Learning

What is Learning?

❖ "a persisting *change* in human performance or performance potential . . . (brought) about   as a result of the learner's interaction with the environment" (Driscoll, 1994, pp. 8-9).

❖ "the relatively permanent *change* in a person's knowledge or behavior due to experience" (Mayer, 1982, p. 1040).

❖"an enduring *change* in behavior, or in the   capacity to behave in a given fashion, which results from practice or other forms of   experience" (Shuell, 1986, p. 412).

What 'Is' and 'Isn't' learning?

- IS: A relatively <u>permanent</u> change in an organism's behavior due to <u>experience</u>.

- <u>ISN'T</u>: reflex or effects of drug (temporary)

  natural maturation (not experience)

Some examples:

- Doping in Sport
  - Athletes taking illegal substances to improve their performances
  - Rio Olympics 2016 suffered a huge setback when wrestler Narsingh Yadav and shot-putter Inderjeet Singh were tested positive for banned substances by the National Anti-Doping Agency (NADA).
  - In 2000, discus thrower Seema was stripped of her gold at the World Junior Championships.
  - On August 23, 2012, Lance Armstrong was stripped of all his Tour de France titles due to doping.
  - In 2005, discus throwers Anil and Neelam were handed
  two-year ban for testing positive .
  - In 2010, shot putter Saurabh got a two-year ban for testing positive for banned stimulant.

Some Examples

- Cheating in Exams In 1997, IIT JEE was cancelled for the first time. The story is that a private coaching institute in Lucknow called its students 12 hours before the Physics and Chemistry exams for 'last-minute tips'.

  - UPSSSC exam at one center cancelled over 'paper leak'… Jul 18, 2016

  - Rajasthan University paper leaked on WhatsApp, exam cancelled
  - Bluetooth devices used in 'leaking' AIIMS paper too

