

UNIT 6: LEARNING

HOW DO WE LEARN?

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 **LEARNING**.
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 **ASSOCIATE** events that occur in sequence. Even simple animals, such as the sea snail *Aplysia*, can learn simple **ASSOCIATIONS** between stimuli. This type of learning is called **ASSOCIATIVE LEARNING**.
3. The type of learning in which the organism learns to associate two stimuli is **CLASSICAL** conditioning.
4. The tendency of organisms to associate a response and its consequence forms the basis of **OPERANT** conditioning.
5. Complex animals often learn behaviors merely by **OBSERVING** others perform them.

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 **IVAN PAVLOV**. Early in the twentieth century, psychologist **JOHN WATSON** urged psychologists to discard references to mental concepts in favor of studying observable behavior. This view, called **BEHAVIORISM**, influenced American psychology during the first half of that century.
2. In Pavlov's classic experiment, a tone, or **CONDITIONED STIMULUS**, is sounded just before food, the **UNCONDITIONED STIMULUS**, is placed in the animal's mouth.
3. An animal will salivate when food is placed in its mouth. This salivation is called the **UNCONDITIONED RESPONSE**.
4. Eventually, the dogs in Pavlov's experiment would salivate on hearing the tone. This salivation is called the **CONDITIONED RESPONSE**.

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 **ACQUISITION**. For many conditioning situations, the optimal interval between a neutral stimulus and the US is **ONE-HALF SECOND**.

6. When the US is presented prior to a neutral stimulus, conditioning **DOES NOT** (does/does not) occur.

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

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

OBJECTIVE 4: Summarize the process of extinction, spontaneous recovery, generalization, and discrimination.

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

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

12. Subjects can also be trained not to respond to **SIMILAR** stimuli. This learned ability is called **DISCRIMINATION**.
13. Being able to recognize differences among stimuli has **SURVIVAL** 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 **COGNITION** was unnecessary.
15. Experiments by Rescorla and Wagner demonstrate that a CS must reliably **PREDICT** the US for an association to develop and, more generally, that **COGNITIVE** processes play a role in conditioning. It is as if the animal learns to **EXPECT** 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 ALCOHOLISM.

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

17. Some psychologists once believed that any natural RESPONSE could be conditioned to any neutral STIMULUS.
18. Garcia discovered that rats would associate SICKNESS with taste but not with other stimuli. Garcia found that taste-aversion conditioning WOULD (would/would not) occur when the delay between the CS and US was more than an hour.
19. Results such as these demonstrate that the principles of learning are constrained by the BIOLOGICAL predispositions of each animal species and that they help each species ADAPT to its environment. They also demonstrate the importance of different LEVELS OF ANALYSIS 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 ADAPT to their environment.
21. Another aspect of Pavlov's legacy is that he showed how a process such as learning could be studied OBJECTIVELY.

Explain why the study of classical conditioning is important.

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.

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

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

Describe the Watson and Rayner experiment.

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

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

1. Classical conditioning associates NEUTRAL stimuli with stimuli that trigger responses that are AUTOMATIC. Thus, in the form of conditioning, the organism DOES NOT (does/does not) control the responses.
2. The reflexive responses of classical conditioning involve RESPONDENT behavior.
3. In contrast, behavior that is more spontaneous and that is influenced by its consequences is called OPERANT 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 LAW OF EFFECT as a starting point in developing a "behavioral technology." This principle states that REWARDED behavior is likely to RECUR.
5. Skinner designed an apparatus, called the SKINNER BOX, 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 SHAPING. This method involves reinforcing successive APPROXIMATIONS of the desired behavior.
7. In experiments to determine what an animal can perceive, researchers have found that animals are capable of forming CONCEPTS and DISCRIMINATING 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 DISCRIMINATIVE STIMULUS.

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

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

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 **__CONTINUOUS__ __REINFORCEMENT__**. Under these conditions, learning is **__RAPID__** (rapid/slow). When this type of reinforcement is discontinued, extinction is **__RAPID__** (rapid/slow).
16. The procedure in which responses are reinforced only part of the time is called **__PARTIAL(INTERMITTENT)__** reinforcement. Under these conditions, learning is generally **__SLOWER__** (faster/slower) than it is with continuous reinforcement. Behavior reinforced in this manner is **__VERY__** (very/not very) resistant to extinction.
17. When behavior is reinforced after a set number of responses, a **__FIXED__ - __RATIO__** 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 **__VARIABLE__ - __RATIO__** schedule is being used.

19. Reinforcement of the first response after a set interval of time defines the **__FIXED__ - __INTERVAL__** schedule. An example of this schedule is **__CHECKING THE MAIL AS DELIVERY TIME APPROACHES__**.
20. When the first response after varying amounts of time is reinforced, a **__VARIABLE__ - __INTERVAL__** schedule is in effect.

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

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, FOLLOVED, 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.

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 **__PUNISHMENT__**. If an aversive stimulus is administered, it is called **__POSITIVE__ __PUNISHMENT__**. If a desirable stimulus is withdrawn, it is called **__NEGATIVE__ __PUNISHMENT__**.
22. Because punished behavior is merely **__SUPPRESSED__**, it may reappear.
23. Punishment can also lead to **__FEAR__** and a sense of helplessness, as well as to the association of the aversive event with **__THE PERSON WHO ADMINISTERED IT__**.
24. Punishment also often increases **__AGGRESSIVENESS__** 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 **__COGNITIVE__** 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 **COGNITIVE** **MAP**.

