

Learning

Learning

- Associative Learning
- Classical Conditioning
- Operant Conditioning
- Observational Learning
- Biological Components of Learning
- Cognitive Components of Learning
- Behavioral Therapies

Associative Learning

- Learning that certain events occur together
 - Classical Conditioning: neutral stimulus is associated with unconditioned stimulus to become a conditioned stimulus
 - Operant Conditioning: response is associated with stimulus (consequence)

Classical Conditioning

- Subject gives a familiar response to a new stimulus; response involuntary, automatic
- Respondent behavior: reflex responses that are elicited by stimuli not under voluntary control
 - Stimulus: change in the environment that elicits a response
 - Response: reaction to a stimulus

Classical Conditioning

- Neutral Stimulus: does not elicit response until paired w/ UCS
- Unconditioned Stimulus: automatically brings about UCR
- Unconditioned Response: automatically occurring response; response to UCS
- Conditioned Stimulus: originally neutral stimulus; elicits CR after paired w/ UCS
- Conditioned Response: response to CS

Classical Conditioning

- Acquisition: learning to give a known response to a neutral stimulus; initial learning of association
- Extinction: repeated pairing of CS without the UCS leads to its return as the NS
- Spontaneous Recovery: after extinction, the previous CS suddenly elicits the CR again temporarily

Classical Conditioning

- **Ivan Pavlov**

- Physiologist who was first to discover classical conditioning while trying to do studies on salivation and digestion with dogs

- UCS: meat/meat powder
 - UCR: salivation at meat/meat powder
 - CS: bell (formerly NS)
 - CR: salivation at bell

Classical Conditioning

- **John B. Watson**
 - Studied classical conditioning as it related to emotions, especially fear
 - Conditioned “Little Albert” to fear a white rat
 - UCS: loud noise
 - UCR: crying/fear of noise
 - CS: white rat (formerly NS)
 - CR: crying/ fear of rat

Classical Conditioning

- **John Garcia**

- Conditioned Taste Aversion/Garcia Effect: avoidance of food due to association with unpleasant or painful stimulus; may only take one pairing; sickness can occur hours later
- Studied how irradiated rats would avoid sugar liquid consumed before becoming nauseated
 - UCS: radiation
 - UCR: sickness
 - CS: sugar liquid (formerly NS)
 - CR: sickness from sugar

Classical Conditioning

- Higher-Order/Second-Order Conditioning: when a well learned conditioned stimulus (CS) is paired with a neutral stimulus (NS) to produce a CR to the NS
 - old CS acts as the new UCS

Classical Conditioning

- Stimulus Generalization: stimuli similar to the CS also elicit the CR without training
- Stimulus Discrimination: only the CS produces the CR

Operant Conditioning

- Subject voluntarily behaves in certain ways and can learn new behaviors depending on consequences
- More behaviors can be learned than with classical conditioning
- Operant behavior: voluntary behavior influenced by consequences
 - Reinforcement: increase frequency of a behavior
 - Punishment: decrease frequency of a behavior

Operant Conditioning

- **Reinforcement**

- Positive Reinforcement/Reward Training: adds a desirable stimulus following a behavior in order to encourage that behavior
- Negative Reinforcement: takes away an aversive stimulus following a behavior in order to encourage that behavior
 - Avoidance Behavior/Learning: takes away aversive stimulus *before* it begins
 - Escape Behavior/Learning: takes away aversive stimulus *after* it has already started

Operant Conditioning

- **Reinforcement**

- Premack Principle: behaviors can be used as reinforcement in addition to other stimuli
 - People will endure negative behaviors in order to be able to experience positive ones
 - Watching TV, etc. could be seen as reinforcing for other behaviors, like doing homework

Operant Conditioning

- **Reinforcement**

- Primary Reinforcer: reinforcer which is biologically important to individual
- Secondary/Conditioned Reinforcer: neutral reinforcer that is associated with primary reinforcer

Operant Conditioning

- **Reinforcement**
 - Immediate Reinforcer: reinforcer which directly follows behavior
 - Delayed Reinforcer: reinforcer given sometime later after behavior as been completed

Operant Conditioning

- **Reinforcement**

- Continuous Reinforcement: reinforcement after *each* desired behavior
- Partial/Intermittent Reinforcement: reinforcement is not given after *each* desired behavior; less frequent
- Continuous is most effective for acquisition; Partial is most effective for avoiding extinction

Operant Conditioning

- **Partial Reinforcement Schedules**

- Reinforcement occurs after:

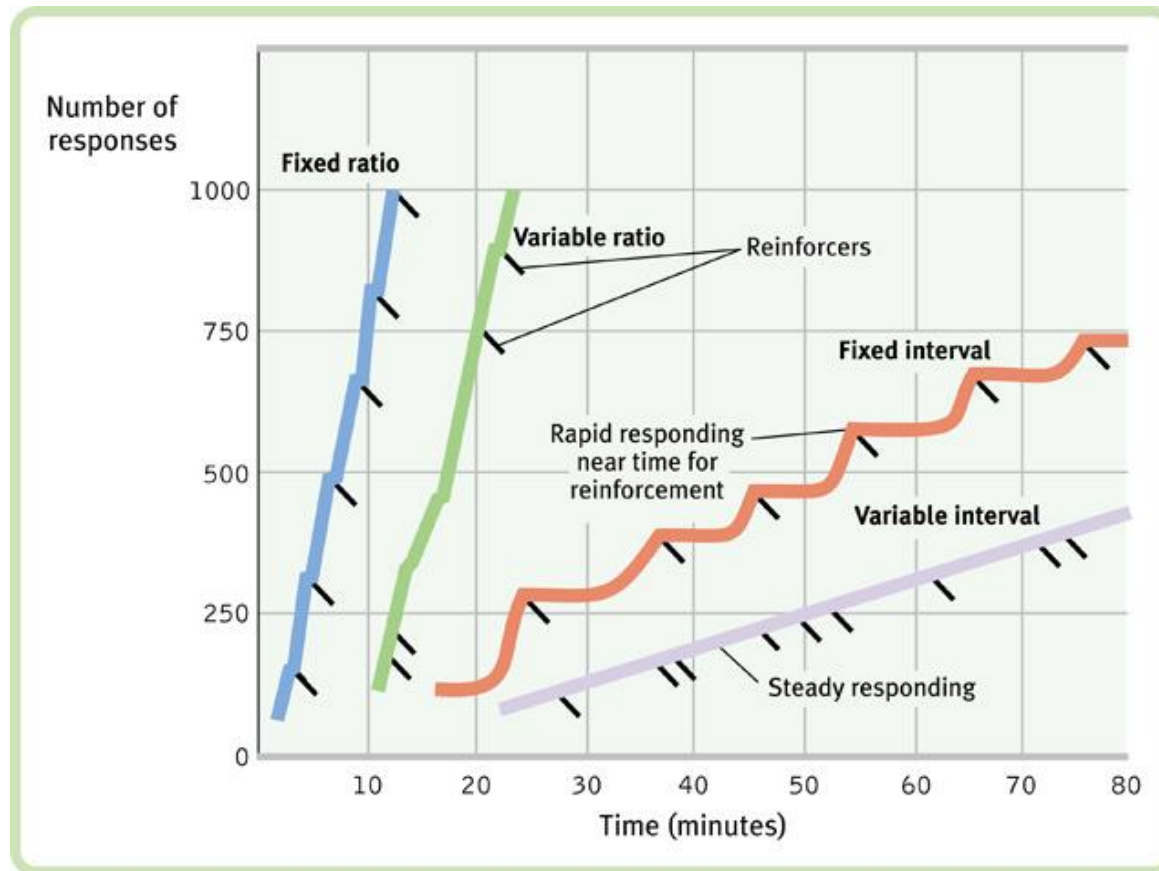
- Fixed Ratio: specific number of responses
- Fixed Interval: specific period of time
- Variable Ratio: unpredictable number of responses
- Variable Interval: unpredictable period of time

- Ratio schedules lead to higher rates of responding than interval schedules

- VR schedule is least resistant to extinction

Operant Conditioning

- **Partial Reinforcement Schedules**



Operant Conditioning

- **Superstition**

- Results when subject believes reinforcement is contingent on a certain behavior, but it is NOT
- Could be due to misinterpretation of partial schedule of reinforcement
 - When pigeons were reinforced on VI schedule, they thought the last behavior before the reinforcer was being reinforced (even though it wasn't), so they developed superstitions (i.e. thinking a pigeon dance led to reinforcement, when the reinforcer was automatically given at varying intervals)

Operant Conditioning

- **Punishment**

- (Positive) Punishment: adds an aversive stimulus following a behavior to discourage that behavior
- (Negative Punishment)/Omission Training: takes away a desirable stimulus following a behavior to discourage that behavior
- Learned Helplessness: feeling of futility and passive resignation that results from inability to avoid repeated aversive events
 - Constant punishment could lead to this

Operant Conditioning

- Shaping: positively reinforcing closer and closer successive approximations of the desired behavior; effective for new and complex behaviors
- Chaining: used to establish a specific sequence of behaviors by initially reinforcing each behavior in the desired sequence, then later rewarding only the completed sequence

Operant Conditioning

- Acquisition: learning which behaviors bring about certain consequences
- Extinction: repeated pairing of behavior without the reinforcement leads to decrease in frequency of behavior
- Spontaneous Recovery: after extinction, the previously reinforced behavior comes back without being reinforced