- Cyber Curfew/ Internet Curfew

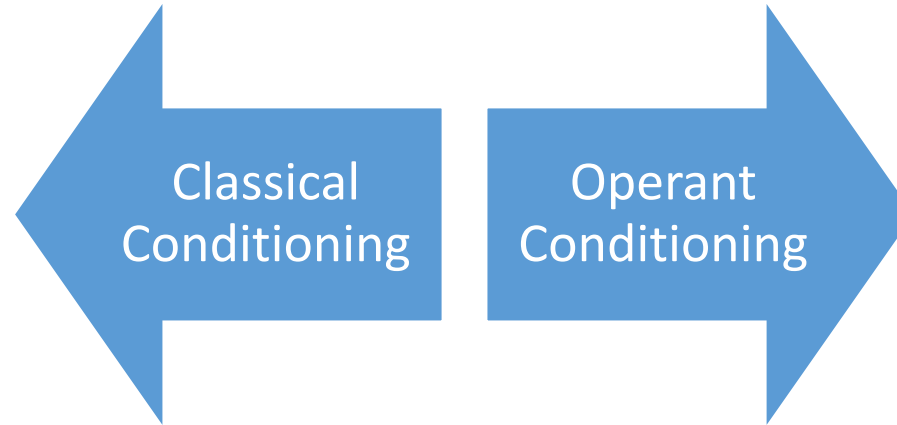# Learning

- Learning by <u>Association</u>

  Classical Conditioning

- Learning by <u>Consequences</u>

  Instrumental/ Operant Conditioning

- Learning by <u>Observation</u>

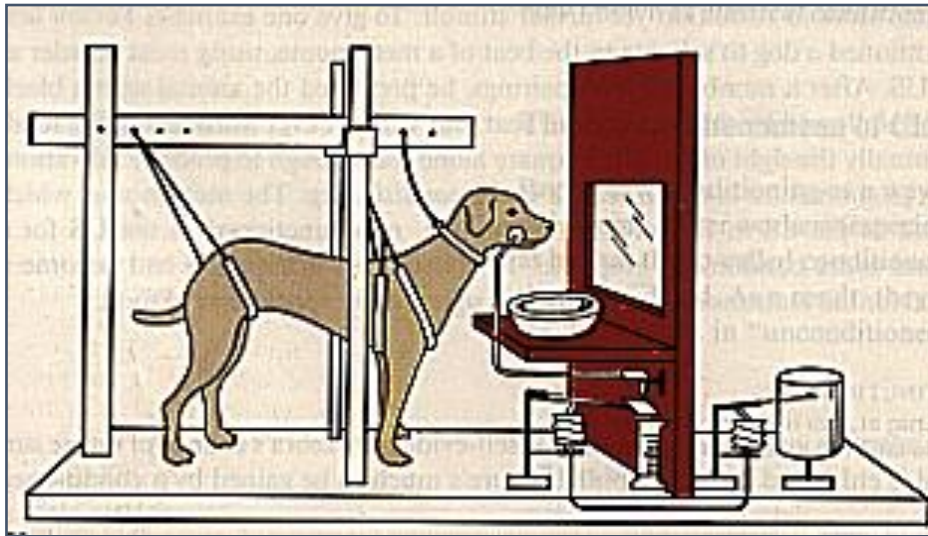 Social Learning Theory

Types of Learning

Ivan Pavlov

Classical Conditioning

Operant Conditioning
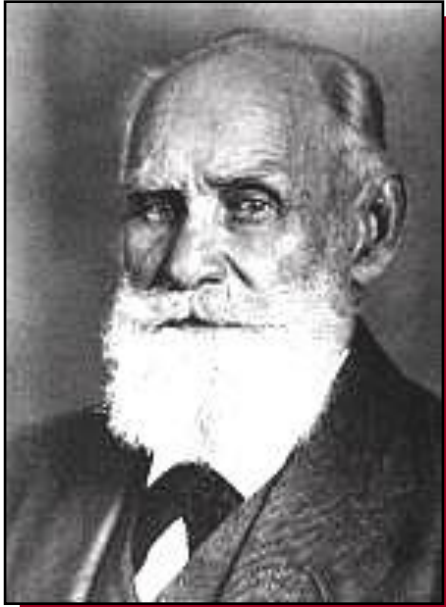
❖Social Learning

John B. Watson
Behaviorism

"Forget the mind…"
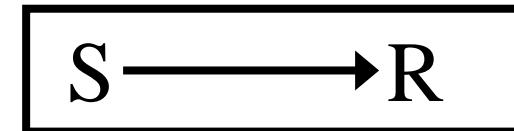Psychology should based on observable behavior

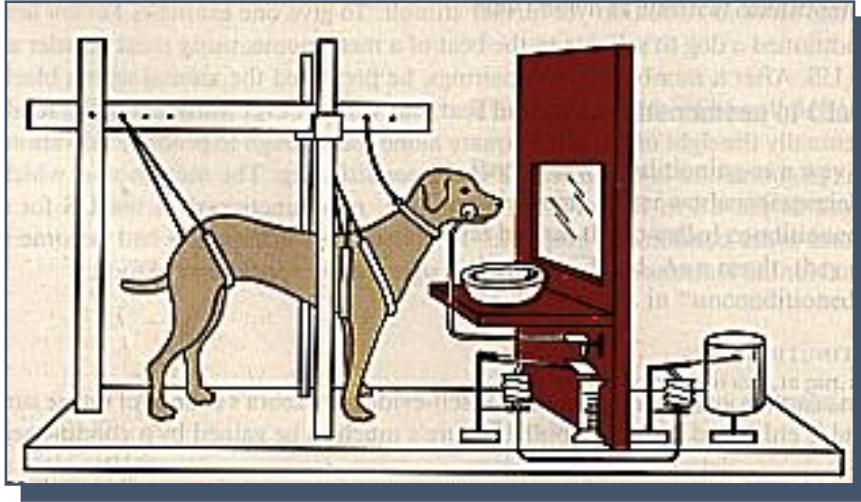# Classical Conditioning - Ivan Pavlov

❖**Short Biography**
- 20 years studying digestive system
- 30 years studying learning
- 1904 Nobel Prize in Medicine

