PSYCHOLOGY

Learning

Objectives

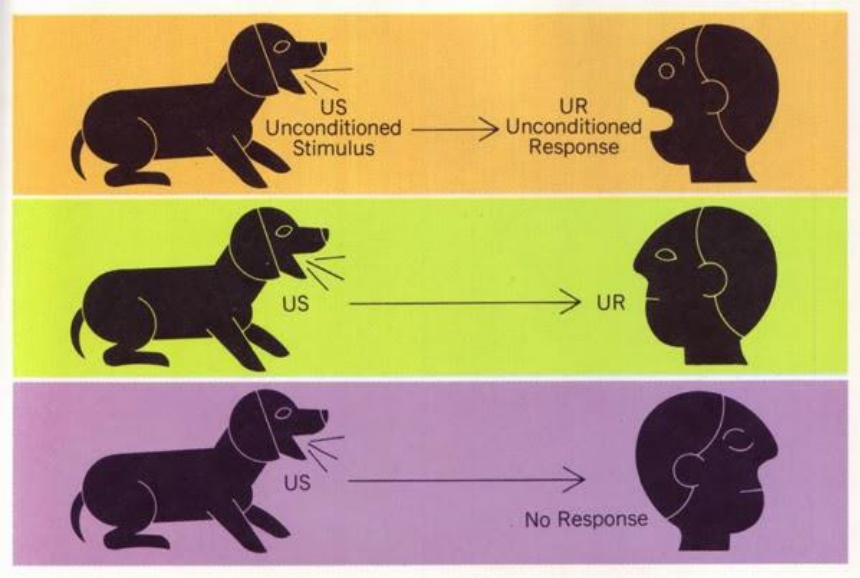
- Define learning
- Classify types of learning
- Illustrate difference between classical and operant conditioning
- Describe various types of operant conditioning (positive reinforcement, negative reinforcement and punishing)

Learning

- It is a permanent change in **knowledge** or **behavior** that is the result of experience
- Experience is the key to learning

Types of Learning

- **Associative learning** involves a connection between two elements or events.
  - Classical conditioning
  - Operant conditioning
- **Nonassociative learning** involves change in the magnitude of response to environmental events.
  - Habituation
  - Sensitization



Habituation

Habituation *is a decrease in the strength of response to a repeated stimulus*.

Habituation

- The response to steady or repeated (harmless) stimulus decreases over time.
- Example: You don't hear your air conditioner after it's been running awhile.

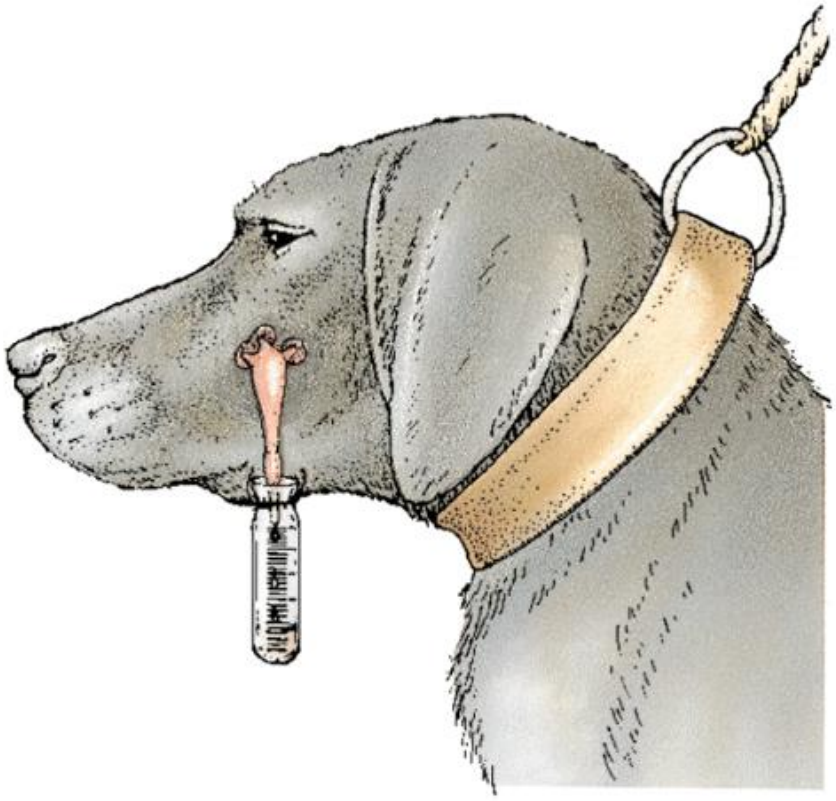
Sensitization

- Sensitization is a non-associative learning process in which repeated administration of a stimulus results in the progressive amplification of a response.

- Example:

  If you have ever burnt one on your fingers you might have noticed that if you run your hands under warm water, your burnt finger will hurt, even if it is the day after you burnt it. The warm water normally does not cause any pain, but after burning your finger, it is sensitized. Now the warm water causes pain.

Classical or Pavlovian Conditioning



Pavlov's device for recording salivation

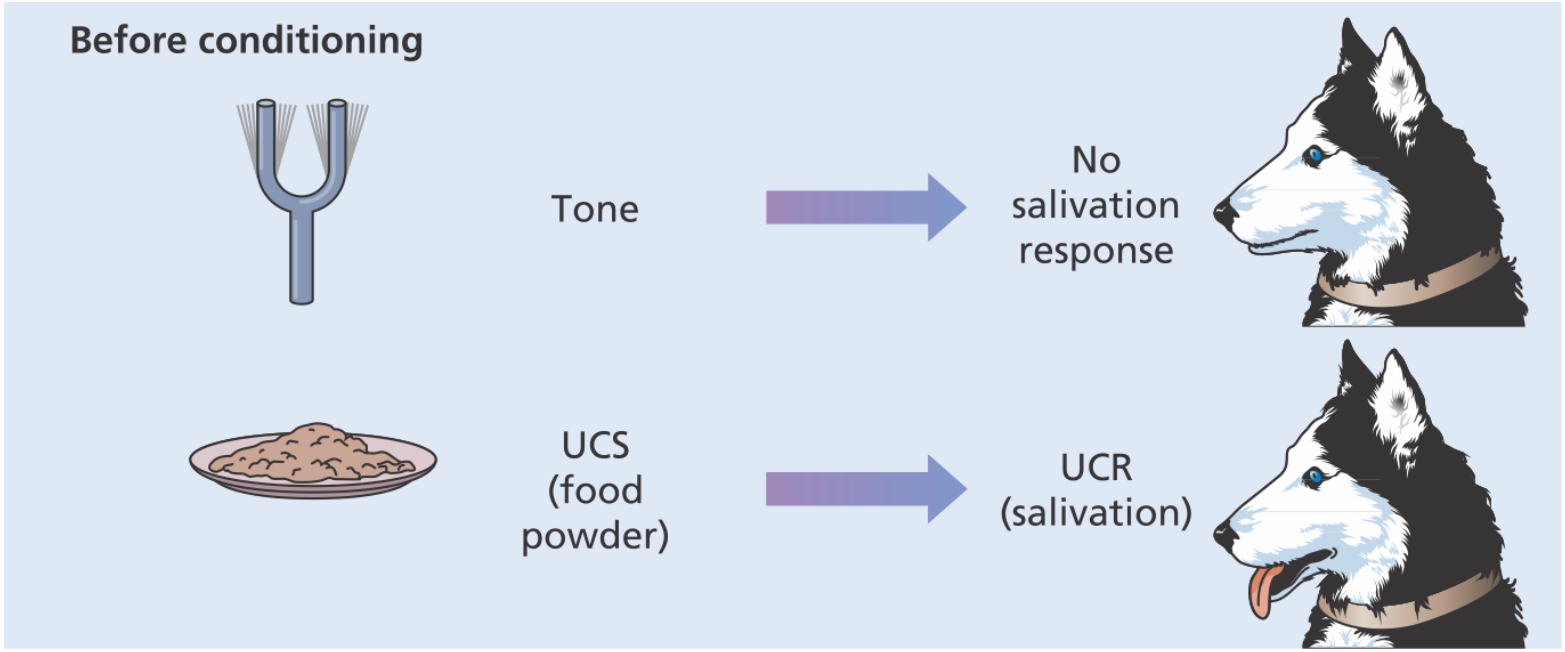
- Discovered by Russian physiologist Ivan Pavlov

