Chapter 7 – Conditioning and Learning

Chapter Summary

Definitions

Learning is defined as a relatively permanent change in behavior due to experience.

A stimulus is anything that comes in through your senses. A response is anything that goes out through your muscles (anything you do). Habituation is a decrease in response to a repeated stimulus.

Overview

Classical conditioning: Ivan Pavlov, J. B. Watson; works on reflexes and emotional behaviors through the repeated pairing of two stimuli.

Operant conditioning: E. L. Thorndike, B. F. Skinner; works on all other behaviors by following a response with reinforcement or punishment.

Cognitive Learning: Albert Bandura; works on any observable behavior when people learn by observing the behavior of others.

Ivan Pavlov's classical conditioning

In classical conditioning we pair an unconditioned stimulus with a conditioned stimulus. The unconditioned stimulus elicits the unconditioned response before any conditioning has occurred. The conditioned stimulus elicits the conditioned response after conditioning has occurred. The period during which the response is being learned is called acquisition.

In J. B. Watson's and Rosalie Rayner's classic experiment with Little Albert, before the experiment began, the loud noise (unconditioned stimulus) elicited fear (unconditioned response). The loud noise (unconditioned stimulus) was paired with the rat (conditioned stimulus). After classical conditioning had occurred, the rat (conditioned stimulus) elicited fear (conditioned response).

If we present the conditioned stimulus over and over without the unconditioned stimulus, the response will grow weaker and disappear. This is called classical extinction. During extinction, the response will sometimes come back after a rest period. This is called spontaneous recovery.

After conditioning an animal to respond to a particular stimulus, the animal will also respond to other, similar stimuli. This is called generalization.

Sometimes, an animal will respond to one stimulus but not to another. We call this discrimination. We can also present one stimulus with the unconditioned stimulus and another stimulus without the unconditioned stimulus. Over time, the animal will learn to respond to the first one and not respond to the second one. This is called discrimination training.

When a person learns an emotional response through classical conditioning (such as learning to fear the sound of the dentist's drill), we call it a conditioned emotional response.

The technique of systematic desensitization is based on classical extinction and can be used to help overcome fears. Mary Cover Jones used this technique to help a boy called Peter overcome his fear of rabbits.

Psychologist Martin Seligman suggests that we are easily conditioned to fear things that were a threat to our ancestors, such as snakes and spiders. This is called biological preparedness.

Robert Rescorla's work suggests that conditioning sometimes works better if the stimulus is logically connected to the response.

Leon Kamin showed that a learned response in classical conditioning can prevent another response from being learned. He calls this process blocking.

John Garcia demonstrated that taste aversions can be learned through classical conditioning even when there is a long delay between the conditioned stimulus and the unconditioned stimulus. Garcia's process was used to teach coyotes not to eat sheep.

Thorndike and Skinner's operant conditioning

In operant conditioning, a response is followed by reinforcement or punishment.

E. L. Thorndike put cats in a "puzzle box." The cat had to work a lever to escape from the box. Thorndike believed that when the cat made the correct response, it was rewarded with escape and food. This reward, according to Thorndike, simply made the correct response a little more likely. Thorndike called this the law of effect.

B. F. Skinner used a similar technique but called it operant conditioning. He believed that behavior was modified when it was followed by reinforcement or punishment. In a typical Skinner box, animals receive food after performing some action. For example, a rat might get a food pellet after pressing a lever. The food serves as a reinforcer. A reinforcer is defined as anything that increases the frequency of the behavior it follows. Punishment is defined as anything that decreases the frequency of the behavior it follows.

In positive reinforcement, we reinforce a behavior by presenting something positive, such as food. In negative reinforcement, we reinforce a behavior by removing an unpleasant stimulus, such as shock. In positive punishment, we punish a behavior by presenting something negative, such as shock. In negative punishment, we punish a behavior by removing something positive, such as food. Notice that the words positive and negative don't have their usual meanings here. Positive means we're presenting something. Negative means we're taking something away.

