

PSYC 221

Introduction to General Psychology

Session 5 – Learning

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Session Overview

- We acquire new ways of doing things as well as complex skills such as driving a car. These skills are attained through the processes of learning. Learning is the relative permanent change in the behavior of organisms brought about by experience. We will focus on understanding the different methods for explaining how we learn as well as the different forms of learning and how the principles of learning could be applied.



Session Outline

The key topics to be covered in the session are as follows:

- Defining learning
- Habituation
- Classical/Pavlovian conditioning
- Operant conditioning
- Observational learning

Reading List

- Chapter 5 of Feldman (2007), Essentials of Understanding Psychology
- Chapter 7 of Myers (2008), Exploring psychology.



Topic One

DEFINING LEARNING



What is Learning

- Relatively permanent change in an organism's behaviour due to experience
- Some learning involves development of new skills (e.g., learning to drive a car)
- Some learning involves changes in existing behaviour (e.g., learning to control temper)
- Some learning involves simple association (e.g., association between smoke and fire)
- Learning complex belief systems (e.g., learning Buddhism)
- Learning can also be imposed on humans (e.g., touch stove and one's hand will get burned)



How do we learn?

- According to philosophers such as Aristotle (2000 years ago) as well as John Locke and David Hume (200 years ago), we learn by **association**.
- Our minds naturally connect events that occur in sequence
- *Conditioning* is the process of learning associations
- Associative Learning
 - learning that two events occur together
 - two stimuli
 - a response and its consequences

What is learning

- Types of learning
 - Classical/Pavlovian conditioning
 - Operant conditioning
 - Observational learning

Topic Two

HABITUATION



Habituation

- Habituation is one of the simplest forms of learning
- It means the decline in responses of organism's response to stimulus once that stimulus becomes familiar.
- It simply means getting used to a stimulus/event but the organism does not learn anything new from that event
- The environment is full of stimuli that include various sounds and sights
- Habituation enable us to ignore repetitive and stimuli that are irrelevant