Classical conditioning

- *In* **classical conditioning,** *an organism learns to associate two stimuli.*
- **Classical conditioning is a** *process by which a* ***neutral stimulus*** *(CS) comes to be associated with* ***another stimulus*** *(UCS) that elicits a response (UCR)*
- After the association is learned, the previously neutral stimulus is sufficient to *elicit the response.*

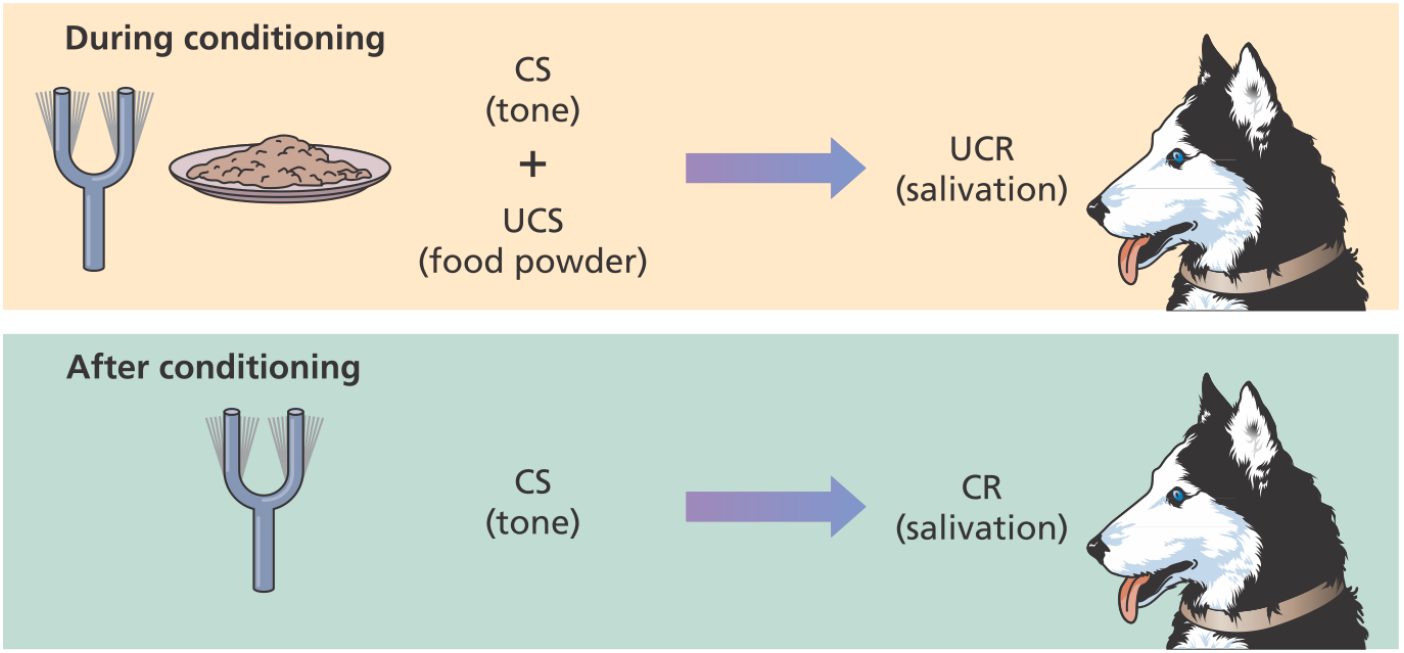
Sequence in Conditioning

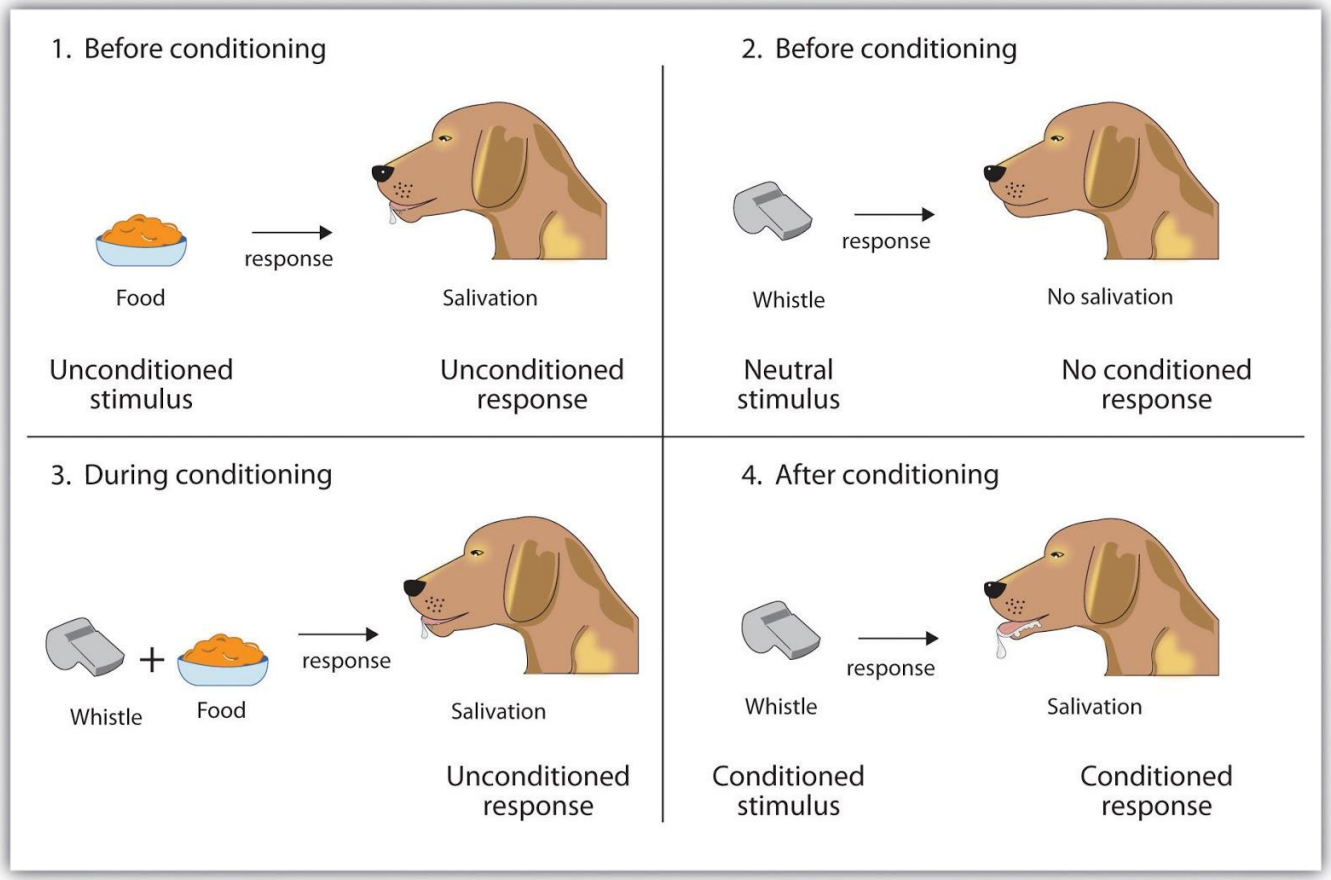
- Initially the neutral stimulus elicits no response.
- **Unconditioned stimulus (**UCS) elicits reflexive **unconditioned response** (UCR)