A stimulus is presented in order to get a response

S ⟶ R

Classical Conditioning

Terms

Unconditioned Response
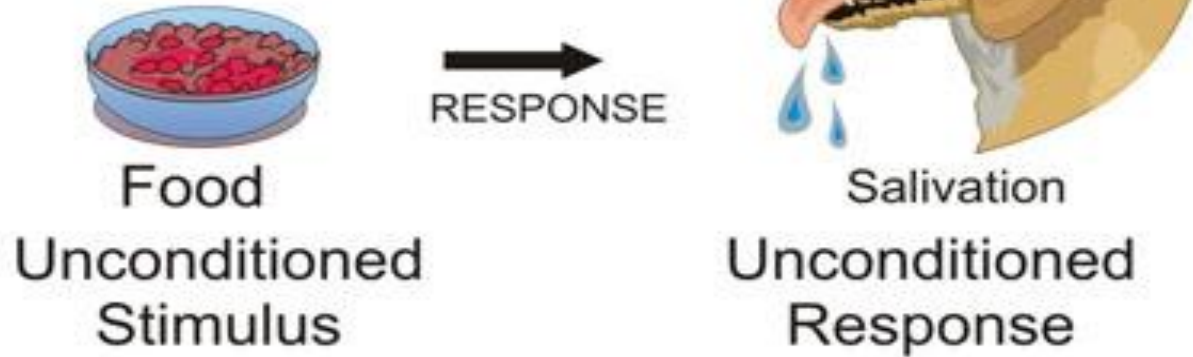Unconditioned Stimulus
Conditioned Response
Conditioned Stimulus

UCS - food (triggers drool reflex)
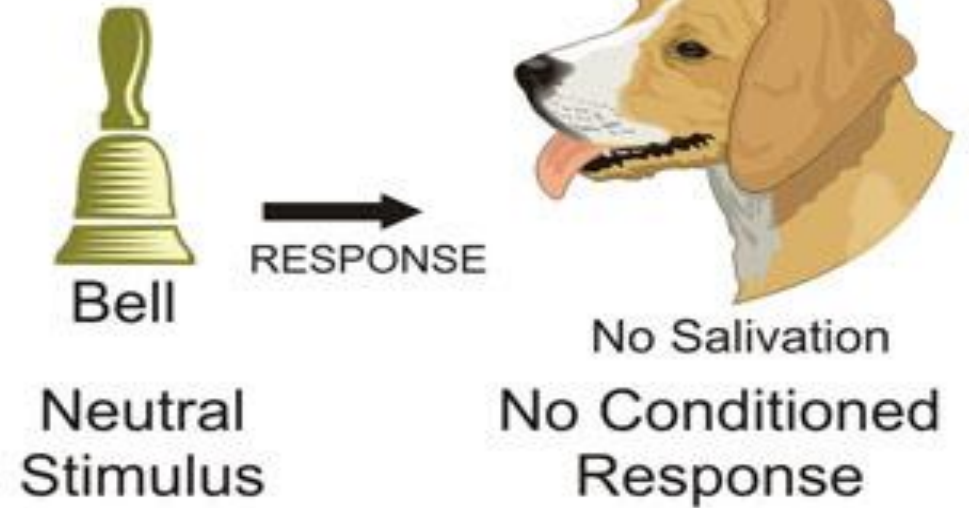
UCR - drool in response to food (not learned)

CS - sound of bell (triggers drool reflex)

CR - drool in response to sound of bell (learned)