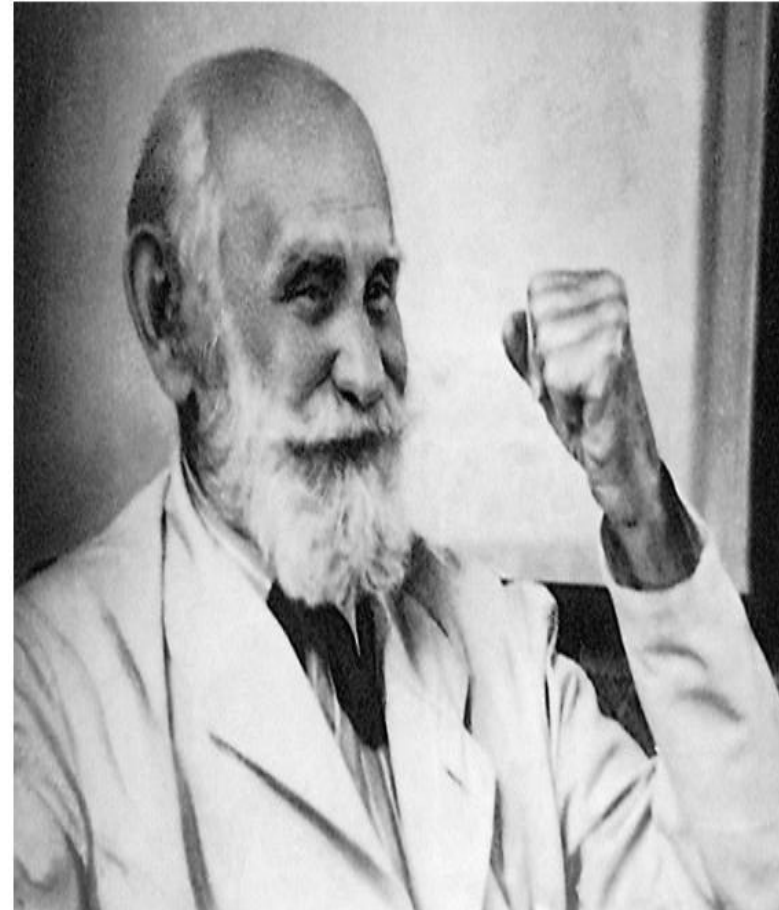
Topic three

CLASSICAL CONDITIONING



Classical/Pavlovian conditioning

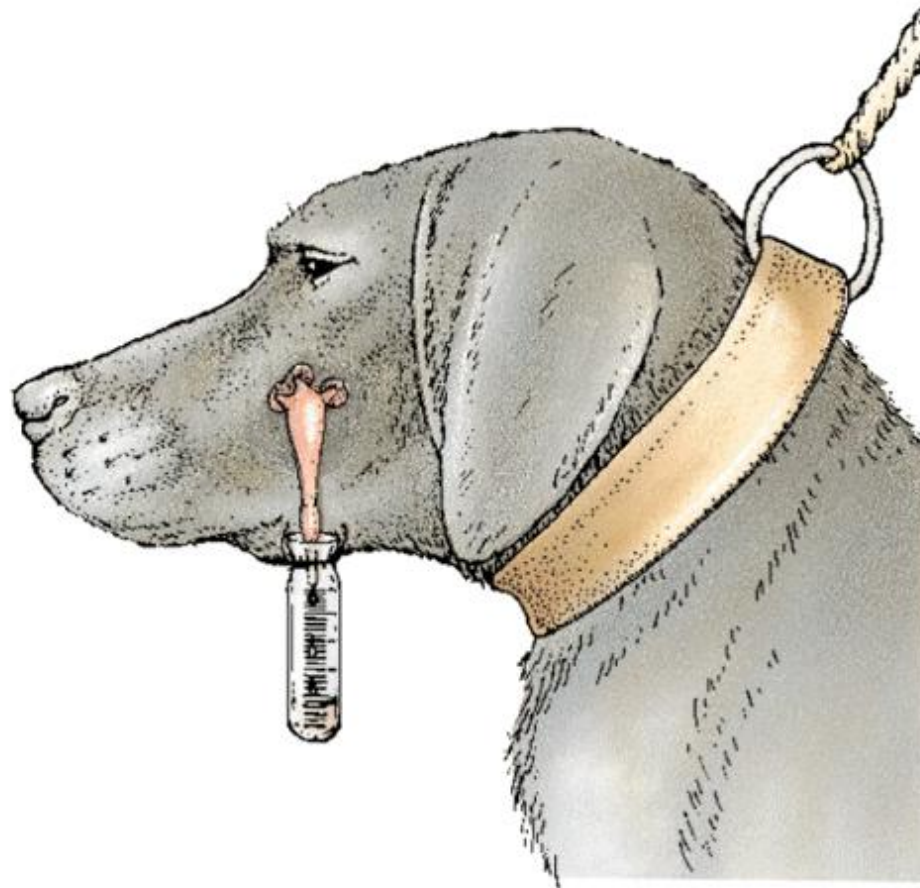
- Credited to Ivan Pavlov (1849-1936)
- He was a Russian physician/neurophysiologist
- He won a Nobel prize in 1904
- He studied digestive secretions



Classical conditioning

- Pavlov noticed that, rather than simply salivating in the presence of meat powder (by which dogs were fed), the dogs began to salivate in the presence of the lab technician who normally fed them.
- He decided to study these effects in his lab
- He developed a device for recording salivation
- Through constant pairing, he found that organism comes to associate two stimuli; a natural one and one that already causes a reflexive response
- A neutral stimulus that signals an unconditioned stimulus begins to produce a response that anticipates and prepares for the unconditioned stimulus