Sequence in Conditioning

- after a neutral stimulus such as a tone is repeatedly associated with food (unconditioned stimulus), the tone becomes a conditioned stimulus capable of eliciting a salivation response (conditioned response).




1. Before conditioning
response
Food
Salivation
Unconditioned stimulus
Unconditioned response
2. Before conditioning
response
Whistle
No salivation
Neutral stimulus
No conditioned response
3. During conditioning
response
Whistle
Food
Salivation
Unconditioned response
4. After conditioning
response
Whistle
Salivation
Conditioned stimulus
Conditioned response

Classical or Pavlovian Conditioning

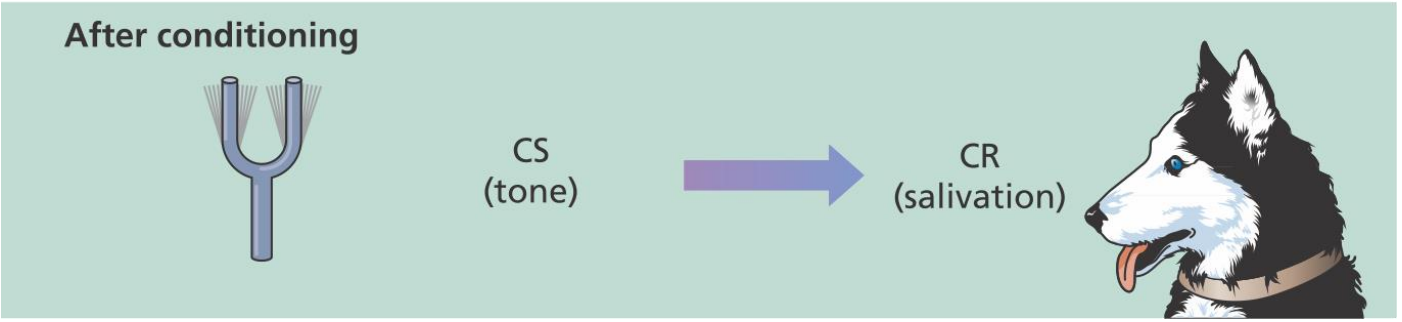
Unconditioned Stimulus (UCS)	Effective stimulus that unconditionally- automatically and naturally- triggers a response
Unconditioned Response (UCR)	Unlearned, naturally occurring automatic response to the unconditioned stimulus e.g. Salivation when food is in the mouth

UCS (food powder)

UCR (salivation)

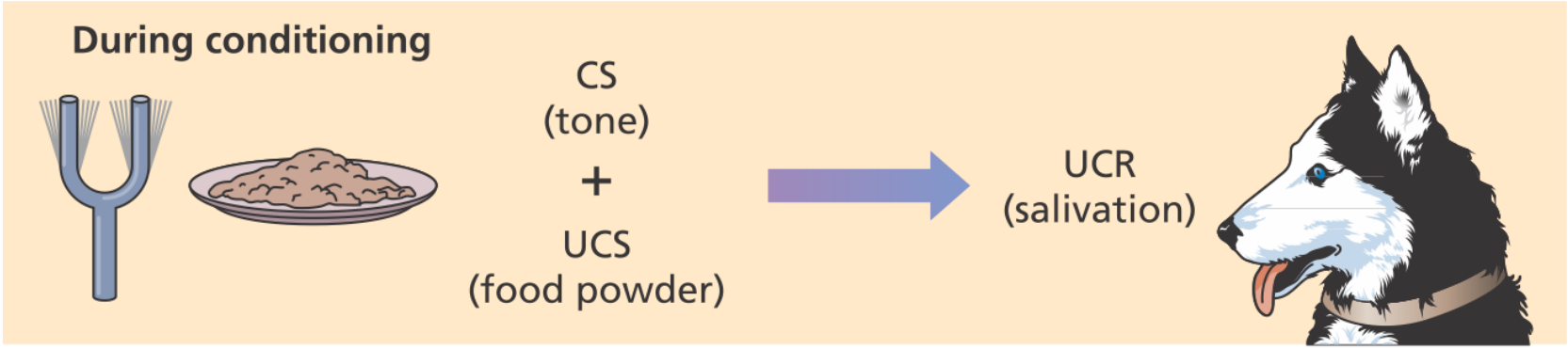
Classical or Pavlovian Conditioning

Conditioned Stimulus (CS)	• Conditioned stimulus (CS) is a once neutral stimulus. • After being repeatedly presented prior to the unconditioned stimulus, the neutral stimulus evokes a similar response as the unconditioned stimulus. • The once neutral stimulus is now called a conditioned (learned) stimulus.
Conditioned Response (CR)	The acquired response to the formerly neutral stimulus.



