep*) made by the signaling device (*electronic pager*) with the delivery of food (classical conditioning), and they have also learned that moving fast (*hustling*) to the food container (*trough*) is followed by the good feeling of satiating their hunger (operant conditioning).

Classical Conditioning

Page 315: For many people, the name Ivan Pavlov (1849–1936) *rings a bell.* Myers is making a little joke here. A common expression when hearing some-

thing familiar but vague is to say, *"That rings a bell."* Pavlov's name is familiar to many people, who may also be vaguely aware that his research involved dogs and ringing bells (classical conditioning).

Page 316: . . . what the dog was thinking and feeling as it *drooled.* . . . To *drool* means to salivate or produce spit. When food (US) is placed in a dog's mouth, the dog will automatically salivate or *drool* (UR). If a tone (CS) is sounded before (or precedes) the US over a number of trials, then the CS alone (the tone) will be able to elicit salivation (CR). Pavlov decided that the dog's internal mental state (thinking and feeling) was not important in reaching an understanding of fundamental learning principles, and that focusing attention on cognitive processes only led to futile arguments (*fruitless debates*).

Page 318: (margin note): If the *aroma* of cake baking *sets your mouth to watering,* what is the US? The CS? The CR? When you bake a cake in the oven, there is a lovely smell (*aroma*) which makes you salivate or drool (*sets your mouth to watering*). This is an example of classical conditioning: the taste of the cake in your mouth is the US (this automatically produces saliva, the UR), the aroma is the CS, and, because of its past associations with the US, it can now, by itself, elicit saliva (the CR).

Page 314: Moreover, the male quail developed a preference for their cage's *red-light district.* Traditionally, a red lamp hung in the window identified the house as a brothel, and the area of town populated by many brothels became known as the *red-light district.* In Domjan's experiments with male quail a red light (CS) was used to signal the arrival of a receptive female quail (US), which elicited sexual arousal (UR). Eventually, the red light (CS) alone elicited sexual arousal (CR), and the male quail appeared to develop a general liking (*preference*) for the cage with the red light (*the red-light district*).

Page 319: After *breaking up* with his *fire-breathing heartthrob,* Tirrell also experienced extinction and spontaneous recovery. He recalls that "the smell of onion breath (CS), no longer paired with the kissing (US), lost its ability to *shiver my timbers."* This paragraph describes the end of the relationship (*breaking up*) with his girlfriend (*heartthrob*) who loved to eat onions and thus had hot, smelly breath (*fire-breathing*). The repeated smell of onions or onion breath (CS) without the US (kissing) resulted in extinction of his conditioned aroused state (CR), and, consequently, the CS lost its ability to get him excited (*shiver his timbers*). He later experienced spontaneous recovery (the extinguished CR returned briefly) when he smelled onion breath once more. [The idiom "shiver my timbers" has no simple explanation; it may be an old expression dating back to the days of wooden (*timbered*) sailing ships that would tremble or shiver in a storm, or alternatively, it may have been used in the game of cricket to describe what happens when the cricket ball shakes and scatters (*shivers*) the wooden wicket and stumps (*timbers*).]

Page 320: Confronted by a pit bull, *your heart may race;* confronted by a golden retriever, it probably will not. Pit bulls are dogs (*not cattle*) that are generally perceived as aggressive and potentially dangerous; golden retrievers are dogs that are usually gentle and friendly. Thus, when you encounter a pit bull, you may experience physiological arousal (*your heart may race*) and you may experience fear, but the sight of a golden retriever will not likely cause the same reaction. To be able to tell the difference (*discriminate*) between two stimuli (in this case, two types of dogs) is an adaptive ability that has obvious survival value

Page 321: . . . *willy-nilly* . . . This means without any forethought, intention, or purpose—at random. An organism does not randomly (*willy-nilly*) form associations. The associations have to be meaningful; the CS needs to have informational value and be able to reliably predict the occurrence of the US.

Page 321: So, even in classical conditioning, it is, especially with humans, not only the simple CS–US association but also *the thought that counts.* The expression "it's the thought that counts" recognizes that a person's intentions and motivations (*thoughts*) are just as important as the actual behavior. Myers is making the point that cognitions (*thoughts, perceptions, expectation*) are now viewed as being critically important in the process of learning through classical conditioning.

Page 323: But if we *see further* than Pavlov did, it is because we *stand on his shoulders.* This phrase is not to be taken literally; it simply means that we now know more than Pavlov did (*we see further*) because we can build and expand on his great work (*stand on his shoulders*).

Page 324: Former *crack* cocaine users often feel a *craving* when they again encounter cues (people, places) associated with previous *highs.* Crack cocaine users are drug addicts who use a drug that is a synthetic, but very potent, form of cocaine (*crack*). For those who are attempting abstinence, the strong desire (*craving*) for the drug may be a classically conditioned response (CR) to the sight or presence of peo-

ple or places (CSs). These people or places (CSs) were associated with taking the drug (US) which produced the UR (euphoric feelings or *highs*). Drug addicts are therefore advised to avoid (steer clear of) settings, equipment (*paraphernalia*), or people related to previous drug-taking activity.