1. Before Conditioning

Food
Unconditioned
Stimulus

→ RESPONSE →

Salivation
Unconditioned
Response

2. Before Conditioning

Bell

→ RESPONSE →

No Salivation
Neutral
Stimulus

No Conditioned
Response

3. During Conditioning

Bell + Food

→ RESPONSE →

Salivation
Unconditioned
Response

4. After Conditioning

Bell
Conditioned
Stimulus

→ RESPONSE →

Salivation
Conditioned
Response
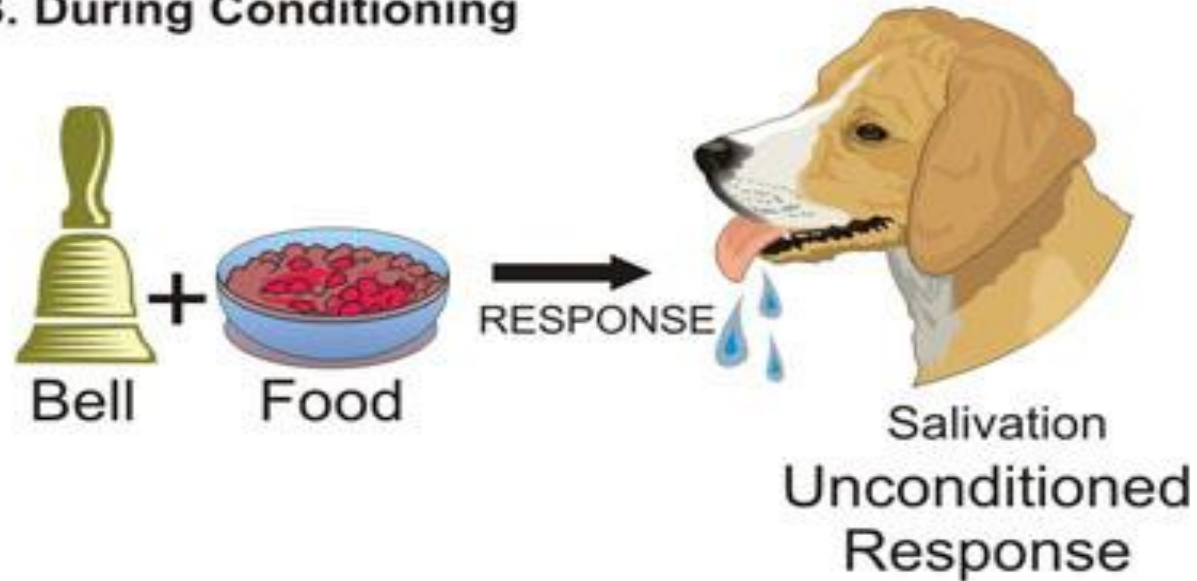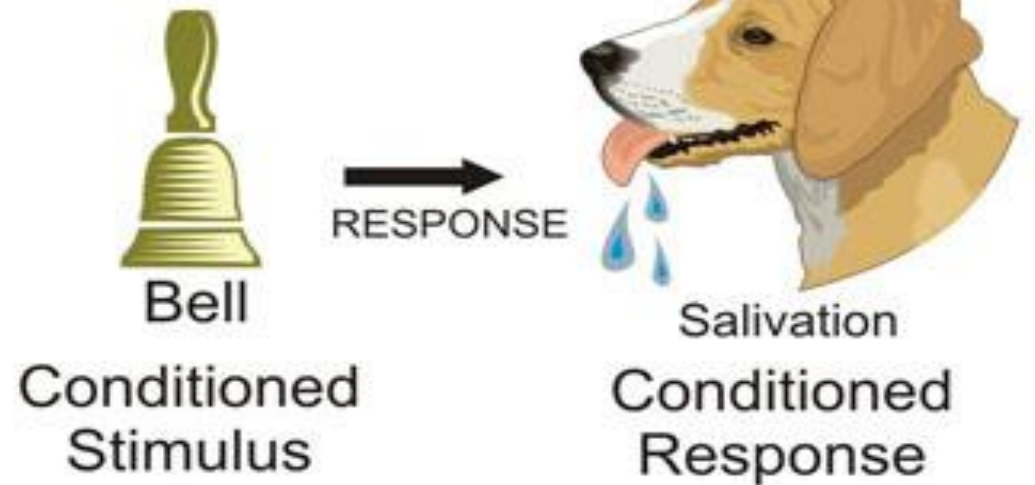
Classical Conditioning

BEFORE Conditioning

Unconditioned Stimulus

Christmas
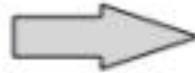
Unconditioned Response

Emotions: Excitement, Happiness, Family

BEFORE Conditioning

Neutral Stimulus

Coca-Cola

No Conditioned Response

Emotions: None

DURING Conditioning

Unconditioned Response

Christmas + Coca-Cola
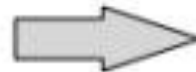
Emotions: Excitement, Happiness, Family