Acquisition

- *Acquisition* refers to the period during which a response is being learned.
- During acquisition, repeated pairing of neutral stimulus with UCS is done
- Learning has occurred when the neutral stimulus alone elicit CS

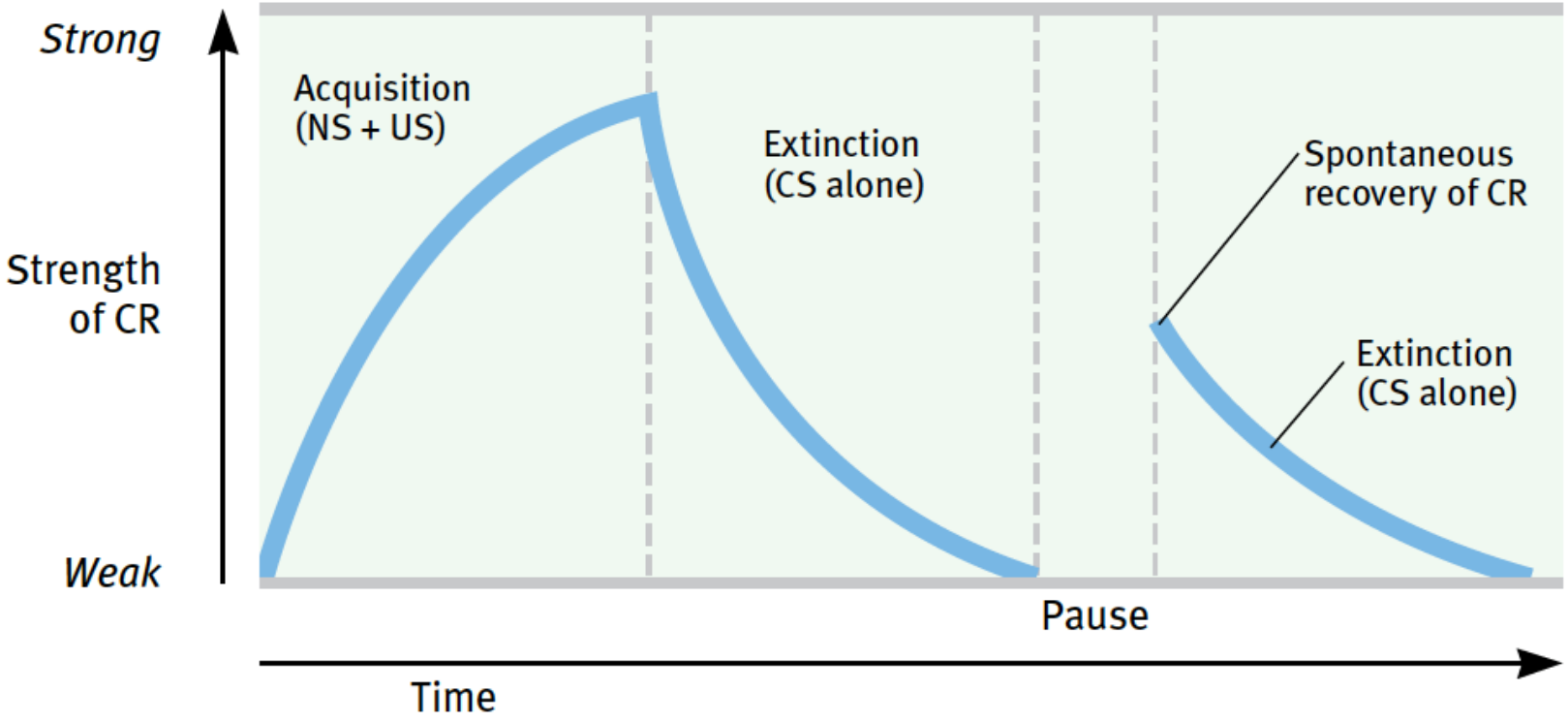


Extinction and Spontaneous recovery

- Extinction is when the occurrences of a conditioned response decreases or disappears.
- In classical conditioning, this happens when a conditioned stimulus is no longer paired with an unconditioned stimulus.
- **Extinction** *is a process in which the CS is presented repeatedly in the absence of the UCS, causing the CR to weaken and eventually disappear*.

- Spontaneous recovery**,** *the reappearance of a previously extinguished CR after a rest period and without new learning trials*.
- Spontaneously recovered CR usually is weaker than the initial CR and extinguishes more rapidly in the absence of the UCS.

Extinction and Spontaneous recovery



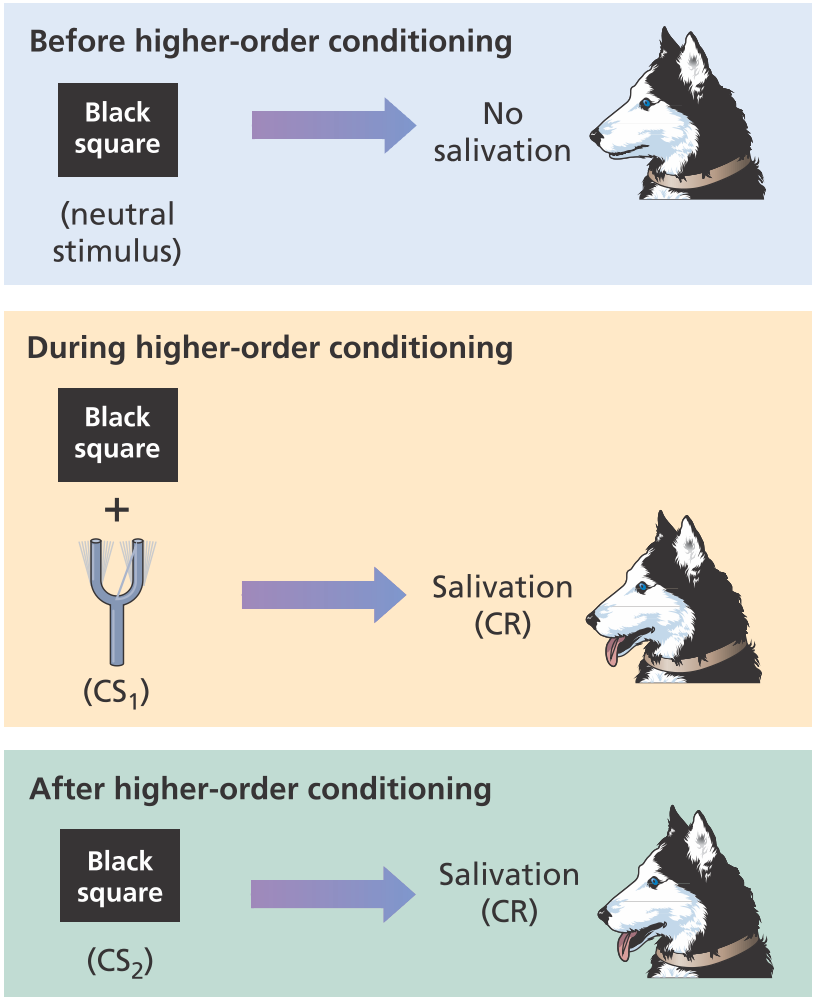
Generalization and Discrimination

- **Stimulus generalization:**
  - The tendency to respond to stimuli that resemble the original conditioned stimulus.
  - *Stimuli similar to the initial CS elicit a CR.*

- **Discrimination:**
  - The ability to differentiate between a **conditioned stimulus** (CS) and **other stimuli** that have not been paired with an unconditioned stimulus.
  - *CR occurs to one stimulus (CS) but not to others.*

Second-order Conditioning

- Conditioned stimulus can serve as an unconditioned stimulus when pairing with a new conditioned stimulus—a process known as second-order conditioning.



Second-order Conditioning

- In one of Pavlov's studies, He first conditioned the dogs to salivate to a sound. → The sound becomes a CS that elicits a strong salivation response.
- Then, he repeatedly presented a black square just prior to the tone, but did not present any food.
- Eventually, he found that the dogs would salivate at the sight of the black square alone, even though it had never been directly associated with the food.
- The square had become a CS and elicited salivation by itself

Application of classical conditioning: Acquiring and Overcoming Fear (phobia)

- At least some fears are conditioned
- **Exposure therapies,** *can be used to treat phobias*
  - **In exposure therapies,** *a patient is exposed to a stimulus (CS) that arouses an anxiety response (such as fear) without the presence of the UCS, allowing extinction to occur*.
  - Mental imagery, real-life situations, or both can be used to present the phobic stimulus.

