Learning and Conditioning:

AP Psychology

Learning Targets:

Distinguish general differences between principles of classical conditioning, operant conditioning, and observational learning (e.g., contingencies).

- Describe basic classical conditioning phenomena, such as acquisition, extinction, spontaneous recovery, generalization, discrimination, and higher-order learning.
- Predict the effects of operant conditioning (e.g., positive reinforcement, negative reinforcement, punishment, schedules of reinforcement).
- Predict how practice, schedules of reinforcement, and motivation will influence quality of learning.
- Interpret graphs that exhibit the results of learning experiments.
- Provide examples of how biological constraints create learning predispositions.
- Describe the essential characteristics of insight learning, latent learning, and social learning.
- Apply learning principles to explain emotional learning, taste aversion, superstitious behavior, and learned helplessness.
- Suggest how behavior modification, biofeedback, coping strategies, and self control can be used to address behavioral problems.
- Identify key contributors in the psychology of learning (e.g., Albert Bandura, John Garcia, Ivan Pavlov, Robert Rescorla, B. F. Skinner, Edward Thorndike, Edward Tolman, John B. Watson).

Imagine This....

You're sitting in the waiting room of your dentist's office. You cringe when you hear the sound of a dental drill coming from the next room. (why?)

The crowd hushes as an Olympic diver prepares to execute her dive. (why?)

A 4-year old boy pinches his hand in one of his toys and curses loudly. His mother looks up in dismay and says to his father, “where did he pick up that kind of language?” (what's going on here?)

Lesson One: Classical Conditioning

By the end of this lesson, I will be able to:

1. Describe basic classical conditioning phenomena, such as acquisition, extinction, spontaneous recovery, generalization, discrimination, and higher-order learning.

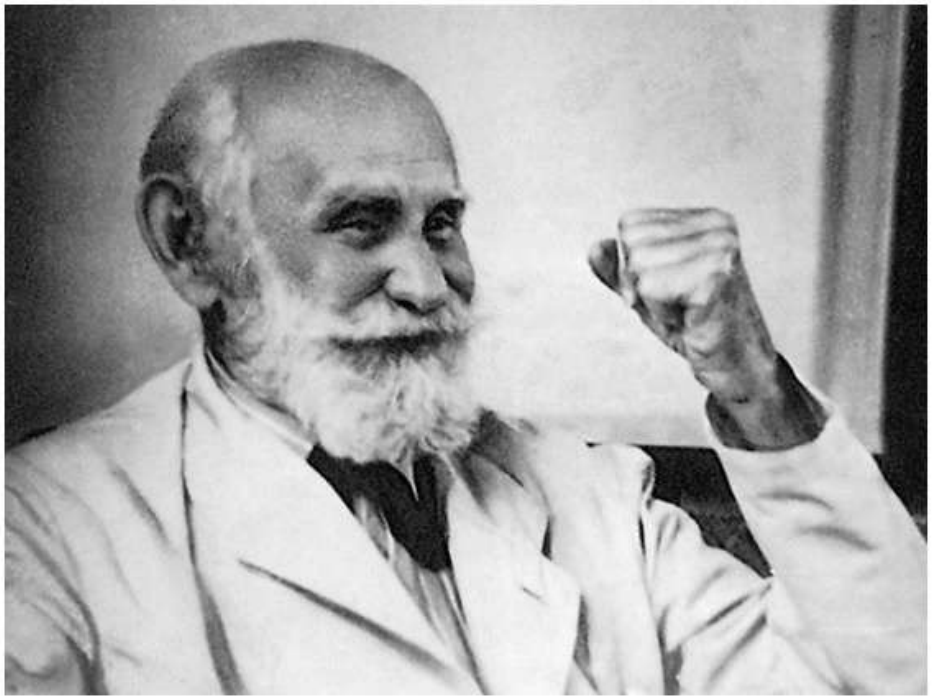
Discussion Questions: Turn and Talk

1. How do humans learn? Is this different than other animals?
2. With all the advances in technology and knowledge, do we still learn in the same ways as our ancestors?
3. Do you think that schools provide students with the best ways to learn? (does this change with grade level?)
4. How could we use psychology to help the educational system?
5. What advancements can be made that can aid people in the learning process?

Learning

- Learning
  - relatively permanent change in behavior or knowledge due to experience.
  - Learning allows you to anticipate future events to better control your environment

Classical Conditioning



- Ivan Pavlov
  - 1849-1936
  - Russian physician/ neurophysiologist
  - Nobel Prize in 1904
  - Scientifically studied the process by which associations are established, modified, and broken.

Classical or Pavlovian Conditioning

Two related events:

Stimulus 1:
Lightning

+

Stimulus 2:
Thunder

Result after repetition:

Stimulus:
We see lightning

→

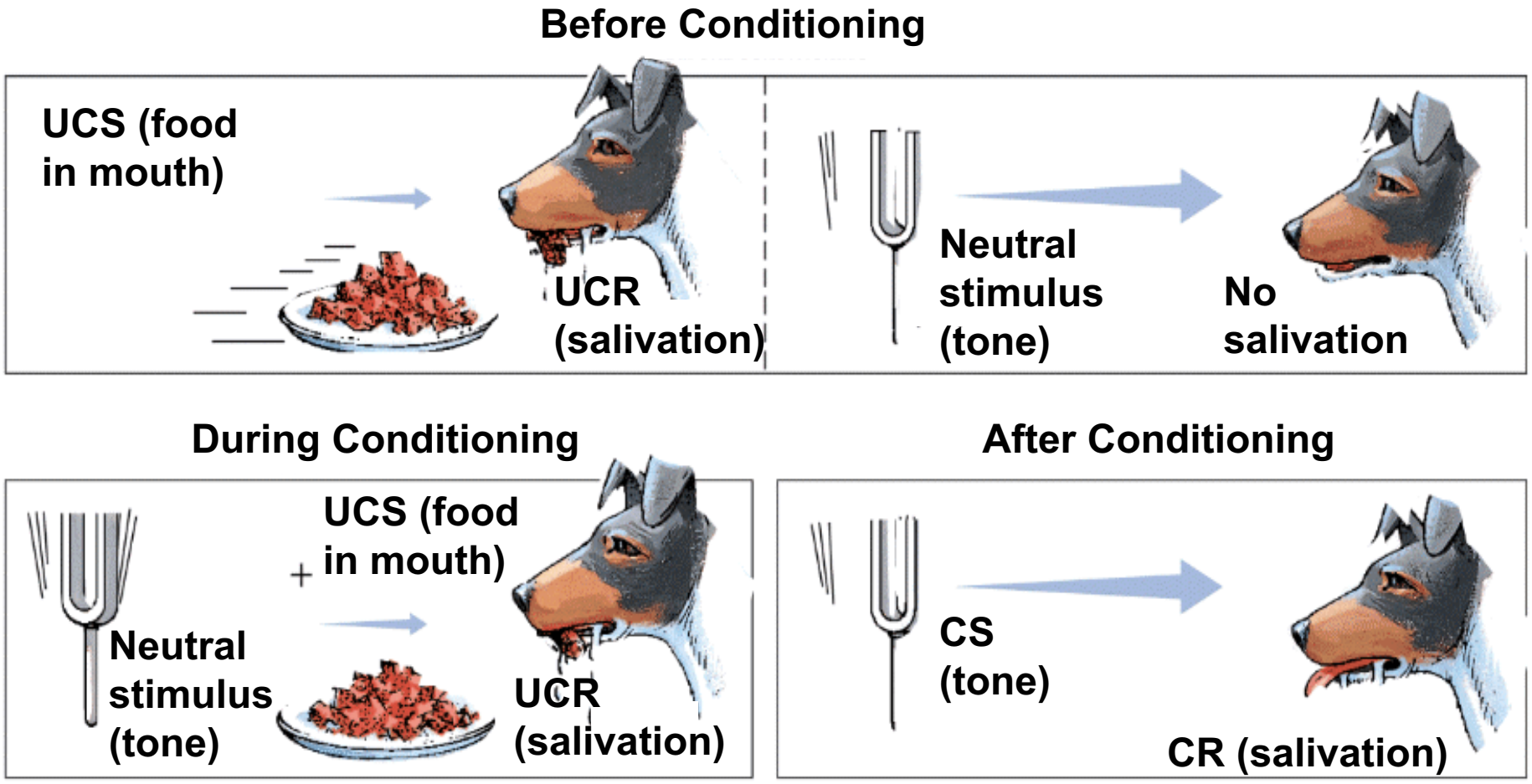
Response:
We wince anticipating thunder

- We learn to associate two stimuli

Classical Conditioning

- Classical Conditioning
  - organism comes to associate two stimuli
  - **Stimulus** – a change in the environment that elicits a response
  - **Response** – a reaction to a stimulus