AFTER Conditioning

Conditioned Stimulus

Coca-Cola

Conditioned Response

Emotions: Excitement, Happiness, Family

Classical conditioning in Humans
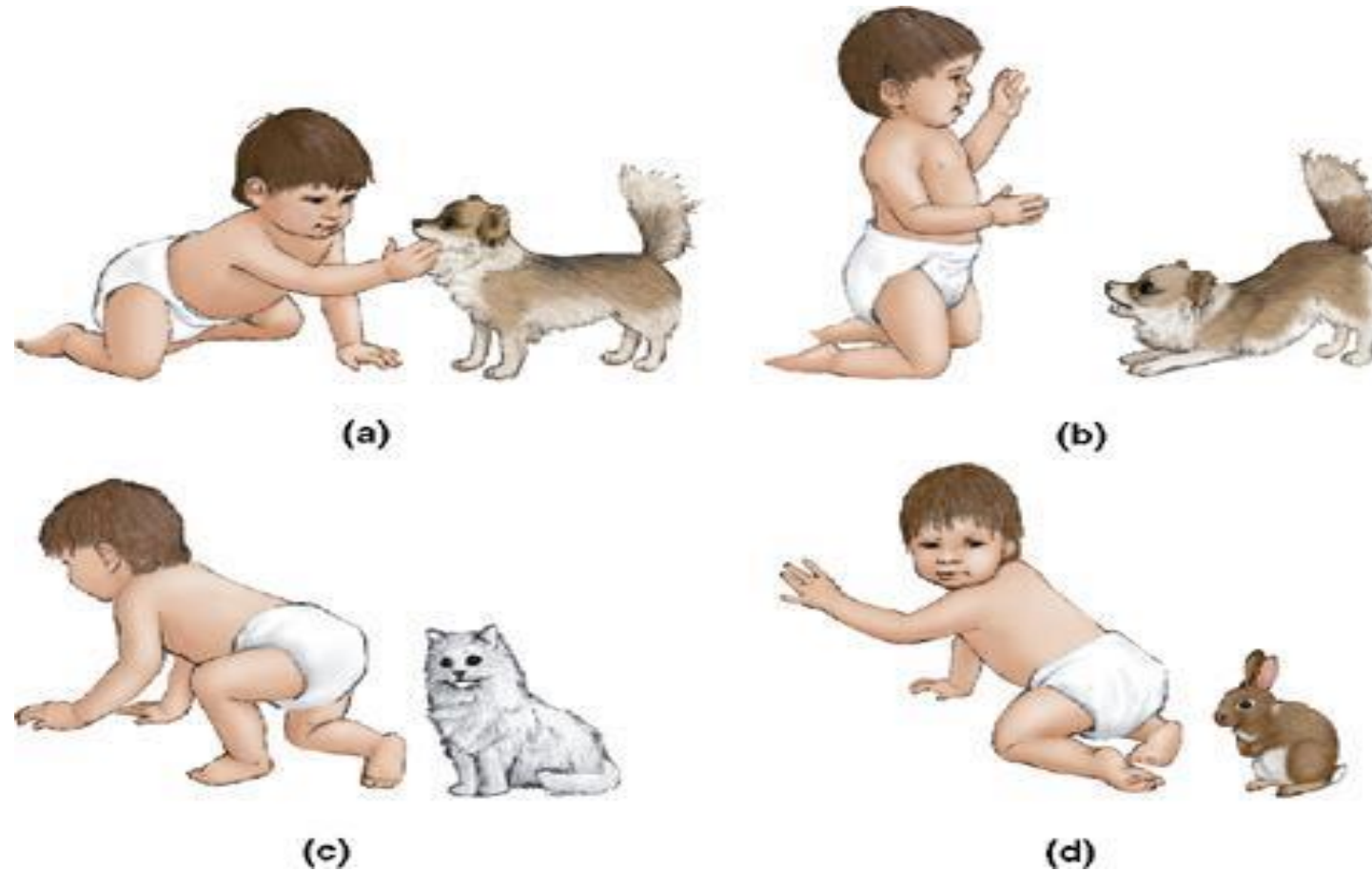
Fig. 8.7 Hypothetical example of a CR becoming a phobia. Child approaches dog *(a)* and is frightened by it *(b)*. Fear generalizes to other household pets *(c)* and later to virtually all furry animals *(d)*.

Five Major Conditioning Processes

Acquisition - Training period when a response is strengthened initial learning of the response

Extinction – Learning that CS no longer predicts the UCS

Spontaneous Recovery - Reappearance of the CR after some time period

Generalization - Tendency to respond to similar CS (e.g., a similar sounding bell)

Discrimination - Learned ability to distinguish between the CS and other stimuli

Behaviorism: Operant/ Instrumental Conditioning

❖ Limitations of Classical Conditioning
  ❖ CR often resembles the normal response to UCS
  ❖ Learning a novel behaviour?

❖ Operant or Instrumental conditioning
  ❖ Certain Responses are learned because they operate on, or affect, the environment

Behaviorism: Operant Conditioning

- Skinner

- A type of learning in which behavior is 'strengthened' if followed by reinforcement or 'diminished' if followed by punishment

  - The frequency will **increase** if the consequence is **reinforcing** to the subject.
  - The frequency will **decrease** if the consequence is **not reinforcing** or **punishing** to the subject