Application of classical conditioning: Conditioned attraction

- Advertising executives carefully link **their products** to attractive and famous people, humor, and pleasurable interactions with family, friends, and the opposite sex.
- Marketing experiments show that the products become conditioned stimuli that elicit favorable consumer attitudes

Operant Conditioning

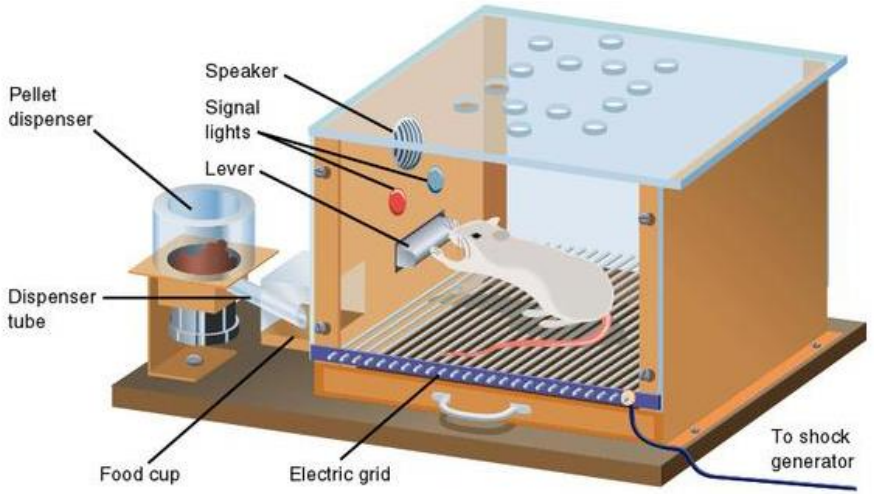
- We learn to associate a response and its consequence

Operant conditioning

- ***It*** *is a type of learning in which behavior is influenced by the* ***consequences*** *that follow it*

Skinner box

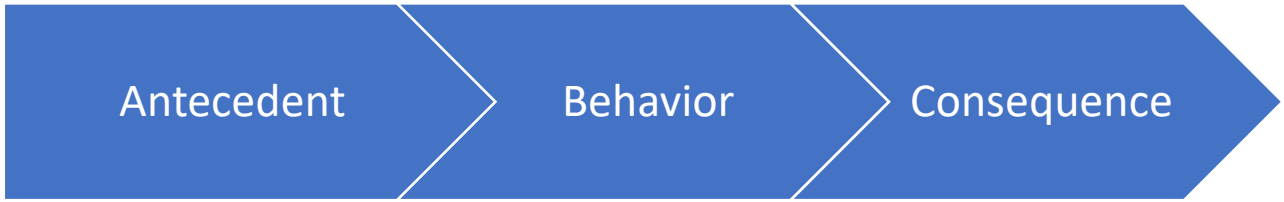
- Special box designed by Skinner
- **Skinner box,** is *a special chamber used to study operant conditioning experimentally*.



Operant conditioning

Operant behavior has three events:

- ***Antecedents***, which are stimuli that are present before a behavior occurs
- ***Behaviors*** that the organism emits
- ***Consequences*** that follow the behaviors



Operant Conditioning

Reinforcer (المؤكد): any event that strengthens the behavior it follows.

- Food pellets are reinforcers because they increase the rat's frequency of lever pressing.

Operant Conditioning

Reinforcement, refers to **any event** that increase the likelihood of a behavior.

Operant Conditioning

Punishment, refers to **any event** that weakens or reduces the likelihood of a behavior.

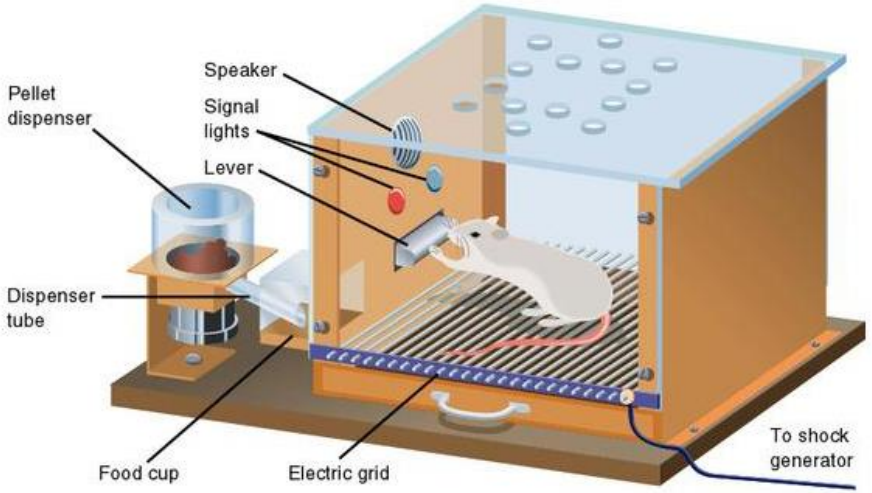
Positive Reinforcement

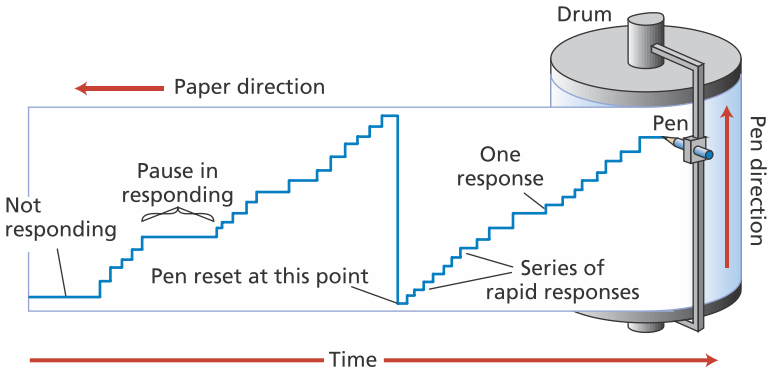
- **Positive reinforcement** *occurs when a response is* ***strengthened*** *by the subsequent* ***presentation*** *of a stimulus*.
  - A new employee, praised by her boss for completing a small project quickly, begins to complete more of her projects on time.

- The stimulus that follows and strengthens the response is called a ***positive reinforcer***.
  - Food, drink, attention, praise, and money are common positive reinforcers.