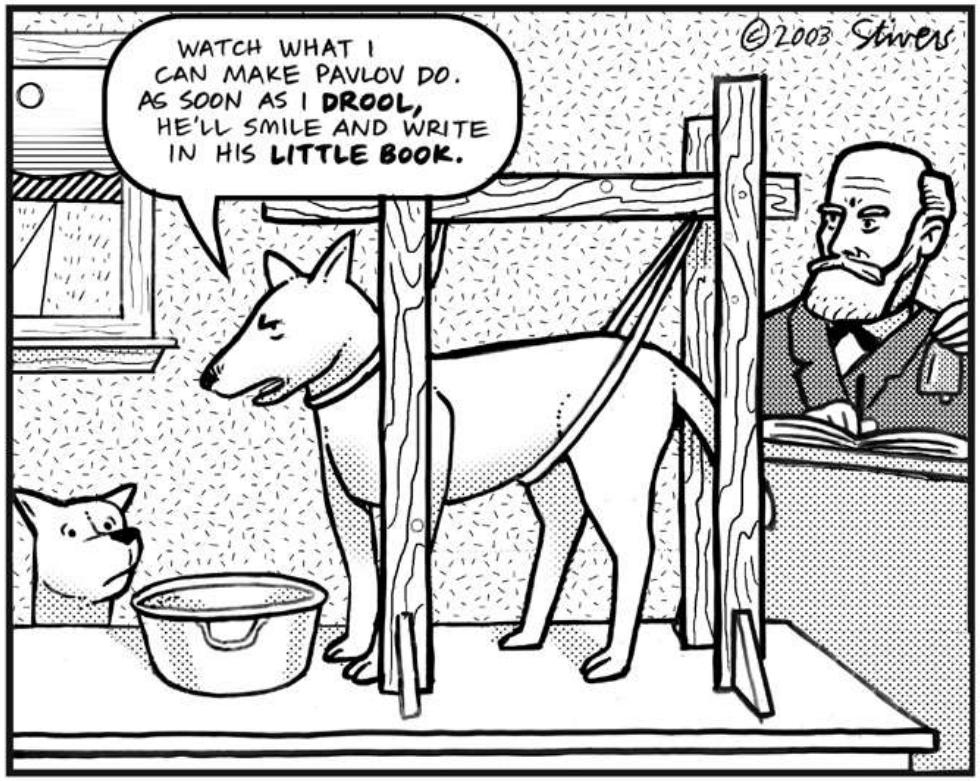
Pavlov's Classic Experiment



Classical Conditioning

- Neutral Stimulus – Initially does not elicit a response (tone)
- Unconditioned Stimulus (UCS)
  - stimulus that unconditionally--automatically and naturally--triggers a response
- Unconditioned Response (UCR)
  - unlearned, naturally occurring response to the unconditioned stimulus (REFLEX)
    - salivation when food is in the mouth

Classical Conditioning



- Conditioned Stimulus (CS)
  - originally irrelevant stimulus that, after association with an unconditioned stimulus, comes to trigger a conditioned response
- Conditioned Response (CR)
  - learned response to a previously neutral conditioned stimulus (LEARN)

Classical Conditioning

- Acquisition
  - the phase associating a neutral stimulus with an unconditioned stimulus so that the neutral stimulus comes to elicit a conditioned response
  - Most learning takes place after several trials

Classical Conditioning

- Extinction
  - diminishing of a CR
  - in classical conditioning, when a UCS does not follow a CS
  - (Baby Albert would probably not be afraid of the rat anymore if they stopped associating it with a loud sound)

Classical Conditioning: John Watson

- Spontaneous Recovery
  - reappearance, after a rest period, of an extinguished CR
  - (Baby Albert might be afraid some day of a white rat)
- Generalization
  - tendency for stimuli similar to CS to elicit similar responses (white rat – Baby Albert)

Classical Conditioning

- Discrimination
  - in classical conditioning, the learned ability to distinguish between a CS and other stimuli that do not signal a UCS
  - (Baby Albert would know the difference between a gun shot, pots and pans, and a whistle)

Watson's 12 Infants Quote:

"Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select – doctor, lawyer, artist, merchant-chief and, yes, even beggar-man and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors."

Food for Thought:

- Does the timing of all of this matter?
- What if you waited awhile to present the food or ring the bell?
- Many different types of conditioning have been used with different results.
- Here are a few of them

Strength of Conditioning:

Delayed conditioning – The NS is presented just before the UCS with a brief period of time between the two.

Trace conditioning – The NS is presented and then disappears before the UCS appears

Simultaneous conditioning – occurs when the UCS and NS are paired together

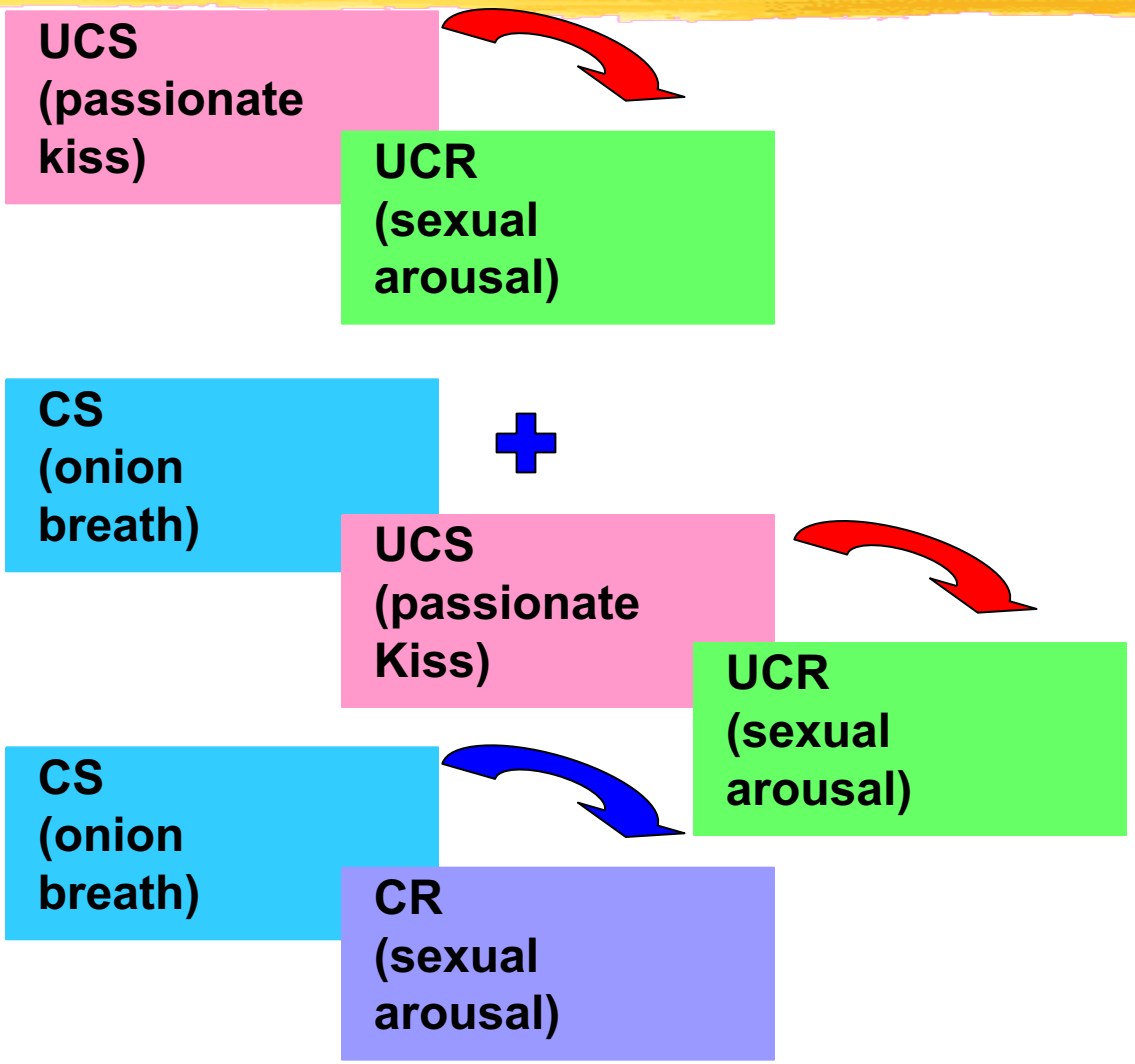
Backward conditioning – The UCS comes before the NS