Skinner Box
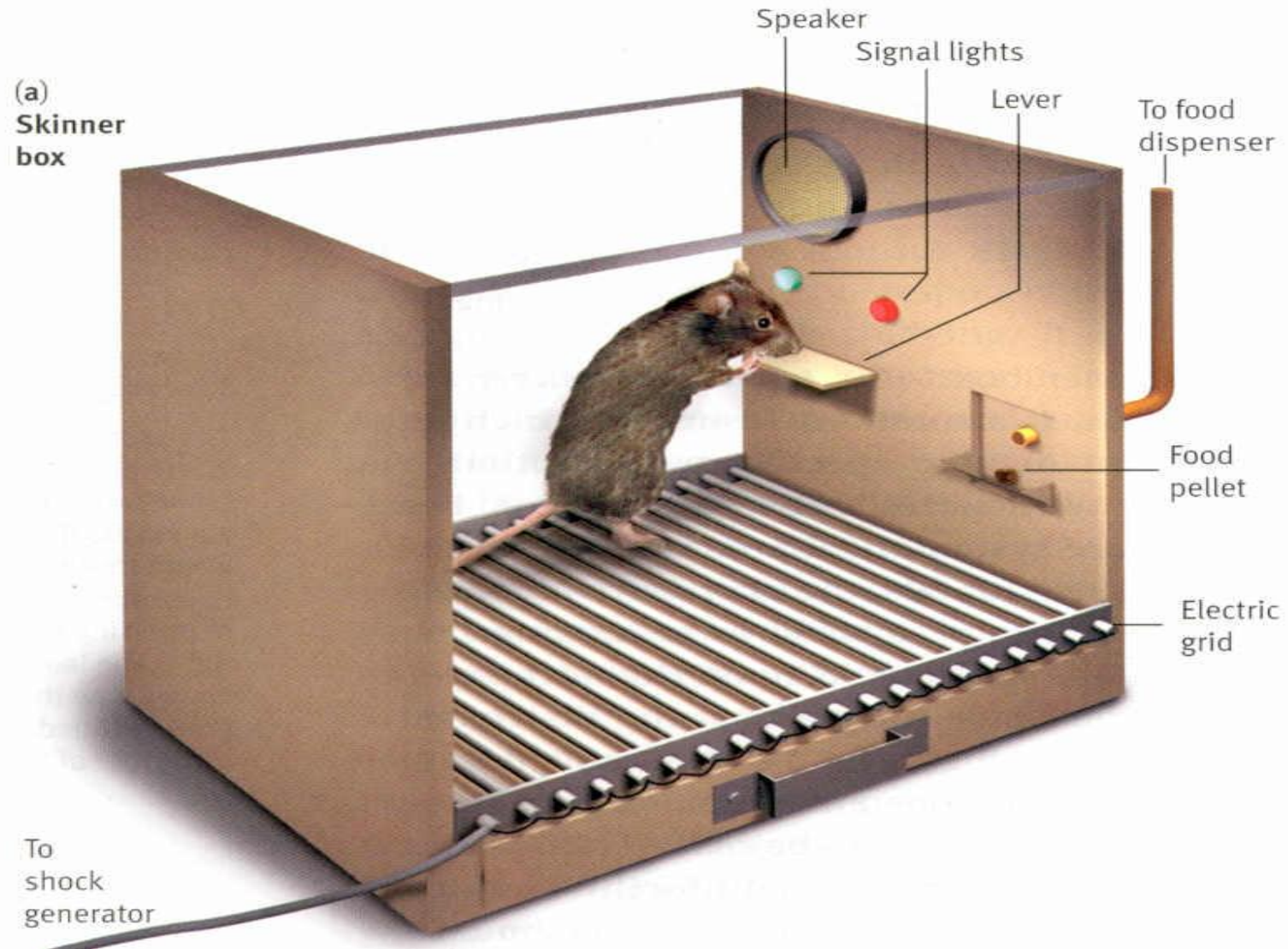
Reinforcement/Punishment

- Reinforcement - Any consequence that *increases* the likelihood of the behavior it follows
    - IS ALWAYS GOOD ???

- Punishment - Any consequence that *decreases* the likelihood of the behavior it follows

- The subject determines if a consequence is reinforcing or punishing

Types of Reinforcement

Principles of Reinforcement

	Reinforcing/Desirable Stimulus	**Aversive/Undesirable Stimulus**
Stimulus is presented or added	**Positive (+) Reinforcement** Add something you DO LIKE. **Behavior Increases**	**Positive (+) Punishment** Add something you DO **NOT** LIKE. **Behavior Decreases**
Stimulus is removed or taken away from	**Negative (-) Punishment** TAKES AWAY something you DO LIKE. **Behavior Decreases**	**Negative (-) Reinforcement** TAKES AWAY something you DO **NOT** LIKE. **Behavior Increases**