Classical conditioning



Terms in classical conditioning

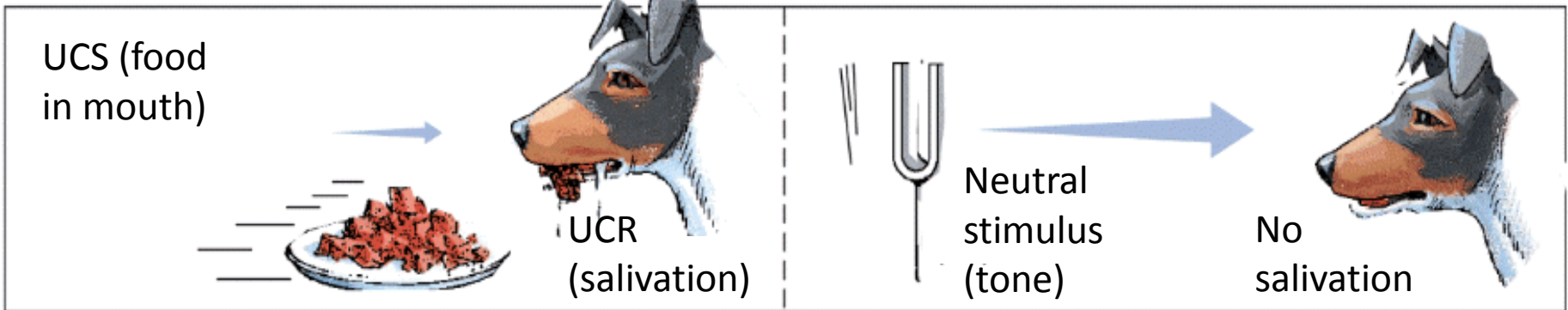
- **Unconditioned Stimulus (UCS)**
- UCS is used to describe a stimulus that unconditionally/automatically and naturally triggers a response
 - E.g., dogs salivate when they see meat. Meat is the UCS
- **Unconditioned Response (UCR)**
- UCR is an unlearned, naturally occurring response to the unconditioned stimulus
 - E.g., salivation when food is in the mouth

Terms in classical conditioning

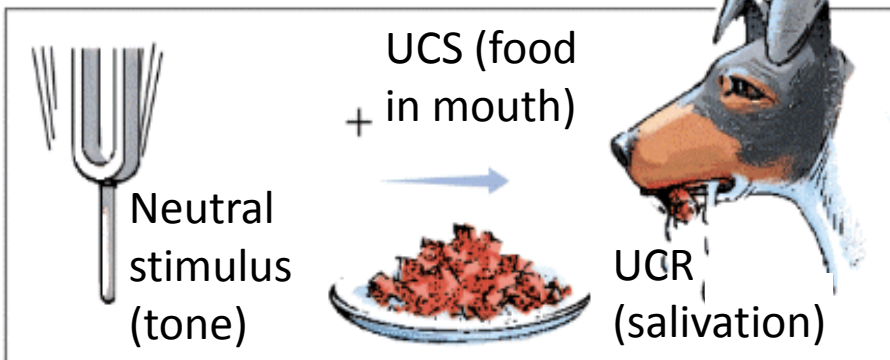
- **Conditioned Stimulus (CS)**
- CS is a stimulus that originally does not elicit, but after association with an unconditioned stimulus, comes to trigger a conditioned response
- **Conditioned Response (CR)**
- CR is a learned response to a previously neutral conditioned stimulus