Strength of Conditioning:

Rank order of effectiveness:

1. Delayed conditioning – produces strongest conditioning
2. Trace conditioning – moderate
3. Simultaneous – weak
4. Backward conditioning - nothing

Classical Conditioning: Fun Stuff



Lesson Two: Objectives

By the end of this lesson, I will be able to:

1. Predict the effects of operant conditioning (e.g., positive reinforcement, negative reinforcement, punishment, schedules of reinforcement).

What is Operant Conditioning?

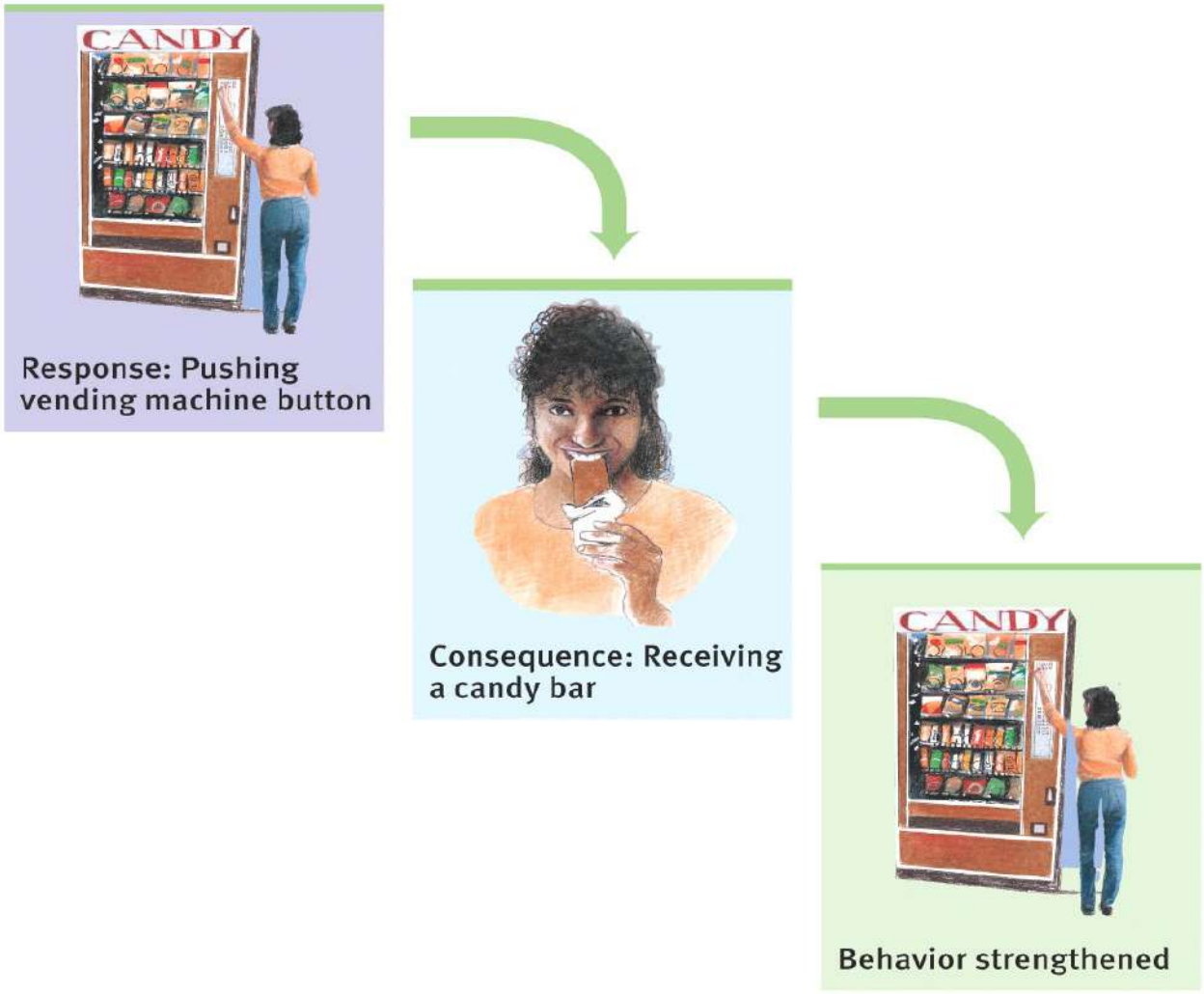
- **Operant conditioning** – an active subject forms an association between a behavior and a consequence.
- B.F. Skinner and his Skinner Box
- E.L. Thorndike and his "puzzle boxes"

The Difference Between Classical and Operant Conditioning:

Classical – The subject learns to give a response it already knows to a new stimulus – you know to drool when you smell yummy food, but could we get you to drool when your cell phone rings?

Operant – The subject only gets the "reward" if the desired action is completed – which creates the association

Operant Conditioning



- We learn to associate a response and its consequence

E. L. Thorndike: Instrumental Conditioning

- Conducted experiments using hungry cats
- Placed cats in "puzzle boxes" and placed fish (reward) outside the box
- If they stepped on a pedal a small door opened and they got the fish
- At first – they clawed at the door
- By accident – they stepped on the pedal
- Then – The learning curve showed that over time, they began to make the association
- There time of "escape" gradually fell and random movements eventually disappeared

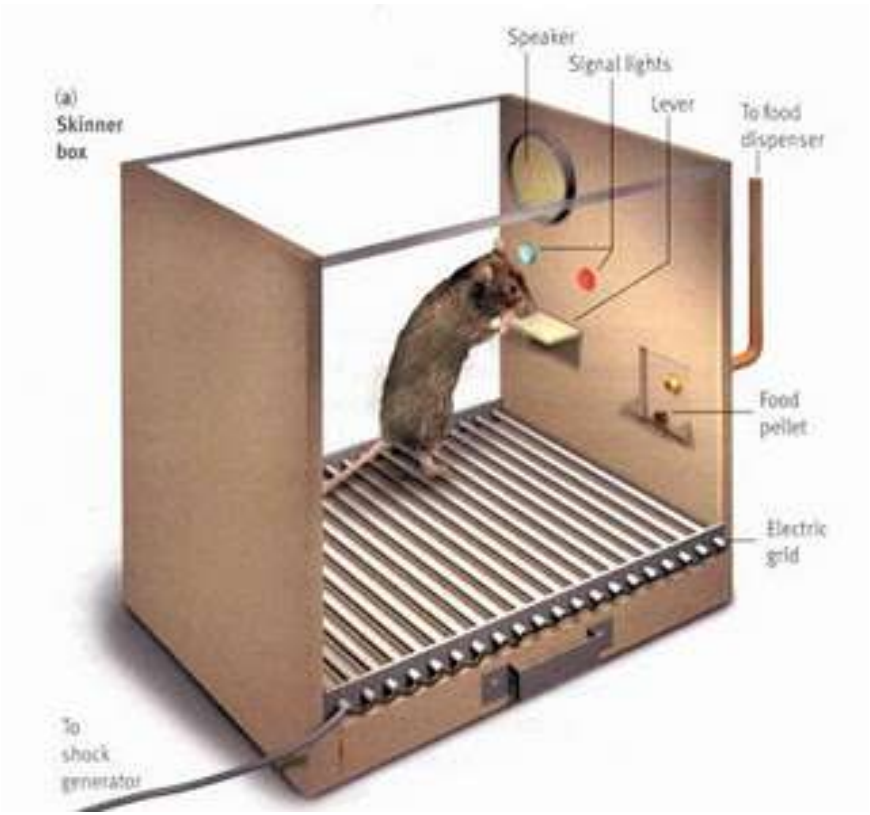
Thorndike's Terminologies:

- **Instrumental Learning** – Associated learning in which behavior becomes more or less probable depending on its consequences.
- **Law of Effect** – Behaviors followed by satisfying / positive consequences are more likely to occur.
- Behaviors following annoying / negative consequences are less likely to occur

B.F. Skinner – Operant Conditioning

- **Operant Conditioning** – Subjects operate on their environment in order to produce desire consequences.
- **Skinner's ABC's of behavior:**
- A – Antecedent – stimuli that were present before a behavior occurs
- B – Behavior – that is emitted
- C – Consequences – that follow the behavior

The Skinner Box:



- **<u>The Skinner Box</u>** contained:
- Levers, Food dispensers, Lights, Electrical Grid
- The rats could press the levers to get food rewards
- The rats could get punished with electrical shocks

Skinner's Four Training Procedures:

- 1. Positive Reinforcement
- 2. Negative Reinforcement
- 3. Punishment
- 4. Omission Training

Positive Reinforcement:

- Reward Training
- Action → Reward
- Example 1 – Rats presses lever →Food
- Example 2 – Student answers question correctly → praise from teacher
- **Premack Principle** – A more probable behavior can be used as a reinforcer for a less probable one.
- Example – If I study for an hour, I can go watch TV for ½ hour then go back to study.

Negative Reinforcement:

- Takes away an unpleasant consequence after a behavior has been given
- Example 1 – Rat presses lever → shocks go away
- Example 2 – Take an aspirin for a headache → pain goes away

Operant Aversive Conditioning: (negative reinforcement)

- Negative reinforcement is often confused with punishment
- Reinforcement takes away aversive stimuli – you get rid of something you don't want
- **Example**: Buzzer goes off when you finally put your seatbelt when driving
- There are two types of negative reinforcement: Avoidance and Escape

Reinforcement Terminologies:

- **Avoidance** – Dog jumps over hurdle to avoid electric shock
- **Escape** – Dog gets shocked first and then jumps over the hurdle to get away
- **Learned Helplessness** – Over time, participants will "give up" when they cannot avoid or escape a situation.

Punishment:

- **Punishment** – Response is followed by an aversive consequence
- 3 Rules of Punishment:
- A. Must be immediate
- B. Must be in enough severity that behavior stops
- C. Must be consistent

WARNING: Punishment

- Doesn't teach what they SHOULD do
- Suppresses rather than extinguishes behavior
- May evoke hostility or passivity

This is the level of comfort I have with labeling the components of classical conditioning:

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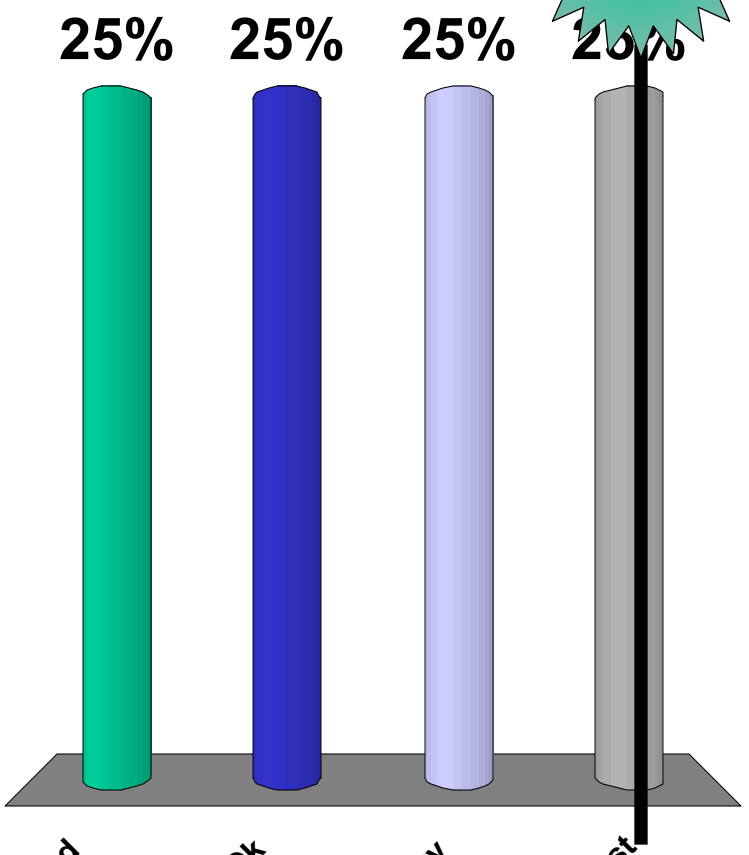
1. Very good
2. Ok
3. Shaky
4. I'm lost



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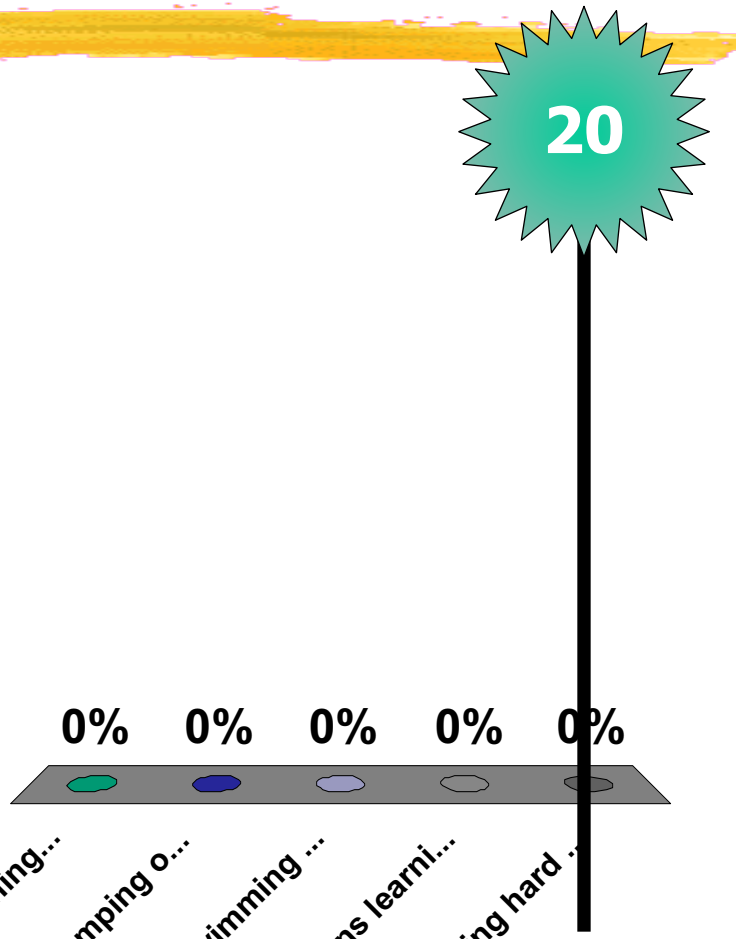
Which of the following responses is NOT learned through operant conditioning?