In a powerful technique called shaping, we reinforce successive approximations to the desired behavior.

In operant extinction, we stop presenting the reinforcer. Without reinforcement, the behavior occurs less and less often and finally disappears. As in classical conditioning, we see spontaneous recovery in which the behavior reappears after a rest period. In operant extinction (unlike classical conditioning), it is common for the rate of the behavior to go up before it goes down and for emotional behavior to occur.

Kinds of reinforcers

Reinforcers that don't need to be learned, such as food, water, escape from pain, and the chance to engage in sex, are called primary reinforcers.

Reinforcers that involve the animals' senses, such as the opportunity to look out a window, are called sensory reinforcers.

Reinforcers that involve other people are called social reinforcers.

Learned reinforcers that get their power by being paired with primary reinforcers are called secondary reinforcers.

All-purpose reinforcers that have been paired with more than one primary reinforcer (such as money) are called generalized reinforcers.

The opportunity to engage in a high-frequency behavior can be used to reinforce a low-frequency behavior. This is called the Premack principle.

Non-contingent reinforcers are not directly related to the behavior that comes before them, they just happen to follow it. Behavior reinforced by non-contingent reinforcers is called superstitious behavior.

Generalization and discrimination

Animals trained with operant conditioning to respond to a particular stimulus will also make the response if we present a similar stimulus. This is called response generalization.

When an animal responds differently to two different stimuli, we call it discrimination. When we reinforce a response to one stimulus but not to another, the animal will learn to respond to the first but not to the second. This is called discrimination training.

A stimulus the lets an animal know that a response will be followed by reinforcement is called a discriminative stimulus. When the animal has learned to respond only when the discriminative stimulus is present, we say the response is under stimulus control.

Schedules of reinforcement

In a continuous schedule of reinforcement, the animal is reinforced for every response. When the animal is not reinforced for every response, it is on an intermittent schedule of reinforcement. In a ratio schedule, the animal is reinforced after a certain number of responses. If the number never changes, the animal is on a fixed ratio schedule. If it varies, the animal is

on a variable ratio schedule. On an interval schedule, a certain interval of time must pass before the animal can receive another reinforcement. If the interval never changes, the animal is on a fixed interval schedule. If the time interval varies, the animal is on a variable interval schedule. Animals generally work harder under ratio schedules.

Punishment

Punishment is often ineffective. To be effective, it should be immediate, consistent, brief, and aversive. Even when it works, punishment has many negative side effects. It can cause anxiety and emotional behavior and it can lower self-esteem. It provides poor feedback and sometimes suppresses behaviors rather than eliminating them. It causes escape and avoidance behavior. It can also cause aggressive behavior and serve as a model for violent behavior.

Prisons are unlikely to be an effective way to change behavior because the punishment they provide is not immediate, consistent, or brief. It may also not be aversive.

Cognitive learning

Cognitive psychology developed when psychologists tried to give scientific explanations of complex human behaviors like language, memory, and problem solving.

In vicarious conditioning, people learn emotional responses by watching others undergo conditioning.

A cognitive map is a mental image of an animal's environment that the animal can use to guide its movements.

Latent learning is learning that occurs in the absence of obvious reinforcers and only appears after reinforcement is introduced.

Albert Bandura is known for his research on modeling, in which people learn by imitating the behavior of others. Modeling research suggests that watching violence in movies, on television, and in video games, makes people more violent.