Operant Conditioning

- Stimulus Generalization: responding in the same way to the stimulus and other stimuli similar to the original reinforced stimulus
- Stimulus Discrimination: responding only to the stimulus which leads to reinforcement

Operant Conditioning

- **Edward Thorndike**
 - Instrumental Learning: associative learning in which a behavior becomes more or less probable depending on consequences
 - Law of Effect: behavior followed by satisfying or positive consequences are strengthened while behaviors followed by annoying or negative consequences are weakened
 - Worked with cats in “puzzle boxes” which learned how to exit based on trial and error and then instrumental learning

Operant Conditioning

- **B. F. Skinner**
 - Took Thorndike's idea of instrumental learning (law of effect) and called it operant conditioning
 - Worked with rats and pigeons which he studied in their interaction with his operant chambers ("Skinner boxes") which were equipped with levers, food dispensers, lights, and an electrified grid which could provide reinforcement or punishment

Observational Learning

- Aka Social Learning Theory
- Subjects learn to behave in certain ways by examining how others behave
- Modeling: process of observing and imitating a specific behavior
- Mirror Neurons: frontal lobe neurons which fire when performing certain actions or when observing someone else do so

Observational Learning

- **Albert Bandura**

- Studied children in Bobo doll experiment to see if aggression learned in one context would be demonstrated if the children were put in a frustrating situation
- Prosocial Behavior: positive, constructive, helpful behavior
 - Opposite of antisocial behavior
 - Can be learned through modeling

Biological Components

- **Preparedness**

- Through evolution, animals are biologically predisposed to easily learn behaviors related to their survival as a species; behaviors contrary to an animal's natural tendencies are learned slowly or not at all
 - Taste aversion & association of sickness with taste as opposed to sights or sounds
 - Fears of more threatening stimuli; easier to fear scary things

Biological Components

- Instinctive Drift: conditioned response that drifts back towards the natural (instinctive) behavior of the organism

Cognitive Components

- Motivation
 - Intrinsic Motivation: motivated by internal factors, satisfaction, accomplishment, pride
 - Extrinsic Motivation: motivated by external factors, especially rewards and punishments
 - Overjustification Effect: occurs when external incentive such as money or prizes decreases a person's intrinsic motivation to perform a task
- Blocking Effect
 - prior experience with one stimulus prevents later conditioning to a second stimulus

Cognitive Components

- **Robert Rescorla**

- Contingency Model of learning: CS tells the organism that the UCS will follow; the predictability of the relationship rather than the frequency of association is important in learning
 - Contrary to Pavlov's contiguity model which sees the repetition of pairings as important for learning the association

Cognitive Components

- **Edward Tolman**

- Latent Learning: learning happens even in the absence of rewards
- Tolman did studies of rats in mazes to show that even those rats not reinforced learned the maze as well as those which *had* been

Cognitive Components

- **Wolfgang Köhler**
 - Insight: sudden appearance of an answer or solution to a problem without any conditioning
 - Put chimpanzee in a cage with a hanging banana (out of reach) and tools to see what it took for them to be able to retrieve the banana

Behavioral Therapies

- **Classical Conditioning**
 - Counterconditioning: triggered stimulus is associated with a new outcome; uses classical conditioning techniques
 - Aversive Conditioning: trains people to associate physical or psychological discomfort with behaviors, thoughts, or situations he/she wants to eliminate
 - Exposure Therapies: exposes people to what they would normally avoid; eventually the feared stimulus becomes associated with calm, neutral feelings

Behavioral Therapies

- **Classical Conditioning**

- Exposure Therapies

- Systematic Desensitization: technique used to treat phobias and other extreme fears
 - Progressive Relaxation: enables a person to recreate the relaxed sensation intentionally in a variety of situations
 - Anxiety Hierarchy: catalogue of anxiety-provoking situations or stimuli arranged in order from least to most distressing
 - Flooding: client repeatedly confronts anxiety-provoking stimulus until the fear is extinguished

Behavioral Therapies

- **Operant Conditioning**
 - Token Economy: reinforcing positive behavior by awarding "tokens" for meeting positive behavioral goals; tokens are accumulated and "spent" in order to obtain a reinforcer (material reward or privilege)
 - Extinction: negative behaviors are ignored in order to remove any reinforcement from reaction to the negative behavior

Behavioral Therapies

- **Observational Learning**

- Social Skills Training

- Modeling: allowing an individual to observe another person performing the appropriate behavior and then providing opportunity to imitate
 - Client practices appropriate social behaviors through role-playing
 - Therapist then shapes behavior by giving positive reinforcement and corrective feedback
 - Uses operant conditioning and observational learning techniques