1. A rat learning to press a bar to get food
2. Dogs jumping over a hurdle to avoid electric shocks
3. Fish swimming to the top of the tank when a light goes on
4. Pigeons learning to turn in circles for a reward
5. Studying hard for good grades on tests



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Which of the following best reflects negative reinforcement?

1. Teresa is scolded when she runs through the house yelling
2. Lina is not allowed to watch television until after she has finished her homework
3. Alan is praised for having the best essay in the class
4. Greg changes his math class so he doesn't have to see his old girlfriend
5. Alex takes the wrong medicine and gets violently ill afterwards

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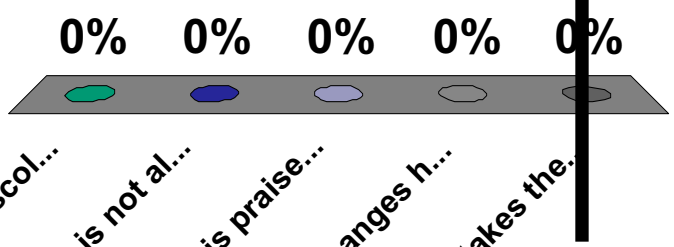

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If a previous experience has given your pet the expectancy that nothing it does will prevent an aversive stimulus from occurring, it will likely:

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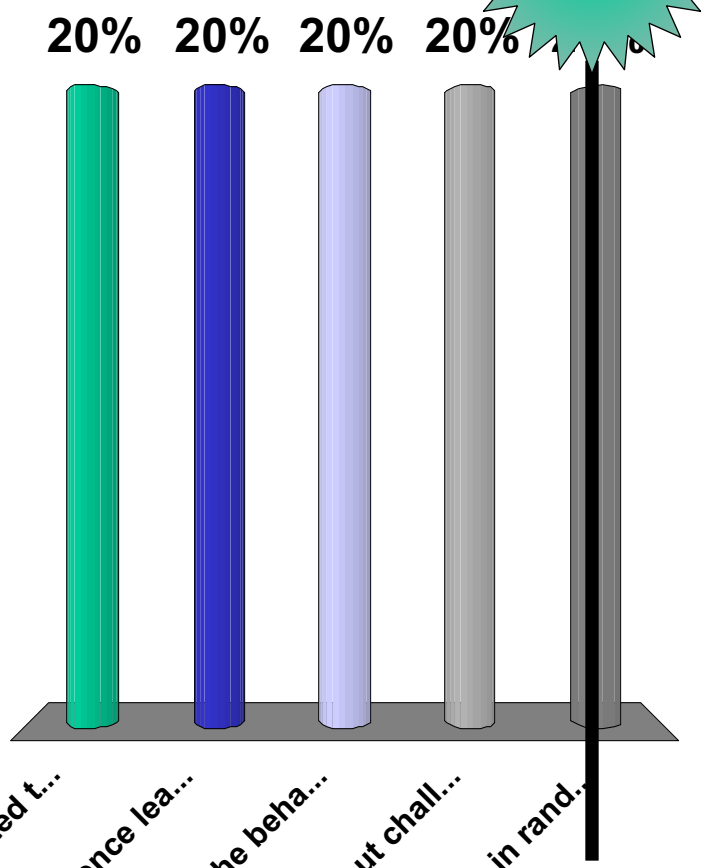
1. Be motivated to seek comfort from you
2. Experience learned helplessness
3. Model the behavior of other pets in hopes of avoiding it
4. Seek out challenges like this in the future to disprove the expectation
5. Engage in random behavior



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Omission Training:

- **Omission training** – a response by the learner is followed by taking away something of value
- This works well because the learner can change their behavior and get back to the positive reinforcer
- Example: Time Out (crate)
- **Key** – You need to find out what is rewarding / isn't rewarding for each individual

Lesson Three: Objectives

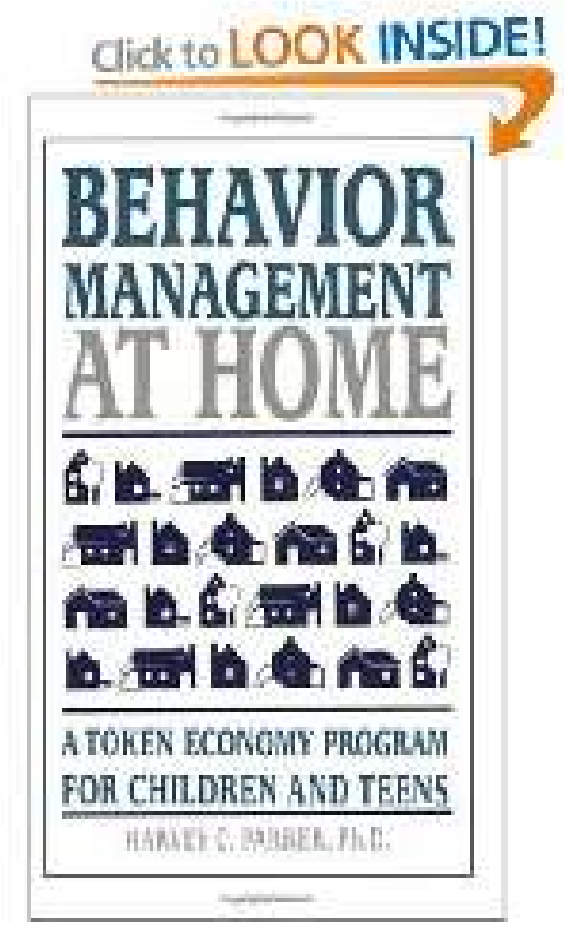
By the end of this lesson, I will be able to:

1. Predict how practice, schedules of reinforcement, and motivation will influence quality of learning.

Reinforcers:

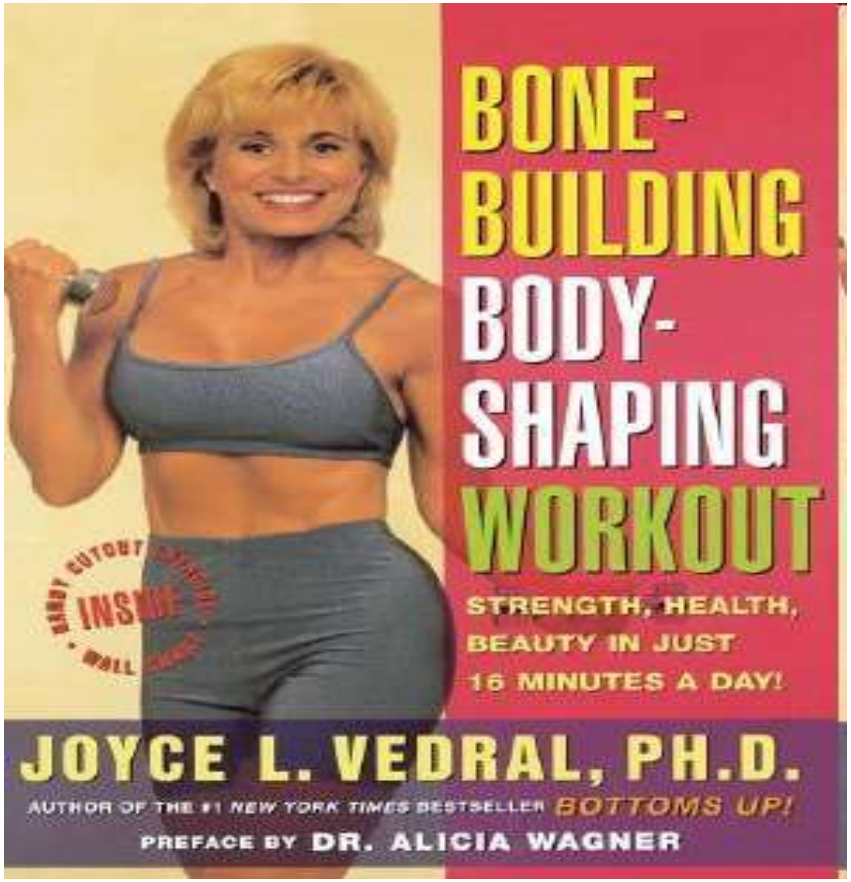
- **Primary reinforcer** – something that is biologically important to us (rewarding)
- **Secondary reinforcer** – something neutral that, when paired with a primary reinforcer, becomes rewarding (gold stars, points, money)
- **Generalized reinforcer** – a secondary reinforcer that can be associated with a number of different primary reinforcers. (money can buy other things like food, necessities)