Short Answer Self-Test

Use the following answers to fill the blanks in this section:

aversion	generalization	reinforcer	superstitious
classical	modeling	shaping	Thorndike
conditioned	operant	Skinner	unconditioned
discrimination	permanent	spontaneous	vicarious
extinction	primary	stimulus	

1. Learning is a relatively _____ change in behavior due to experience.

2. A _____ is anything that comes in through your senses.

3. In _____ conditioning, we pair the conditioned and unconditioned stimuli.

4. In _____ conditioning, we follow a response with reinforcement or punishment.

5. Repeated presentation of the conditioned stimulus without the unconditioned stimulus is called classical _____.

6. After classical conditioning the conditioned stimulus elicits the _____ response.

7. Recovery of a response after a rest period is called _____ recovery.

8. In the experiment with Little Albert, his fear of the loud noise was the _____ response.

9. When an animal is trained on one stimulus and responds to a similar stimulus, we call it _____.

10. John Garcia is known for his work on taste _____.

11. E. L. _____ put cats in puzzle boxes.

12. B. F. _____ first used the term "operant conditioning."

13. A _____ is anything that increases the frequency of the behavior it follows.

14. In _____ we reinforce successive approximations to the desired behavior.

15. Secondary reinforcers get their power by being paired with _____ reinforcers.

16. Behavior reinforced by non-contingent reinforcers is called _____ behavior.

17. When an animal responds differently to two different stimuli, we call it _____.

18. In _____ conditioning, people learn emotional responses by watching what happens to someone else.

19. Albert Bandura is known for his research on _____.

Multiple-Choice Practice Test

1. Which of the following is known for his research on modeling?
   a. Albert Bandura
   b. Ivan Pavlov
   c. E. L. Thorndike
   d. B. F. Skinner

2. The period during which a response is being learned is called _____.
   a. generalization
   b. discrimination
   c. acquisition
   d. extinction

3. Before conditioning has started, the unconditioned stimulus elicits the _____.
   a. unconditioned stimulus
   b. conditioned stimulus
   c. unconditioned response
   d. conditioned response

4. When a response bounces back after a rest period, it's called _____.
   a. shaping
   b. extinction
   c. spontaneous recovery
   d. discrimination training

5. In _____ we present one stimulus with the unconditioned stimulus and another without it.
   a. systematic desensitization
   b. discrimination training
   c. classical extinction
   d. acquisition

6. Being easily conditioned to fear things that were a threat to our ancestors, such as snakes and spiders is called biological _____.
   a. preparedness
   b. aversion
   c. discrimination
   d. generalization

7. _____ is known for his research on taste aversion.
   a. Leon Kamin
   b. John Garcia
   c. J. B. Watson
   d. Robert Rescorla

8. _____ proposed the "law of effect."
   a. Ivan Pavlov
   b. J. B. Watson
   c. E. L. Thorndike
   d. B. F. Skinner

9. Anything that decreases the frequency of the behavior it follows is called _____.
   a. a conditioned stimulus
   b. a conditioned response
   c. reinforcement
   d. punishment

10. In operant extinction, we stop presenting the _____
   a. unconditioned stimulus
   b. conditioned stimulus
   c. reinforcer
   d. stimulus

11. Reinforcers that don't need to be learned such as food and water are called _____ reinforcers.

a. learned
b. sensory
c. secondary
d. primary

12. Money is an example of a _____ reinforcer.

a. primary
b. tertiary
c. generalized
d. Premack

13. Superstitious behavior is reinforced by _____ reinforcers.

a. primary
b. secondary
c. non-contingent
d. Premack

14. A stimulus the lets an animal know that a response will be followed by reinforcement is called a _____ reinforcer.

a. discriminative
b. Premack
c. intermittent
d. generalized

15. On a(n) _____ schedule of reinforcement, the animal is reinforced after every response.

a. ratio
b. continuous
c. interval
d. intermittent

16. A _____ is a mental image of an animal's environment that the animal can use to guide its movements.

a. cognitive map
b. latent schema
c. vicarious representation
d. model

17. _____ learning is learning that occurs in the absence of obvious reinforcers.