Pavlov's Classic Experiment

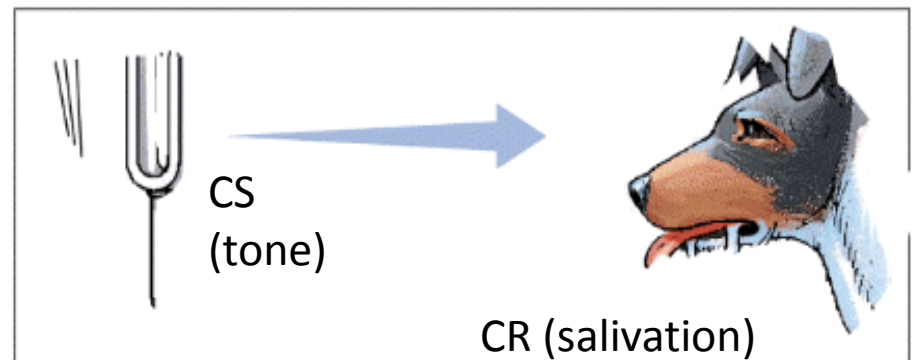
Before Conditioning



During Conditioning



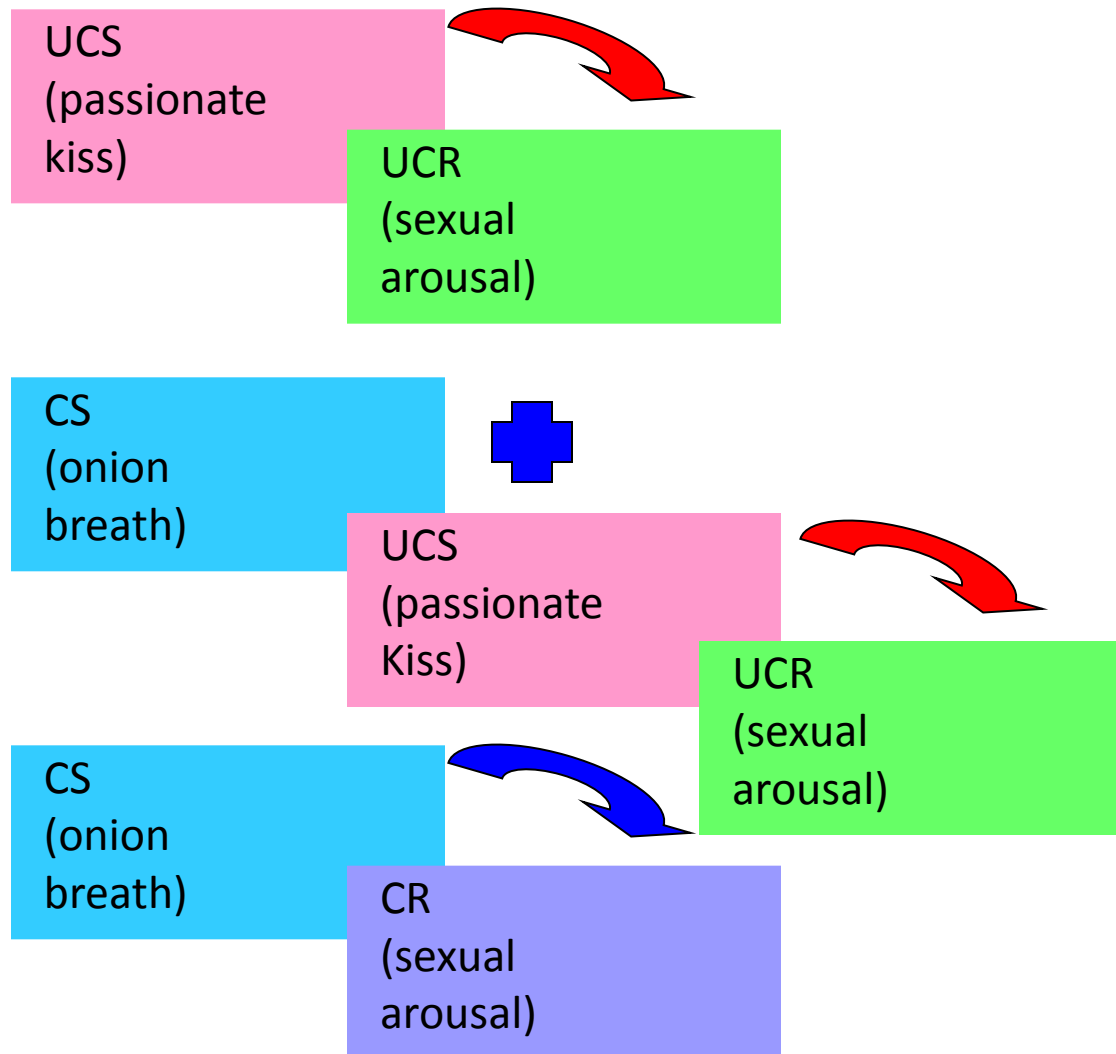
After Conditioning



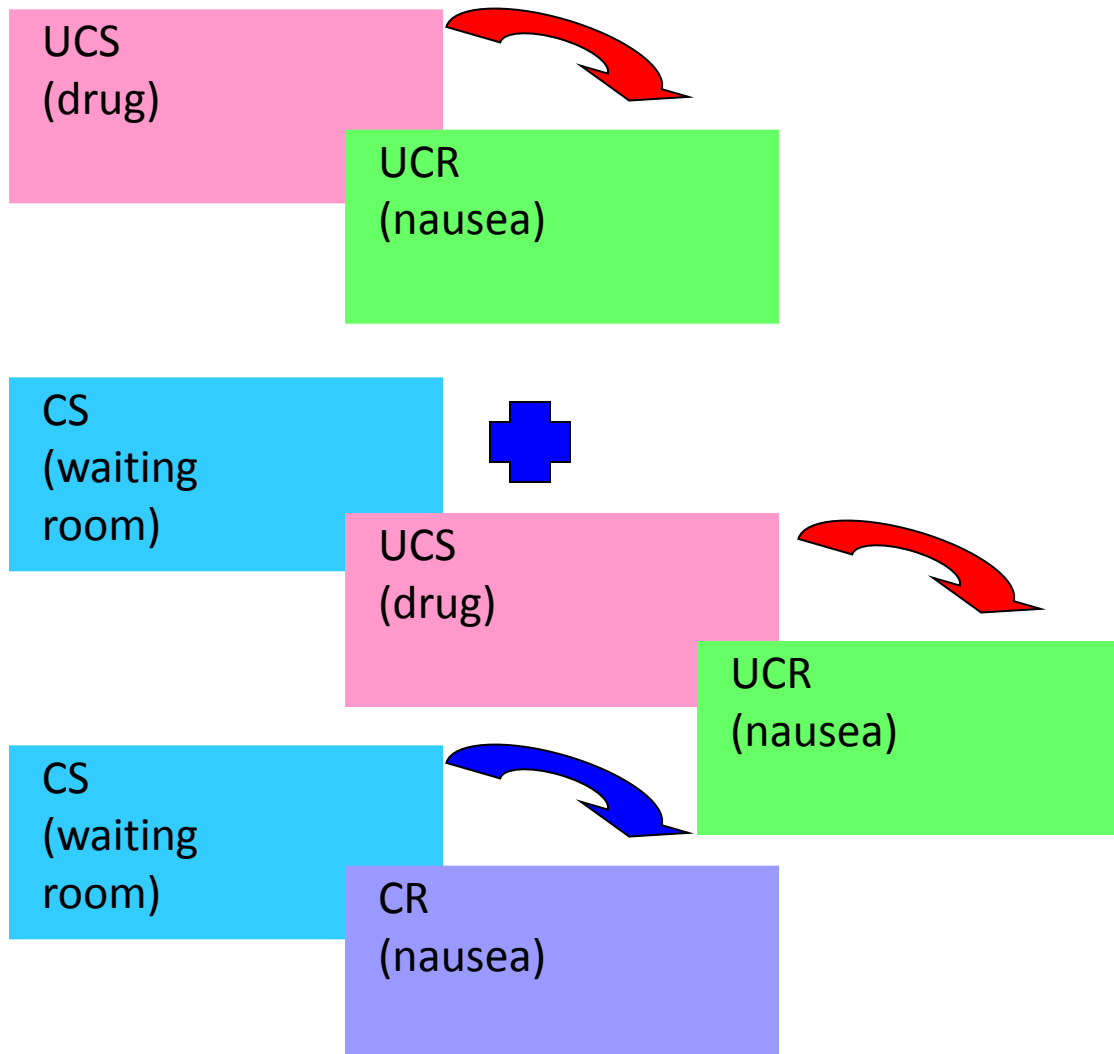
Terms in classical conditioning

- Acquisition
- It is the initial stage in classical conditioning
- The phase where a neutral stimulus is paired with an unconditioned stimulus after which the neutral stimulus comes to elicit a conditioned response
- In operant conditioning, the strengthening of a reinforced response

Diagrammatic representation of Classical Conditioning



Nausea Conditioning in Cancer Patients



Terms in classical conditioning

- **Extinction**
- This is the diminishing of a CR
- In classical conditioning, extinction result when a UCS does not follow a CS
- Conditioned Response will gradually disappear if the CS is repeatedly presented by itself; without the Unconditioned Stimulus
- E.g., Bell but no food

Terms in classical condition

- **Spontaneous Recovery** is the reappearance, after a rest period, of an extinguished CR
- Extinction does not erase the original learning.
- The animal keeps some memory of the previous learning.
- After the extinction if the animal is shown with CS, it would often elicit CR
- **Generalization** is the tendency for stimuli similar to CS to elicit similar responses

Terms in classical conditioning

- **Discrimination** is the learned ability to differentiate between a CS and other stimuli that do not signal a UCS
- E.g.,
- **Stimulus generalization** is the tendency to respond to stimuli similar to the CS.
- Pavlov conditioned the dog's salivation (CR) by using miniature vibrators (CS) on the thigh. When he subsequently stimulated other parts of the dog's body, salivation dropped.