27. Animals may learn from experience even when reinforcement is not available. When learning is not apparent until reinforcement has been provided, **LATENT** **LEARNING** is said to have occurred.
28. Excessive rewards may undermine **INTRINSIC** **MOTIVATION**, which is the desire to perform a behavior for its own sake. The motivation to seek external rewards and avoid punishment is called **EXTRINSIC** **MOTIVATION**.

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

29. Operant conditioning **IS** (is/is not) constrained by an animal's biological predispositions.
30. For instance, with animals it is difficult to use food as a **REINFORCER** to **SHAPE** behaviors that are not naturally associated with **FOOD**.
31. Biological constraints predispose organisms to learn associations that are naturally **ADAPTIVE**. When animals revert to their biologically predisposed patterns, they are exhibiting what is called "**INSTINCTIVE** **DRIFT**."

OBJECTIVE 18: Describe the controversy over Skinner's views of human nature.

32. Skinner's views were controversial because he insisted that **EXTERNAL** influences, rather than **INTERNAL** **THOUGHTS** and **FEELINGS**, shape behavior.
33. Skinner also advocated the use of **OPERANT** principles to influence people in ways that promote more desirable **BEHAVIOR**.
34. Skinner's critics argued that he **DEHUMANIZED** people by neglecting their personal **FREEDOM** and by seeking to **CONTROL** 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 **SHAPING** to education. On-line **TESTING** systems, software that is **INTERACTIVE**, and **WEB**-based learning are newer examples of this application of operant principles. Reinforcement principles can also be used to enhance **ATHLETIC** abilities by shaping successive approximations of new skills.
36. In boosting productivity in the workplace, positive reinforcement is **MORE** (more/less) effective

when applied to specific behaviors than when given to reward general merit and when the desired performance is well defined and **ACHIEVABLE**. For such behaviors, immediate reinforcement is **MORE** (more/no more) effective than delayed reinforcement.

37. Many economists and psychologists believe that people's spending behavior is controlled by its consequences (its **COSTS** and **BENEFITS**).
38. In using operant conditioning to change your own behavior, you would follow these four steps:
- STATE YOUR GOAL**
 - MONITOR THE BEHAVIOR (WHEN AND WHERE IT OCCURS)**
 - REINFORCE THE DESIRED BEHAVIOR**
 - REDUCE THE INCENTIVES TO PERFORM THE UNDESIRED BEHAVIOR**

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

39. Classical conditioning and operant conditioning are both forms of **ASSOCIATIVE** **LEARNING**.
40. Both types of conditioning involve similar processes of **ACQUISITION**, **EXTINCTION**, **SPONTANEOUS** **RECOVERY**, **GENERALIZATION**, and **DISCRIMINATION**.
41. Classical and operant conditioning are both subject to the influences of **COGNITIVE** processes and **BIOLOGICAL** predispositions.
42. Through classical conditioning, an organism associates different **STIMULI** that it does not **CONTROL** and responds **AUTOMATICALLY**.
43. Through operant conditioning, an organism associates its **OPERANT** **BEHAVIORS** with their **CONSEQUENCES**.

LEARNING BY OBSERVATION

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

- Learning by observing and imitating others is called **MODELING**, or **OBSERVATIONAL** **LEARNING**. This form of learning **OCCURS** (occurs/does not occur) in species other than our own.
- Neuroscientists have found **MIRROR** neurons in the brain's **FRONTAL** lobe that provide a neural basis for **OBSERVATIONAL** learning. These neurons have been observed to fire when monkeys perform a simple task and when they **OBSERVE OTHER MONKEYS PERFORMING THE SAME TASK**. This type of neuron **HAS** (has/has not) been found in human brains.

3. By age **9 MONTHS**, infants will imitate novel play behaviors. By age **14 MONTHS**, 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 **BANDURA**.
5. In one experiment, the child who viewed an adult punch an inflatable doll played **MORE** (more/less) aggressively than the child who had not observed the adult.
6. Bandura believes people imitate a model because of **REWARDS** and **PUNISHMENT**, those received by the model as well as by imitators.
7. These results may help explain why **ABUSIVE** parents might have **AGGRESSIVE** children. However, **GENETIC** factors may also be involved.

OBJECTIVE 23: Discuss the impact of prosocial modeling.

8. Children will also model positive, or **PROSOCIAL**, behaviors.
9. Models are most effective when they are perceived as **SIMILAR**, **SUCCESSFUL**, or **ADMIRABLE**. Models are also most effective when their words and actions are **CONSISTENT**.

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 **WATCHING TELEVISION** than they spend in school.
11. Compared to real-world crimes, television depicts a much higher percentage of crimes as being **VIOLENT** in nature.
12. Correlational studies **LINK** (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 **AGGRESSION** and **CRIME** as teens and adults.
14. Correlation does not prove **CAUSATION**. Most researchers believe that watching violence on television **DOES** (does/does not) lead to aggressive behavior.
15. The violence effect stems from several factors, including **IMITATION** of observed aggression and the tendency of prolonged exposure to violence to **DESENSITIZE** viewers.