a. discriminative
b. modeled
c. latent
d. pre-cognitive

18. Modeling is most closely related to _____.

a. generalization
b. shaping
c. extinction
d. imitation

Short Answer Self-Test - ANSWERS

1. permanent
2. stimulus
3. classical
4. operant
5. extinction
6. conditioned
7. spontaneous
8. unconditioned
9. generalization
10. aversion
11. Thorndike
12. Skinner
13. reinforcer
14. shaping
15. primary
16. superstitious
17. discrimination
18. vicarious
19. modeling

Multiple-Choice Practice Test - ANSWERS

1. a
2. c
3. c
4. c
5. b
6. a
7. b
8. c
9. d
10. c
11. d
12. c
13. c
14. a
15. b
16. a
17. c
18. d

Flash Cards

classical conditioning	Pavlov; reflexes & emotional behaviors; repeated pairing of two stimuli
operant conditioning	Thorndike & Skinner; following behavior with reinforcement of punishment
Cognitive learning	Bandura; learning by observing the behavior of others
Little Albert	learned to fear a rat when Watson paired the rat with a loud noise
unconditioned stimulus	stimulus that elicits the unconditioned response
conditioned stimulus	paired with the unconditioned stimulus; produces the conditioned response
unconditioned response	elicited by the unconditioned stimulus
conditioned response	elicited by the conditioned stimulus
classical extinction	presentation of the conditioned stimulus without the unconditioned stimulus
spontaneous recovery	when a response undergoing extinction bounces back after a rest period.
generalization	after training on one stimulus, responding to a similar stimulus
discrimination	responding differently to two different stimuli

conditioned emotional response	an emotional response learned through classical conditioning
systematic desensitization	an operant technique for reducing fear; based on classical extinction
biological preparedness	Martin Seligman's idea that we easily learn to fear threats to our ancestors
Robert Rescorla	said conditioning works best when stimulus is connected to response
Leon Kamin	discovered "blocking" of one stimulus by another
John Garcia	discovered taste aversion
taste aversion	classically conditioned distaste for certain foods if they are followed by illness
E. L. Thorndike	Put cats in "puzzle boxes"; proposed "law of effect"
B. F. Skinner	coined the term "operant conditioning"
reinforcer	anything that increases the frequency of the behavior it follows
punishment	anything that decreases the frequency of the behavior it follows
positive reinforcement	reinforcing behavior by presenting something pleasant
negative reinforcement	reinforcing behavior by removing something unpleasant

positive punishment	punishing behavior by presenting something unpleasant
negative punishment	punishing behavior by removing something pleasant
shaping	reinforcing successive approximations to the desired behavior
operant extinction	response weakens because it is not followed by a reinforcer
primary reinforcer	unlearned reinforcer like food and water
secondary reinforcer	reinforcer that gets its power by being paired with a primary reinforcer
generalized reinforcer	reinforcer paired with several different primary reinforcers; good any time
sensory reinforcer	reinforcer involving the animal's senses
social reinforcer	reinforcer involving other people
David Premack	developed the Premack principle
non-contingent reinforcers	reinforcers not directly related to the behavior they follow; accidental
superstitious behavior	behavior reinforced by non-contingent reinforcers
continuous schedule	animal is reinforced for every response

intermittent schedule	animal is not reinforced for every response
fixed ratio schedule	animal is reinforced after a certain number of responses; number is fixed
variable ratio schedule	animal is reinforced after a certain number of responses; number varies
fixed interval schedule	animal is reinforced after a certain time interval; interval is fixed
variable interval schedule	animal is reinforced after a certain time interval; interval varies
punishment (best if)	immediate, consistent, brief, aversive
punishment (side effects)	anxiety, emotion, low self-esteem, bad feedback, aggression, escape, avoidance
vicarious conditioning	conditioning in which people learn by watching the conditioning of others
cognitive map	mental image of an animal's environment
latent learning	learning that occurs in the absence of obvious reinforcers
Albert Bandura	known for his research in modeling
modeling	learning by imitating others