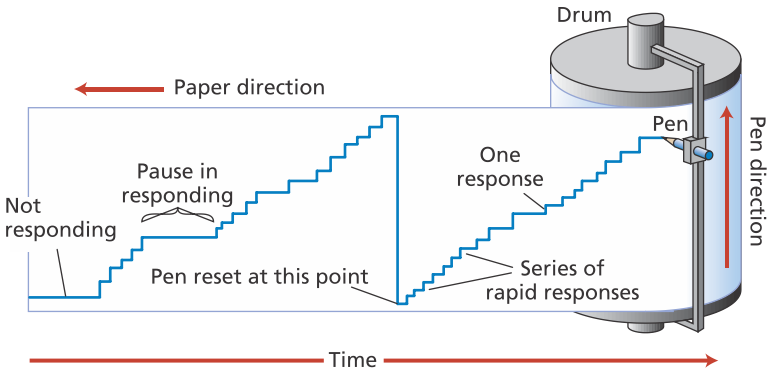
Skinner box - positive Reinforcement

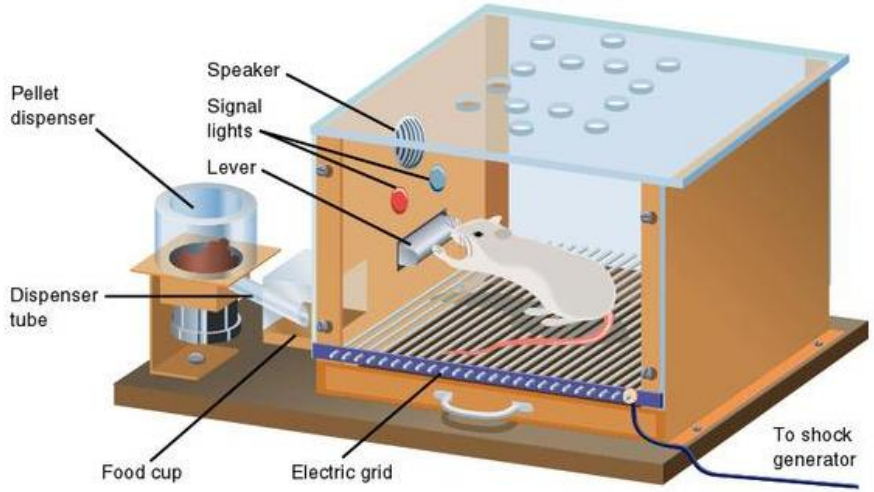
- A hungry rat is put into the chamber.
- When a lever is pressed, a food pellet automatically drops in the box.
- A rat receives food pellets when it presses a lever and eventually begins to press the lever more often.





Skinner box - positive Reinforcement





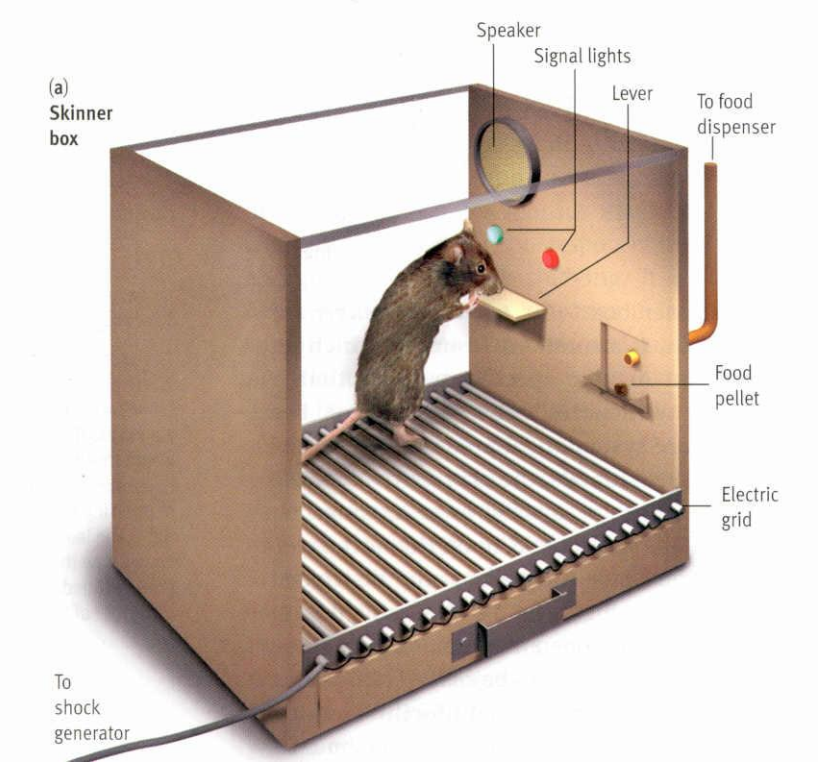
	Behavior	Consequence	Result
Positive Reinforcement	Response occurs	A stimulus is presented	Response increases
	(Rat presses a lever)	(Food pellets appear)	(Lever pressing increases)

Negative Reinforcement

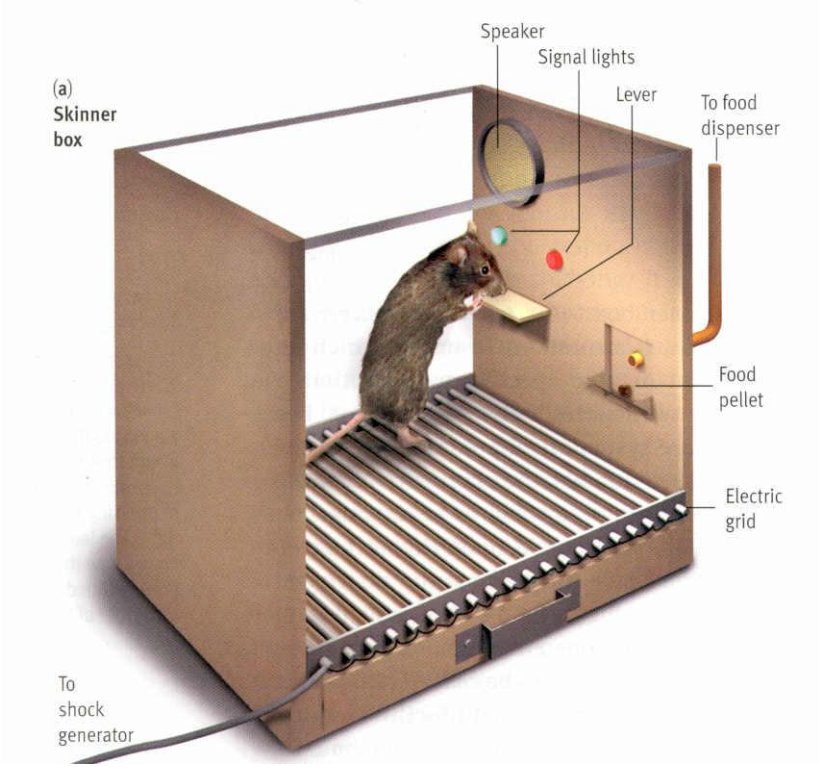
- *A response is **strengthened** by the subsequent **removal** (or avoidance) of an aversive stimulus*
- The aversive stimulus that is removed is called a *negative reinforcer*