Token Economy:



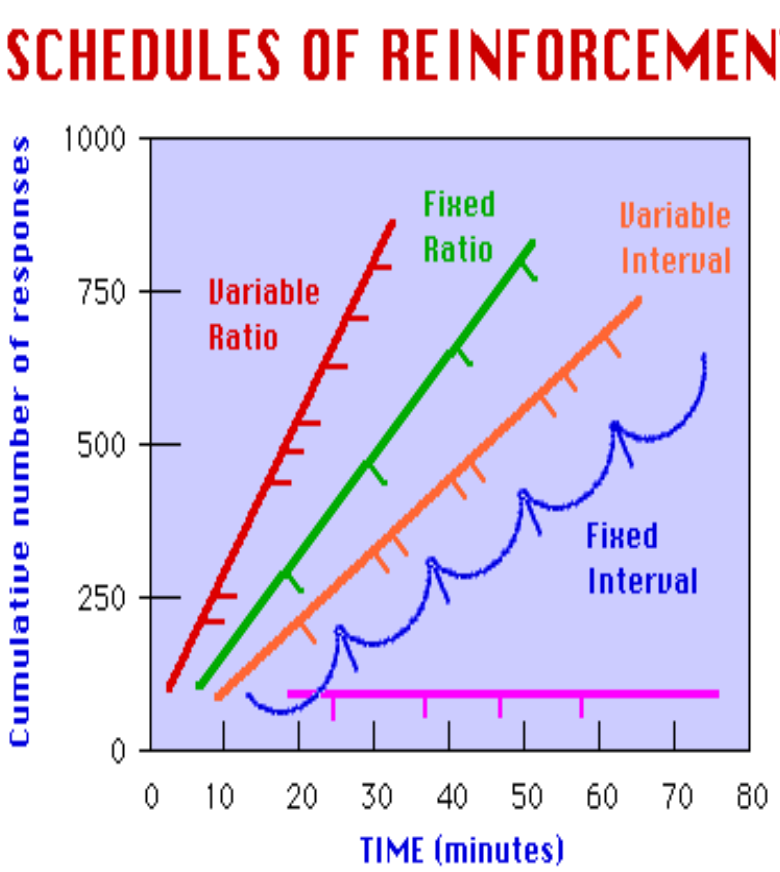
- Operant training system that is used in mental hospitals, jails, and schools.
- **Token Economy** - Tokens are used as secondary reinforcers to increase a list of acceptable behaviors
- Tokens can be exchanged for special privileges (snacks, movies, etc.) – Chucky Cheese
- This is also used for behavior modification

Teaching New Behavior:



- What is the best way teach and maintain behaviors through operant conditioning?
- **Shaping** – Reward subjects as they get closer to desired result (toilet training)
- **Chaining** – Rewarding a specific sequence of behavior, then later rewarding only the completed sequence.
- Animal training (Sea World) – Swimming, jumping through a hoop, then honking a horn → Fish

Schedules of Reinforcement:



- **Schedules of Reinforcement** – The training program that states how/when reinforcers will be given to the learner
- **Continuous Reinforcement** – Schedule that provides reinforcement every time the behavior is emitted.
- Problem – Not reinforcing the behavior once or twice could lead to extinction of the behavior before the behavior has been learned.

Schedules of Reinforcement: (cont)

- After the behavior has been learned partial or intermittent reinforcement is best.
- **Partial reinforcement** – reinforcing the behavior only some of the time.
- Why do you think this works better only after the behavior has been learned?

Schedules of Reinforcement:

A **fixed interval** means that a reward will occur after a fixed amount of time.

For example, every five minutes.

Paychecks work on this schedule - every two weeks I got one.

Schedules of Reinforcement:

A **variable interval** schedule means that reinforcers will be distributed after a varying amount of time.

Sometimes it will be five minutes, sometimes three, sometimes seven, sometimes one.

E-mail accounts work on this system - at varying intervals I get new mail

Schedules of Reinforcement:

A **fixed ratio** means that if a behavior is performed X number of times, there will be one reinforcement on the Xth performance.

For a fixed ratio of 1:3, every third behavior will be rewarded.

Assembly-line production systems work on this schedule - the worker gets paid for every 10 widgets she makes.

Schedules of Reinforcement:

A **variable ratio** schedule means that reinforcers are distributed based on the average number of correct behaviors.

A variable ratio of 1:3 means that *on average*, one out of every three behaviors will be rewarded.

Example: Slot Machines (you think your chances go up with each pull)

Schedules of Reinforcement:

With a **random schedule**, there is no correlation between the animal's behavior and the consequence.

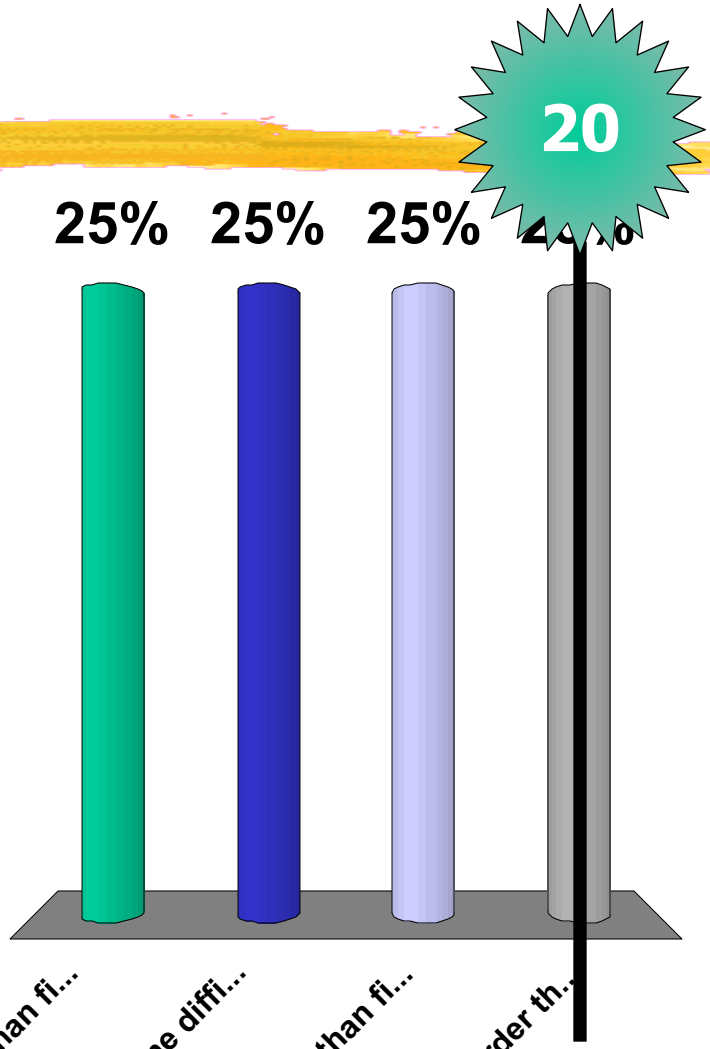
Lesson Four: Objectives

By the end of this lesson, I will be able to:

1. Describe the essential characteristics of insight learning, latent learning, and social learning

AP Psychology is:

1. Easier than first semester
2. The same difficulty as first semester
3. Harder than first semester
4. Much harder than first semester