Classical Conditioning

UCS
(loud noise)



UCR
(fear)

CS
(rat)



UCS
(loud noise)



UCR
(fear)



CS
(rat)



CR
(fear)



Stimulus similar
to rat (such as
rabbit)



Conditioned fear
(generalization)



Applications of Classical Conditioning

- Former crack cocaine users should avoid cues (people, places) associated with previous drug use.
- Through classical conditioning, a drug (plus its taste) that affects the immune response may cause the taste of the drug to invoke the immune response.
- May also be used to explain how children develop fear towards settings (e.g., hospital) and how phobias are developed
- Watson used classical conditioning procedures to develop advertising campaigns for a number of organizations, including Maxwell House, making the “coffee break” an American custom.



Topic Four

OPERANT/INSTRUMENTAL CONDITIONING

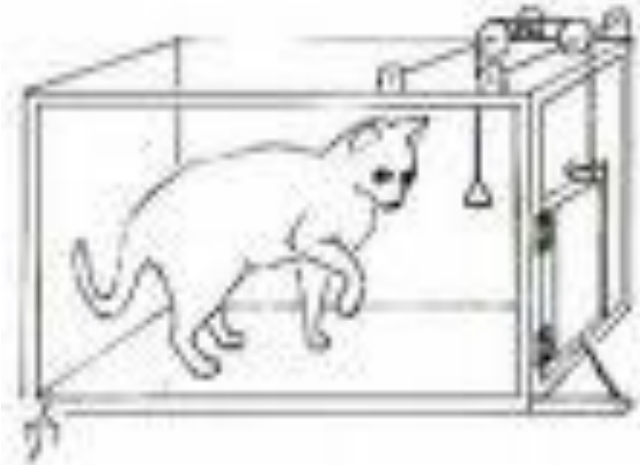


Operant/instrumental conditioning

- This is a type of learning in which behaviour is strengthened if followed by reinforcement or diminished if followed by punishment



Operant/instrumental conditioning



- Door can only be opened if the cat pulls the rope attached to the string
- If it manages the trick, a small portion of food would be given as a reward

Thorndike's Cat in a
Puzzle Box

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Operant conditioning

- **Thorndike's Law of effect**
- Thorndike's principle that behaviors followed by favorable consequences become more likely to occur, and behaviors followed by unfavorable consequences become less likely to occur

Operant conditioning

- B.F. Skinner (1904-1990) elaborated Thorndike's Law of Effect and developed behavioral technology
- He developed **Skinner Box**
- This box has a chamber with a bar or key that an animal manipulates to obtain a food or water reinforcer and contains devices to record responses
- contains devices to record responses

Terms in operant conditioning

- **Shaping** is the operant conditioning procedure in which reinforcers guide behavior towards the desired target behavior through successive approximations.
- **Reinforcement:** Any event that strengthens the behavior it follows. A heat lamp positively reinforces a meerkat's behavior in the cold.
- **Positive:** it's existence helps to create the desired behavior (food, drink etc)
- **Negative:** it's non-existence helps to create the desired behavior (loud noise, electric shock etc)

Principles of reinforcement

- **Primary Reinforcer** is an innately reinforcing stimulus
 - i.e., satisfies a biological need
- **Conditioned Reinforcer** is a learned reinforcer (stimulus) that gains its reinforcing power through its association with primary reinforcer
 - secondary reinforcer
- **Immediate Reinforcer:** A reinforcer that occurs instantly after a behavior. A rat gets a food pellet for a bar press.
- **Delayed Reinforcer:** A reinforcer that is delayed in time for a certain behavior. A paycheck that comes at the end of a week.