Page 324: . . . legendary significance . . . Watson and Rayner's work with Little Albert was the first investigation of how phobias or irrational fears might develop through the process of classical conditioning. Thus, the story was passed on to future generations of psychologists (it became a legend) and influenced their research.

Operant Conditioning

Page 327: . . . to pull habits out of a rat. David Myers is having fun playing with the English language here. The expression "to pull rabbits out of a hat" refers to stage magicians who are able to extract rabbits from a seemingly empty hat. Can you see the way Myers has twisted this expression? Both classical and operant conditioning involve teaching new habits to various organisms, including rats. Following classical conditioning the CS triggers a new response from the animal (i.e., the CS *"pulls a habit out of the rat"*), or the sight of the lever may elicit the habit of lever pressing (operant conditioning).

Page 328: With training, pigeons have even been taught to discriminate between *Bach's music and Stravinsky's.* Bach and Stravinsky were composers whose styles of musical composition were quite different. Through shaping (rewarding behaviors that are closer and closer to the target or desired response), psychologists have been able to train pigeons to discriminate (or choose) between the two musical sounds. For example, pigeons may be rewarded for pecking a disk when Bach is playing and for refraining from pecking when Stravinsky is playing. They can be trained to discriminate, or tell the difference, between the two.

Page 329: Or consider a teacher who pastes *gold stars on a wall chart* after the names of children scoring 100 percent on spelling tests. Teachers often use extrinsic rewards such as small, bright stickers (*gold stars*) and typically display them on a classroom bulletin board (*pastes them on a wall chart*) for, say, the very best spellers in the class. Unfortunately, if only the top few students (*academic all-stars*) are recognized in this way, the rest of the students may lose motivation because, even if they improve their spelling and work very hard (but still don't get 100%), they don't get any reinforcers. Myers recommends a shaping procedure that rewards even small improvements and recognizes the child for making the effort to do better and better.

Page 329: Pushing the *snooze button* silences the annoying alarm. When your radio alarm goes off in the morning, you may press the switch (*snooze button*) which turns off the irritating tone for a brief period of time. The ensuing quiet period, which may allow you to go back to sleep for a while (*snooze*), and the absence of the buzzer are negative reinforcers for pushing the snooze button. (Your button-pushing behavior has been strengthened because it removed an aversive event, the alarm.) Likewise, a regular smoker (*nicotine addict*) may be negatively reinforced for inhaling tobacco smoke (*dragging on a cigarette*) because doing so diminishes the pain (*pangs*) associated with going without the drug.

Page 329 . . . goofing off and getting a bad exam grade . . . Students may score poorly on an exam because they were doing something unproductive, such as watching TV, instead of studying (they were *goofing off*). As a consequence, they may decide to change their behavior and work hard to avoid further exam anxiety and the unpleasant possibility of getting a low grade. The new behavior may be strengthened if it avoids the aversive consequences of anxiety (negative reinforcement); in addition, getting a good score on the exam can positively reinforce good study habits. Remember, reinforcers of either kind (positive or negative) always strengthen behavior.

Page 330: . . . the *kick* that often comes within seconds [after taking drugs] . . . The term *kick* as used here refers to a jolt of pleasure (not as in "to kick the ball"). Myers is making the point that behaviors such as smoking, drinking, and drug taking, in general, are followed by some immediate pleasurable consequence, which controls the behavior more than does the delayed consequence (e.g., lung cancer, memory loss, cognitive impairment, or even a headache the next day [*a hangover in the morning*], etc.).

Page 331: A salesperson does not make a sale with every *pitch,* nor does an *angler* get a bite with every *cast*. The *pitch* referred to here is the sales talk (*pitch*) that the salesperson uses to promote the product or service. The bite the angler (fisherman) does not get refers to the fact that throwing out the line (*casting*) does not always result in fish biting the bait. The idea is that much of our behavior is not continuously reinforced but persists, nevertheless, by being partially reinforced (you make a sale or catch a fish only once in a while despite many responses). Thus,

intermittent rewards encourage the expectation of future reinforcement (*hope springs eternal*) and create greater resistance to extinction of the behavior compared to a continuous schedule.

Page 331: . . . paid on a piecework basis . . . This refers to situations in which someone is paid for the number of items produced (and not by the hour or the week). A worker gets paid only if he or she produces, so the number of responses (i.e., the number of items produced) is reinforced on a **fixed-ratio schedule**. An example would be factory worker sewing shirts who would be paid five dollars for each finished shirt (*piecework*). The more shirts she makes, the more money she earns, and thus the rate of responding is usually high.