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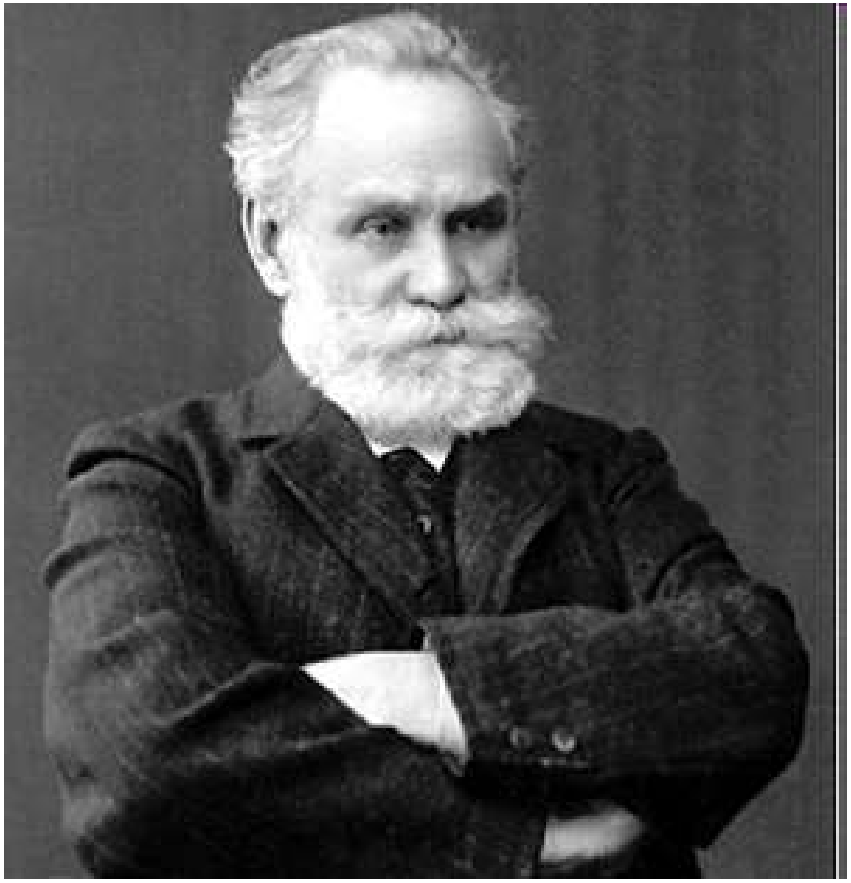
The Contingency Model:



- **Contingency model** – The CS tells the learner that the US will follow
- **Contiguity model** – Over time, the CS will substitute the US
- **Blocking** – if learner is already making an association between two things, a second neutral stimulus will be blocked from creating a reaction.

The Difference between humans and animals:

- Timing is sometimes less critical when working with humans
- The "rational" mind allows some of us to delay gratification
- Some of us may have a harder time – smoking, weight loss, etc.

Latent Learning:

- **Latent learning** – learning in the absence of rewards
- Humans and animals will work in the absence of rewards
- If one group is given rewards and the other is not, the rewarded group will work harder
- But…if the non rewarded group is eventually rewarded at a later time, they will work hard because the think a reward might come at a later time.
- Edward Tolman – Rats and maze example (rats created a cognitive map)

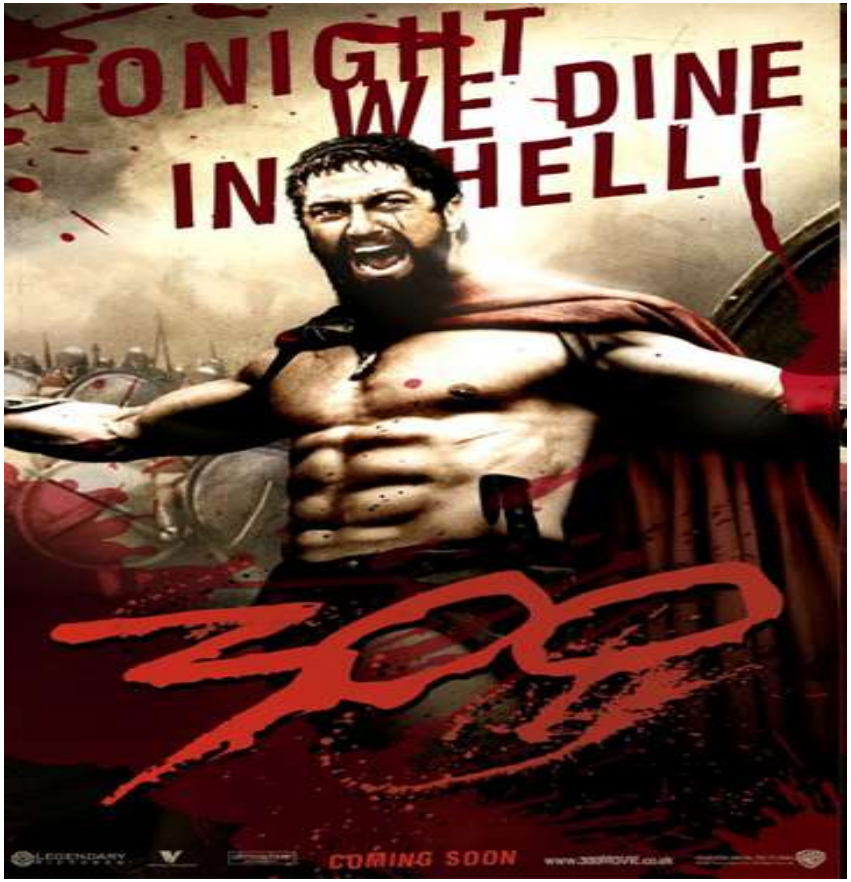
Insight: Wolfgang Kohler

- Have you ever walked out of a class after leaving a problem blank on your test and suddenly the answer popped in your head?
- **Insight** – a sudden appearance of an answer or solution to a problem.
- Wolfgang Kohler and his monkeys (using a stick to get fruit outside of cage or stacking boxes to get bananas)

Social Learning:

- **Observational learning** – (also called modeling) learning that occurs by watching the behavior of a "model"
- **Albert Bandura's Four Steps of Observational Learning**:
- 1. Attention – what's going on here?
- 2. Retention – I think I might be able to do that
- 3. Reproduction – I can do that
- 4. Motivation – I'd like to do that again

Further Research: Observational Learning



Click the PIC!

- Viewing violence can increase the likelihood of aggressive behavior. (300)
- Viewing violence reduces our sensitivity to violence. (videogames)
- Viewing violence decreases our concern about the suffering of victims
- Feeling pride or shame here impacts our further reaction(s) to violence

Albert Bandura: Bobo Doll Experiment

The Bobo Doll Experiment

Discussion: Turn and Talk

1. Why do you think children react in this way?
2. Do you think that children would have been aggressive towards the doll if they would have been told not to?
3. Do you think that violence towards the doll will lead to violence towards others?

At what age do you think that media violence impacts people the most?