Schedules of Reinforcement

- **Continuous Reinforcement:** reinforcing the desired response each time it occurs
- **Partial (Intermittent) Reinforcement:** reinforcing a response only part of the time
 - This results in slower acquisition and greater resistance to extinction
- **Fixed Ratio (FR):** reinforces a response only after a specified number of responses
 - faster you respond the more rewards you get
 - different ratios
 - very high rate of responding
 - like piecework pay



Schedules of Reinforcement

- Variable Ratio (VR)
 - reinforces a response after an unpredictable number of responses
 - average ratios
 - like gambling, fishing
 - very hard to extinguish because of unpredictability

Schedules of Reinforcement

- Fixed Interval (FI)
 - reinforces a response only after a specified time has elapsed
 - response occurs more frequently as the anticipated time for reward draws near
 - Mail delivery, waiting for cake to bake
- Discriminative stimulus = in operant conditioning, a stimulus (cue) signaling that a response will be reinforced
 - Logos such as golden arches – turn in here and you will find food
 - Word “Sale” -
 - Others?

Punishment

- Punishment is an aversive event that decreases the behavior that it follows
- It is a powerful controller of unwanted behavior
- **Types of punishment**
- Positive punishment : administer an aversive stimulus such as spanking a child.
- Negative punishment: withdraw a desirable stimulus such as using time out



Effects of punishment

Although there may be some justification for occasional punishment (Larzelere & Baumrind, 2002), it usually leads to negative effects.

- Results in unwanted fears.
- Conveys no information to the organism.
- Justifies pain to others.
- Causes unwanted behaviors to reappear in its absence.
- Causes aggression towards the agent.
- Causes one unwanted behavior to appear in place of another.

Criticism

- Skinner believed in inner thought processes and biological underpinnings, but many psychologists criticize him for discounting them.
- Skinner argued that behaviors were shaped by external influences instead of inner thoughts and feelings. Critics argued that Skinner dehumanized people by neglecting their free will.

Applications of operant conditioning

- Skinner introduced the concept of teaching machines that shape learning in small steps and provide reinforcements for correct rewards.
- Reinforcers affect productivity. Many companies now allow employees to share profits and participate in company ownership.
- In children, reinforcing good behavior increases the occurrence of these behaviors. Ignoring unwanted behavior decreases their occurrence.

Topic Five

OBSERVATIONAL LEARNING



Differences between classical and operant conditioning

- Although both are forms of association learning, there are differences
- In operant conditioning, organisms associate their own actions with consequences.
- Operant Behavior: behaviors that operates (acts) on environment to produce consequence
- Classical conditioning forms association between stimuli
- Classical conditioning also involves respondent behavior that occurs as an automatic response to stimulus

Observational learning

- Higher animals, especially humans, learn through observing and imitating others.
- Neuroscientists discovered mirror neurons in the brains of animals and humans that are active during observational learning.
- Mirror neurons are frontal lobe neurons that fire when performing certain actions or when observing another doing so
- They may enable imitation, language learning, and empathy

Operant vs. Classical Conditioning

TABLE 8.2 COMPARISON OF CLASSICAL AND OPERANT CONDITIONING

	Classical Conditioning	Operant Conditioning
Response	Involuntary, automatic	“Voluntary,” operates on environment
Acquisition	Associating events; CS announces UCS.	Associating response with a consequence (reinforcer or punisher).
Extinction	CR decreases when CS is repeatedly presented alone.	Responding decreases when reinforcement stops.
Cognitive processes	Subjects develop expectation that CS signals the arrival of UCS.	Subjects develop expectation that a response will be reinforced or punished; they also exhibit latent learning, without reinforcement.
Biological predispositions	Natural predispositions constrain what stimuli and responses can easily be associated.	Organisms best learn behaviors similar to their natural behaviors; unnatural behaviors instinctively drift back toward natural ones.

Observational learning

- Observational learning begins early in life where children learn by observing others.
- The process of learning through observing and imitating a specific behavior is called modeling
- Observational learning depends on the following:
 - Attention: the extent to which we focus on other's behavior
 - Retention: our ability to retain a representation of others' behavior in memory
 - Production processes: the ability to act on the memory represented in mind
 - Motivation: the usefulness of the information we have acquired

Applications of observational learning

- Albert Bandura's experiment with the Bobo doll
- He concluded that we look and learn
- Bandura's studies show that antisocial models (family, neighborhood or TV) may have antisocial effects.
- Research shows that viewing media violence leads to an increased expression of aggression.
- Gentile et al., (2004) shows that children in elementary school who are exposed to violent television, videos, and video games express increased aggression.

Sample Question

- Differentiate between classical and operant conditioning?
- How might educators, business managers, and other individuals apply classical and operant conditioning?



References

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