Page 332: . . . fly fishing . . . This refers to a style of fishing in which artificial insects, such as flies, are used as bait to catch the fish. People who fly fish are reinforced only once in a while despite making many responses. This variable-ratio schedule of reinforcement makes the target behavior very persistent and hard to suppress (the behavior is very resistant to extinction) because ultimately the more responding, the more reinforcement.

Page 332: . . . a choppy stop-start pattern . . . When reinforcement is for the first response after a set time period (a **fixed-interval schedule**), responding is typically more frequent as the expected time for the reinforcer gets closer (*draws near*) and is much less frequent after the reward has been received. The pattern of responding is consequently uneven (*choppy*) because cycles of post-reinforcement pauses followed by higher levels of responding (a *stop-start pattern*) are characteristic of the fixed-interval schedule.

Page 332: . . . . "You've got mail" . . . E-mails can arrive at unpredictable times, so it is best to check on-line every once in a while if you are expecting an e-mail from someone. Slow, steady responding like this, typical of a **variable-interval schedule,** may be reinforced with the *"You've got mail"* announcement.

Page 332: . . . the child who *loses a treat* after running into the street . . . Here the phrase *"loses a treat"* refers to the withholding of some pleasant consequence such as a candy bar or piece of cake (appetitive stimulus) following some unwanted behavior. This is one type of punishment; it decreases the probability of the behavior being repeated. Another example is *time out*, in which the child is put in a situation (such as in the corner) in which no reinforcement is available.

Page 333: . . . drawbacks . . . This means problems or bad consequences. One problem (*drawback*) with using punishment is that the behavior may be temporarily suppressed in the presence of the punisher but may reappear in other, safer settings. In addition, punishment may elicit aggression, create fear and apprehension, and generate avoidance behavior in those being punished. As Myers notes, punishment teaches what not to do, whereas reinforcement teaches what to do.

Page 333: No wonder *spanking is a hit* with so many U.S. parents of 3- and 4-year-olds. . . . *Hit* has a number of meanings; it can mean to physically strike someone or something (*hit the ball*), but it can also mean to be popular (*to be a hit*). Parents who physically punish (*hit or swat*) their young children are negatively reinforced for doing so if the bad behavior is suppressed or eliminated. It is not surprising then that spanking (*hitting or swatting*) is popular (*it is a hit*) with so many parents.

Page 335: Actually, promising children a reward for a task they already enjoy can *backfire.* If children enjoy doing something because it is fun (intrinsic motivation), they may lose interest in the task if they are promised a reward for it (extrinsic motivation). Thus, in some circumstances offering material gains (a *payoff*) may have an effect opposite to the one expected (it can *backfire*). Applied properly, however, rewards can motivate high performance levels (*they fuel your efforts*), increase creativity, enhance enjoyment of tasks, and raise (*boost*) feelings of competence, especially if they suggest (*signal*) that a job was well done

Page 336: . . . piggy bank . . . This is a small container for saving money (usually coins) that is often in the shape of a pig. Children can learn to save their money by putting it in their *piggy bank*. However, as Myers points out, pigs who were trained to put big wooden coins in a large *piggy bank* soon reverted to their natural behavior of pushing the coins with their snouts (noses) despite the fact that they received no reward for doing this. This is an example of the biological constraints on learning. This example of *instinctive drift* illustrates the biological constraints on learning.

Page 336: . . . stirred a hornet's nest. . . . A hornet is a large yellow and black stinging insect belonging to the wasp family. Up to 200 hornets live together in a sheltered home (*nest*); if disturbed or agitated (*stirred*), they will attack in an angry and aggressive manner. B. F. Skinner aroused a great deal of anger

and hostility and was vehemently attacked by many people (*he stirred a hornet's nest*) for insisting that mental events and free will (internal events) were of little relevance as determinants of behavior compared to environmental factors such as rewards and punishments (external influences).

Page 338: . . . rule of thumb . . . This is a simple guide or principle that is true in general. Applying the principles of operant conditioning to economics, Al Gore noted that, as a general principle (*rule of thumb*), whatever is taxed tends to decrease and whatever is subsidized tends to increase.

Learning by Observation

Page 343: Compared with children not exposed to the adult model, those who observed the model's *aggressive outburst* were much more likely to *lash out* at the doll. Bandura's experiments on observational learning demonstrated that children who saw an adult engage in (*model*) violent behavior (an *aggressive outburst*) were more inclined to attack and beat up (*lash out at*) a Bobo doll and copy (*imitate*) the words and gestures used by the role model.

Page 344: Does the *reel world reflect the real world?* Traditionally motion pictures (*movies*) were projected on the screen from a large reel (*spool*) of film. Thus, the "reel" world referred to here is the fantasy world created by movie companies, TV networks, cable companies, etc. (*the media*). Myers notes that the actual (*real*) world is not accurately reflected in movies, TV shows, video games, cable programming, and so on (*the reel world*). Watching the excessive aggression and violence depicted in the media tends to be **correlated** with increased acceptance of aggressive attitudes, indifference to violent acts, and higher levels of antisocial behavior.