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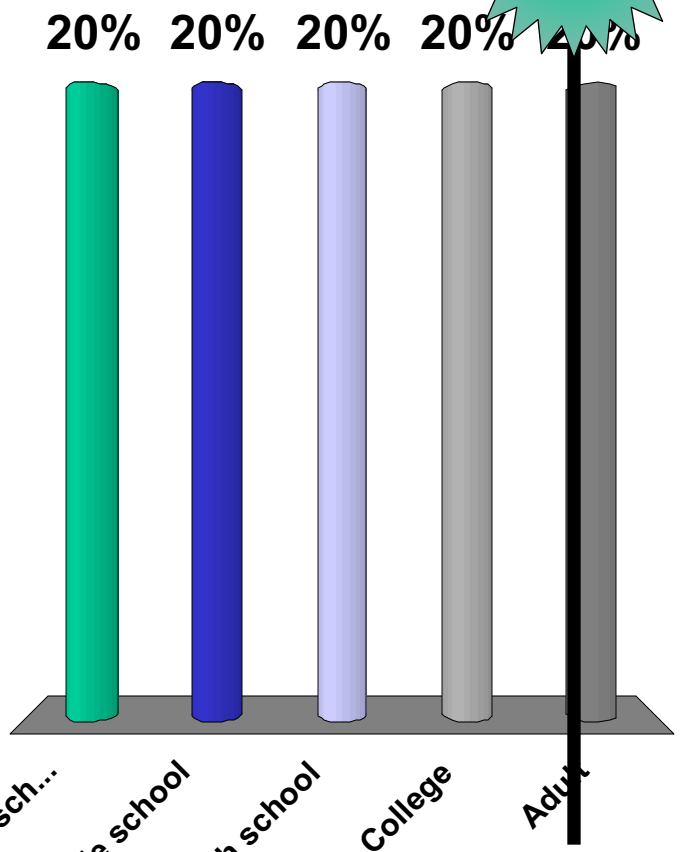
1. Elementary school
2. Middle school
3. High school
4. College
5. Adult



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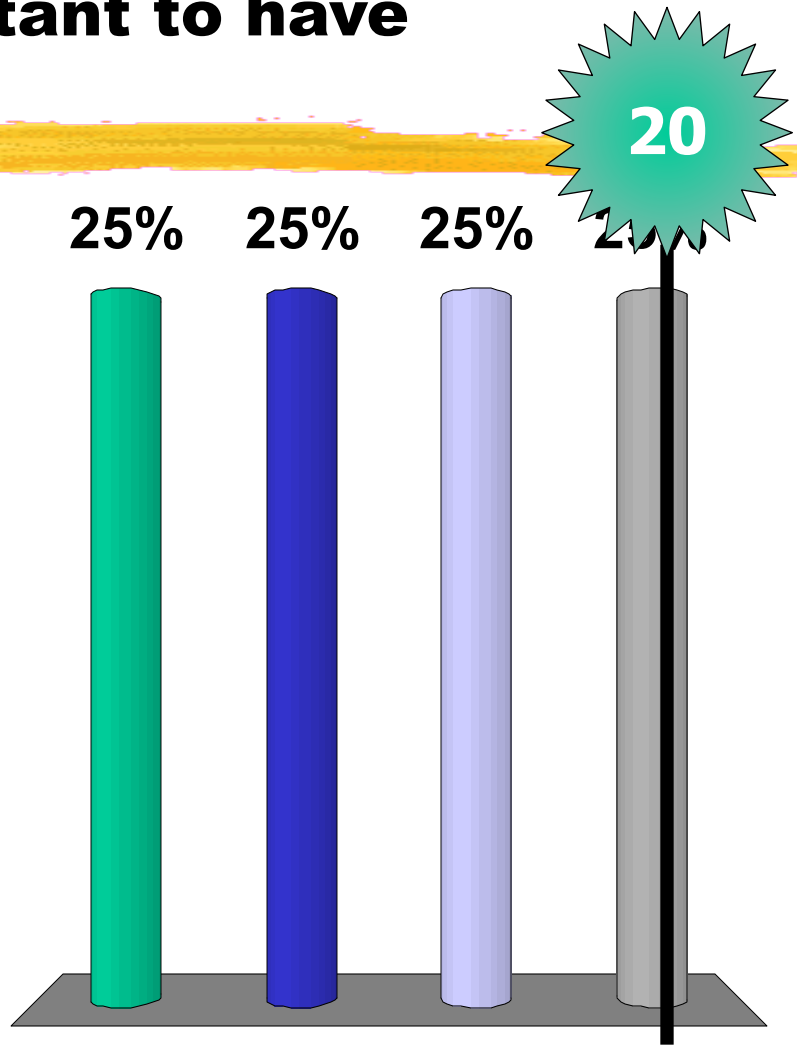
Do you think that it is important to have ratings on media?

1. Yes
2. Maybe
3. No
4. Not sure



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Which of the following forms of media impact children most when it comes to violence?

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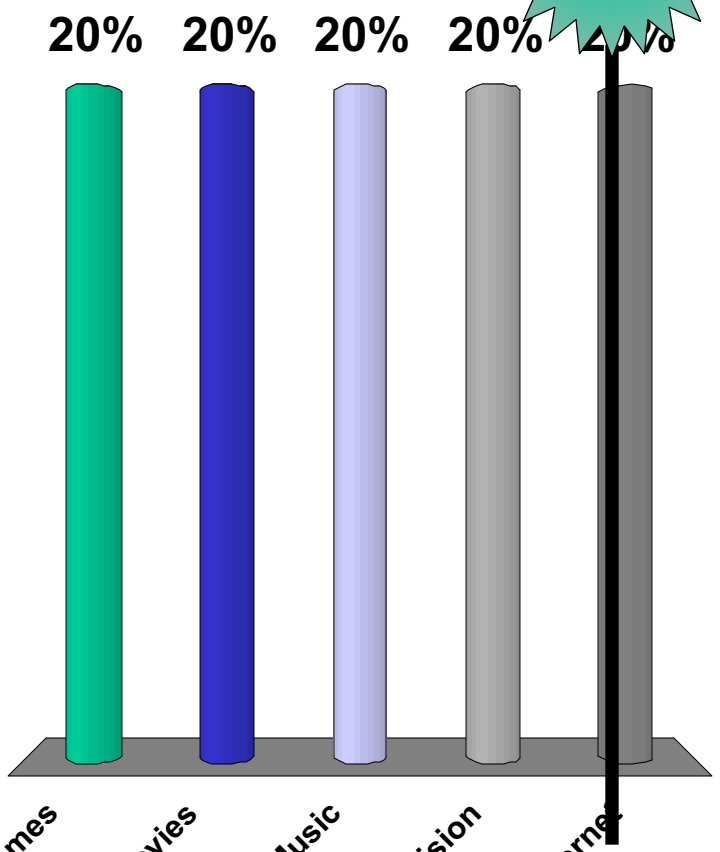
1. Video Games
2. Movies
3. Music
4. Television
5. Internet



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Lesson Five: Objectives

1. Apply learning principles to explain taste aversion, superstitious behavior, and instinctive drift.

Before We Start:

Recap from yesterday:

1. Insight learning - Kohler
2. Latent learning - Tolman
3. Social Learning - Bandura

Biological Factors in Learning:

- Historically speaking, humans have avoided foods that are sour/bitter from a survival standpoint.
- **Taste Aversions** – an intense dislike or avoidance of food because of its association with an unpleasant or painful stimulus through backward conditioning.

Taste Aversion Scenario:

- You have the stomach flu
- You eat popcorn and throw up 2 hours later (the delay portion of this is important)
- Stomach Virus is the UCS
- Vomiting is the UCR
- Now you don't want to eat popcorn
- **NOTE**: Behavioral psychologists have a tough time explaining this because of the length of time in between eating something and getting sick.
- How do we choose what to blame the sickness on?

Preparedness

- **Preparedness** – Through evolution, animals are biologically pre-disposed or prepared to associate illness with bitter or sour foods.
- Other behaviors are learned slowly or not at all.
- Example: People are more likely to be afraid of snakes and spiders than flowers or happy faces.

Instinctive Drift:

- Why don't people always do what they are supposed to?
- **Instinctive Drift** – a conditioned response drifts back toward the natural instinctive behavior of an organism.
- Application – training wild animals (dangerous behaviors)

Behavioral Modification:

Systematic Desensitization – Provide the person with a very minor version of the phobia and work them up to handling the phobia comfortably.

Example: Fear of snakes:

1. Have them watch a short movie about snakes
2. Have them hold a stuffed animal snake
3. Have them hold a plastic snake
4. Have them hold a glass container with a snake inside
5. Have them touch a small harmless snake
6. Gradually work to holding a regular size snake

Last Few Terms:

Counter conditioning – reward behavior when improvement is made

Mere exposure effect – the more you see something, the more likely you are to buy it or do it.

Superstitions – happen just like any other association – something positive happened so they want to do it again