Positive Reinforcement

- Strengthens a response by presenting a stimulus that you like after a response

- Anything that increases the likelihood of a behavior by following it with a *desirable* event or state

- The subject receives something they want (added)

- Will **strengthen** the behavior

Positive Reinforcement

POSITIVE REINFORCEMENT

Behavior is followed by a desirable event or state.
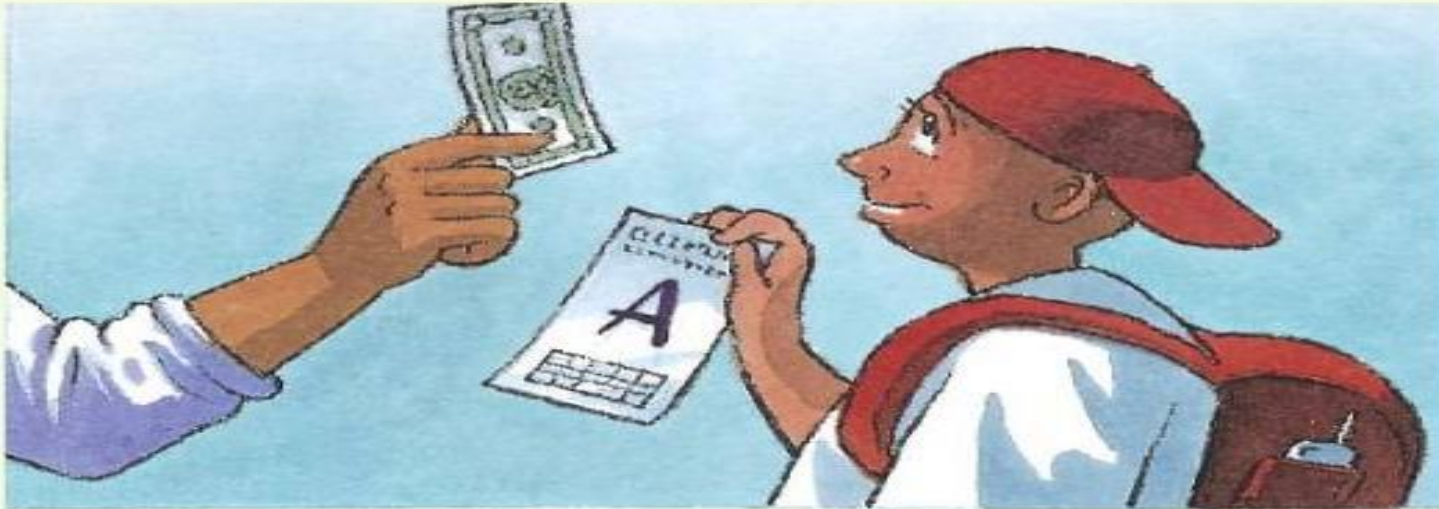
$10 for an A makes it more likely a student will earn more As.

Negative Reinforcement

- Strengthens a response by *reducing or removing* an aversive (disliked) stimulus

- Anything that increases the likelihood of a behavior by following it with the <u>*removal of an undesirable event*</u> or state

- Will **strengthen** the behavior

- Neg. Rein. Allows you to either:
  - *Escape* something you don't like that is *already present* (Neg. Rein. By Escape)
  - *Avoid* something *before* it occurs (Neg. Rein. By Avoidance)

How is this different from Punishment?

- Negative Reinforcement will always ***increase*** a behavior (desirable)

- Punishment will always ***decrease*** a behavior (undesirable)

- Negative Reinforcement is something YOU DO to take away something bad.

- Punishment is something DONE TO YOU that is bad and makes you stop doing a behavior.

Negative Reinforcement

NEGATIVE REINFORCEMENT

Behavior ends an undesirable event or state.

Taking aspirin relieves headaches and makes it more likely that aspirin will be taken in the future.

Punishment: The Process of Punishment

Types of Punishment

- An undesirable event following a behavior

- Behavior ends a desirable event or state

- Its effect is opposite that of reinforcement – it *decreases* the frequency of behavior

Positive Punishment (Punishment by Application)

- Something is added to the environment you do NOT like.