Negative Reinforcement

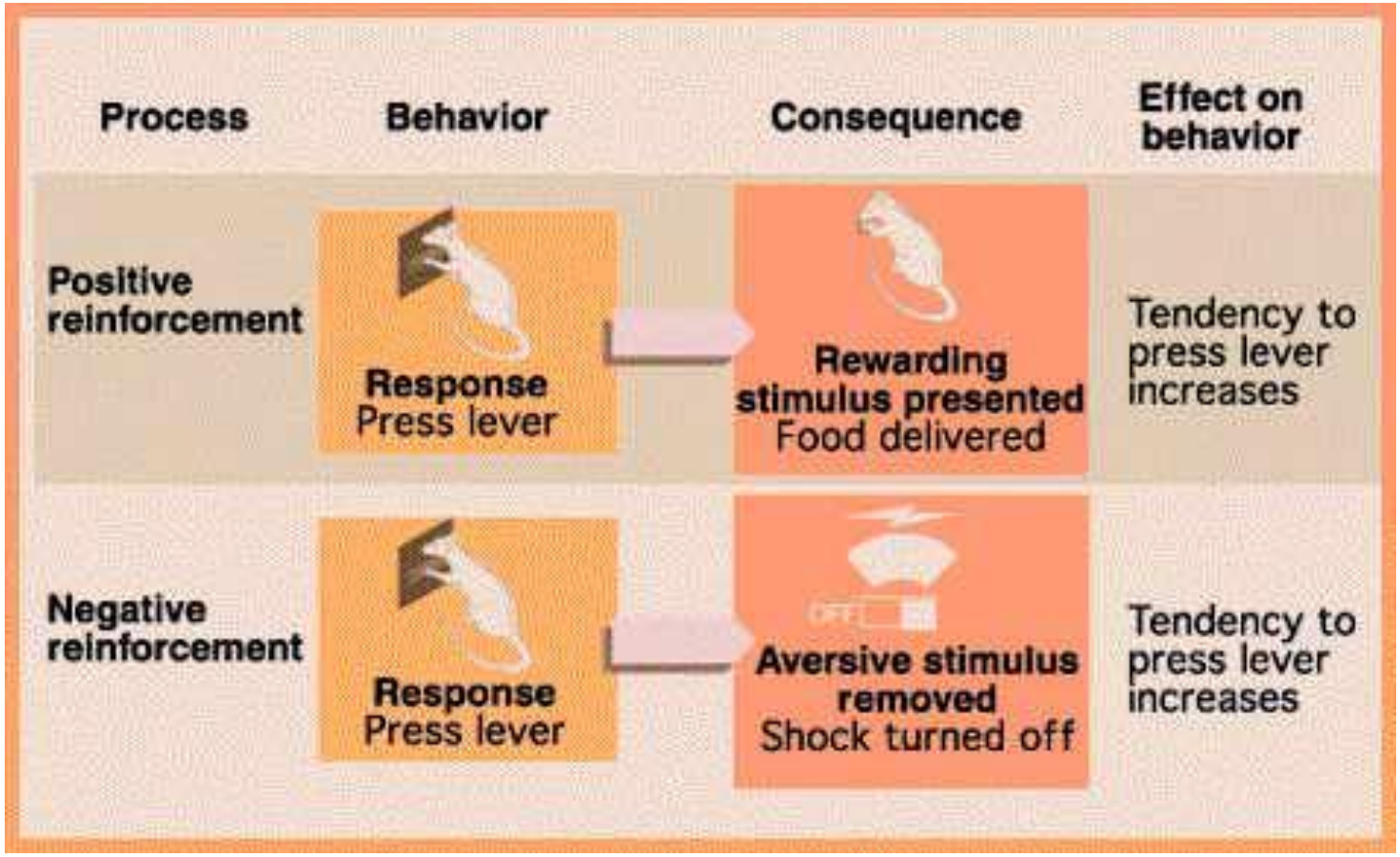
- Skinner placed a rat in his Skinner box and then subjected it to an unpleasant electric current.
- Electric current would be switched off by pressing a lever
- The rats quickly learned to go straight to the lever after a few times of being put in the box.



Negative Reinforcement



	Behavior	Consequence	Result
Negative Reinforcement	Response occurs	An aversive stimulus is removed	Response increases
	(Rat presses a lever)	(electric current is switched off)	(lever pressing increase)


Process
Behavior
Consequence
Effect on behavior
Positive reinforcement
Response
Press lever
Rewarding stimulus presented
Food delivered
Tendency to press lever increases
Negative reinforcement
Response
Press lever
Aversive stimulus removed
Shock turned off
Tendency to press lever increases

Punishment

- Event that decreases the behavior that it follows (in contrast to reinforcement)
- Powerful controller of unwanted behavior

	Behavior	**Consequence**	**Result**
Punishment	Response occurs	An aversive stimulus is presented	Response decreases
	(Two siblings fight over a toy)	(Parents scold them)	(fighting decreases)

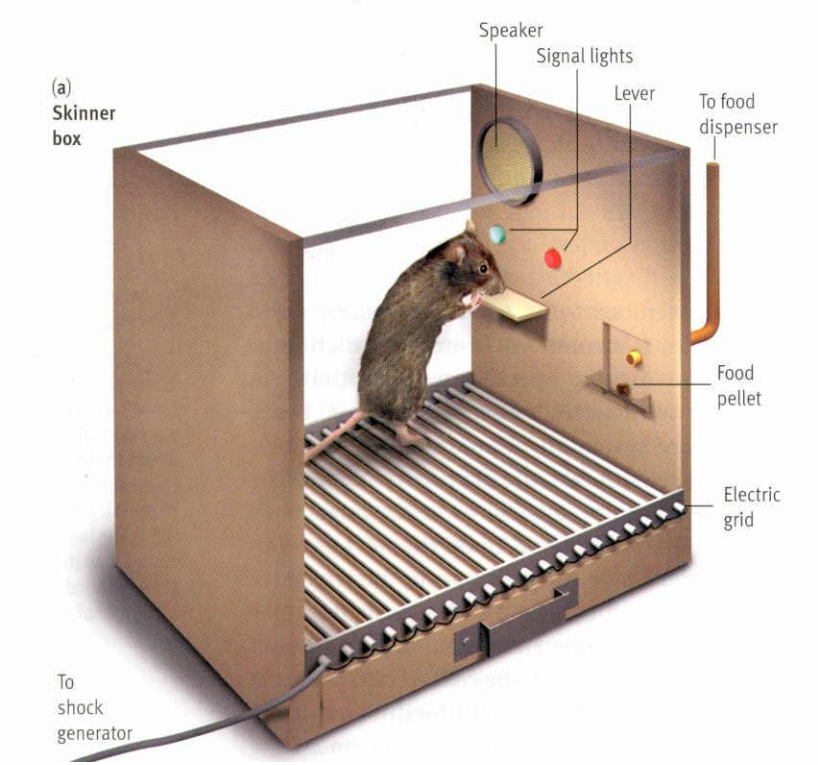
Punishment

Do not confuse negative reinforcement with punishment.

- Punishment weakens a response.
- Reinforcement—whether positive or negative— strengthens a response

Punishment Example: Skinner box.

- Pressing the lever delivers a brief electric shock rather than food.
- The electric shock represents a *punisher,* a consequence that weakens the behavior.
- The rat learns to **avoid** pressing the lever.



Punishment

- Positive punishment:
  - **Add** noxious stimulus following behavior
  - Example → Spanking child for cursing
- Negative:
  - **Remove** appetitive stimulus following behavior
  - Example: telling child to go to his room for cursing.