- A verbal reprimand or something painful like a spanking

Negative Punishment
(Punishment by Removal)

- Something is taken away that you DO LIKE.
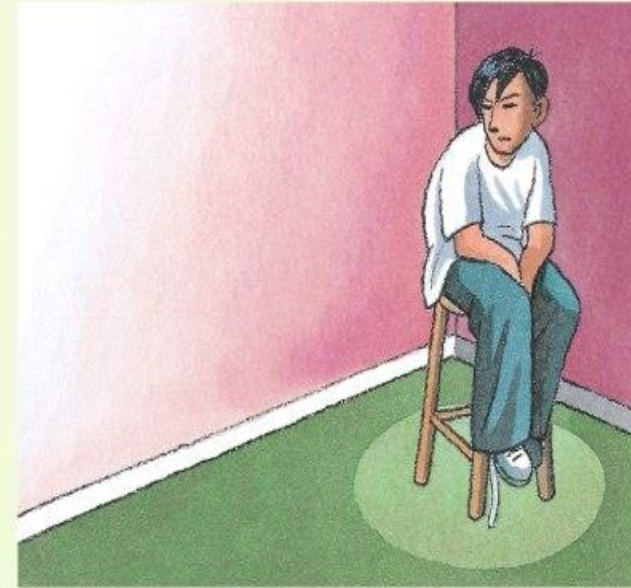
- Lose a privilege.

TWO FORMS OF PUNISHMENT

Behavior is followed by an undesirable event.

A toddler burned by a hot stove will be less likely to touch the stove again.

Behavior ends a desirable event or state.

A boy who loses his TV privileges for pulling his sister's hair will be less likely to pull her hair again.

The Good Effects of Punishment

- Punishment can effectively control certain behaviors if...
  - It comes immediately after the undesired behavior
  - It is consistent and not occasional

- Especially useful if teaching a focuses on not to do a dangerous behavior

- Most still suggest reinforcing an incompatible behavior rather than using punishment

Bad Effects of Punishment

- Does not teach or promote alternative, acceptable behavior.

- Only tells what NOT to do while reinforcement tells what to do.

- Doesn't prevent the undesirable behavior when away from the punisher in a "safe setting"

- Can lead to fear of the punisher, anxiety, and lower self-esteem

- Children who are punished physically may learn to use aggression as a means to solve problems.

Quiz

Identify types of learning and its component in the following examples:

1. It is springtime and the pollen from the flowers causes you to sneeze. Soon you are sneezing at the mere sight of a flower...real or fake.

2. Students or children follow rules strictly to avoid being nagged by the teachers or parents.

3. After hitting a classmate, a student is made to sit alone in the class, and no one is allowed to talk to him or sit with him.

4. While Mohit was having a cavity filled by his dentist, the drill hit a nerve (a couple of times) that had not been dulled by anesthetic. Each time Mohit screamed in pain. Mohit now gets anxious each time he sees the dentist.

Schedules of Reinforcement

Continuous Reinforcement

- A schedule of reinforcement in which a reward follows *every* correct response

- Learning occurs rapidly

- But the behavior will extinguish quickly once the reinforcement stops.

    - Once that reliable candy machine eats your money twice in a row, you stop putting money into it.

Partial Reinforcement

- A schedule of reinforcement in which a reward follows only *some* correct responses

- Learning of behavior will take longer

- But will be more resistant to extinction

- Includes the following types:
  - Fixed-interval and variable interval
  - Fixed-ratio and variable-ratio

Schedule of Reinforcement

	Fixed	Variable
Ratio	Completion of a **constant** number of responses	Completion of a **changing** number of responses
Interval	Reinforces the first response after a **constant** amount of time	Reinforces the first response after a **changing** amount of time

Fixed-Ratio Schedule

- A partial reinforcement schedule that rewards a response only after some set number of correct responses

- The faster the subject responds, the more reinforcements they will receive.

- i.e. piece work: You get $5 for every 10 widgets you make.

Variable-Ratio Schedule

- A partial reinforcement schedule that rewards an **unpredictable average** number of correct responses

- High rates of responding with little pause in order to increase chances of getting reinforcement

- This schedule is very resistant to extinction.

- Sometimes called the "gambler's schedule"; similar to a slot machine or fishing

Fixed-Interval Schedule

- A partial reinforcement schedule that rewards only <u>the first correct response after some **set** period of time</u>

- Produces gradual responses at first and increases as you get closer to the time of reinforcement

- "Procrastinator Schedule"

- Example: a known weekly quiz in a class, checking cookies after the 10 minute baking period.

Variable-Interval Schedule

- A partial reinforcement that rewards the first correct response after an **unpredictable** amount of time

- Produces slow and steady responses

- Example: "pop" quiz in a class