Problems with Punishment

1. Punished behavior is not forgotten

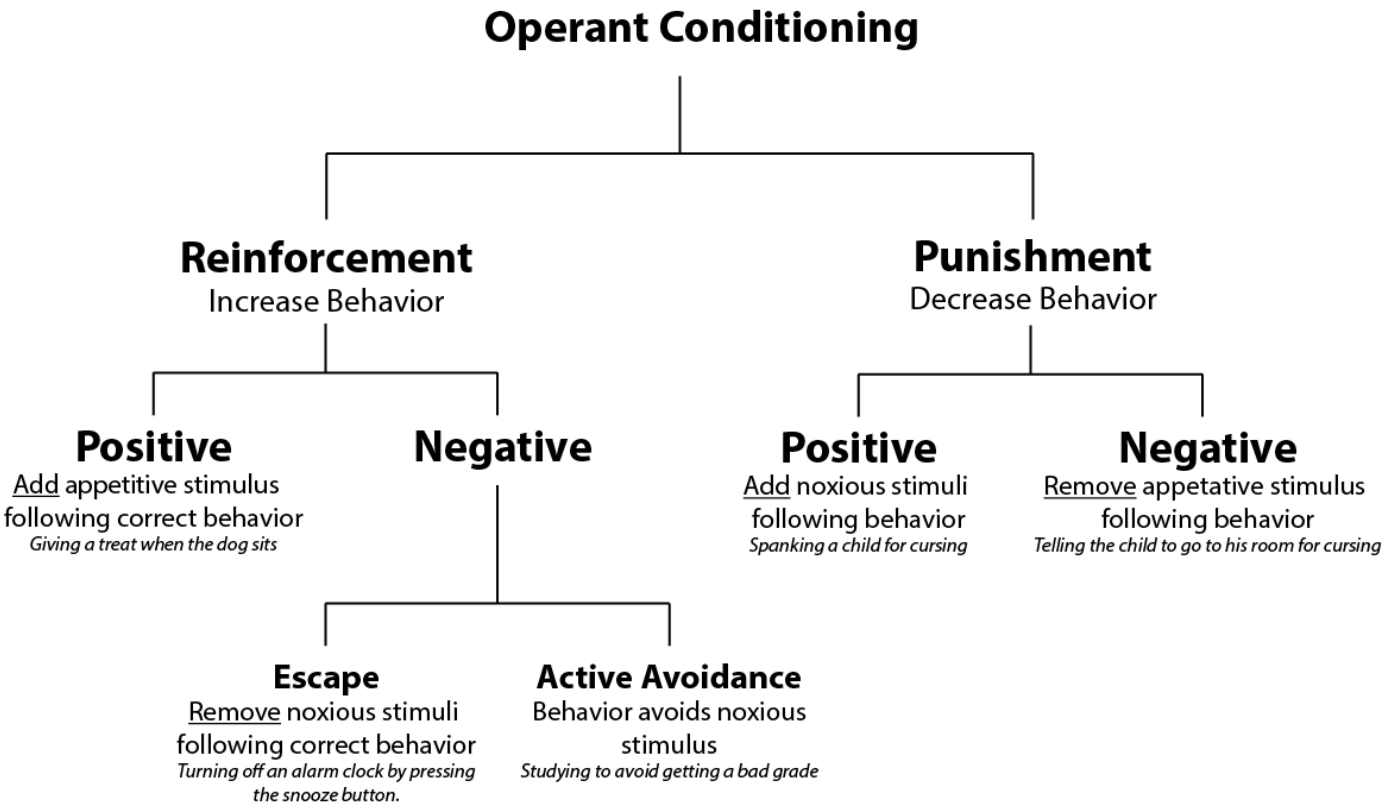
   it's suppressed- behavior returns when punishment is no longer done.

2. Causes increased aggression-

   shows that aggression is a way to cope with problems.

Problems with Punishment

3. Creates fear that can generalize to desirable behaviors, e.g. fear of school, learned helplessness, depression.
4. Does not necessarily guide toward desired behavior- reinforcement tells you what to do--punishment tells you what not to do- Combination of punishment and reward can be more effective than punishment alone.



Postive presence of a stimulus

Negative absense of a stimulus

Reinforcement increases behavior

Punishment decreases behavior

Escape removes a stimulus

Avoidance prevents a stimulus

Operant Extinction

- **Operant extinction** *is the weakening and eventual disappearance of a response because it is no longer reinforced*.

- In skinner box experiment, If pressing a lever no longer results in food pellets, the rat will eventually stop making this response.

	Behavior	**Consequence**	**Result**
Punishment	Response occurs	A stimulus that was reinforcing the behavior no longer appears	Response decreases
	(Rat presses a lever)	(No food pellets)	(Lever pressing decreases)

Quizzes

_____ is defined as: the response to steady or repeated (harmless) stimulus decreases over time

A. Habituation
B. Negative reinforcement
C. Punishment
D. Sensitization

What of the following is not considered associative learning?

A. Sensitization
B. Positive reinforcement
C. Negative reinforcement
D. Operant conditioning
E. Classical conditioning

What is positive reinforcement?

A. Any consequence where something unpleasant is taken away
B. Any consequence where something pleasurable is added
C. Any consequence where something pleasant is taken away
D. A classical conditioning technique

What is negative reinforcement

A. Any consequence where something unpleasant is taken away
B. Any consequence where something pleasurable is added
C. Any consequence where something pleasant is taken away
D. A classical conditioning technique

What is punishment

A. Any consequence which makes behavior unlikely to reoccur in the future
B. Any consequence which makes behavior likely to reoccur in the future
C. Any consequence where something pleasurable is added
D. A classical conditioning technique

What is reinforcement

A. Any consequence which makes behavior unlikely to reoccur in the future
B. Any consequence which makes behavior likely to reoccur in the future
C. Any consequence where something pleasurable is added
D. A classical conditioning technique

In classical conditioning, the acquired response to the formerly neutral stimulus is _____

A. unconditioned stimulus
B. conditioned stimulus
C. unconditioned response
D. conditioned response

The reappearance of a previously extinguished conditioned response (CR) after a rest period and without new learning trials

A. Extinction

B. unconditioned stimulus

C. conditioned stimulus

D. unconditioned response

E. Spontaneous recovery

In classical conditioning, an unlearned, inborn reaction to an unconditioned stimulus is _____

A. unconditioned stimulus
B. conditioned stimulus
C. unconditioned response
D. conditioned response

Learning that results from the consequences of behaviors is called

A. operant conditioning
B. classical conditioning
C. positive conditioning

Taking a pain reliever is results in the reduction of pain. This is an example of _____

A. Positive reinforcement
B. Negative reinforcement
C. Operant Extinction
D. Classical conditioning
E. Punishment

John loves to receive mail. Over the years, he has learned to tell the difference between the sound of the mail car and the other cars that pass his house. What process is at work here?

A. stimulus discrimination
B. stimulus generalization
C. extinction
D. negative reinforcement

After Little Albert was conditioned to fear a white rat, he also displayed fear responses to a white rabbit and a white coat. This is an example of _____

A. stimulus generalization
B. stimulus discrimination
C. superstitious behavior

Weakening and eventual disappearance of a response because it is no longer reinforced

A. Operant Extinction
B. Positive reinforcement
C. Negative reinforcement