Links to Learning Objectives

ENDURING ISSUES IN LEARNING

CLASSICAL CONDITIONING
Definition of learning
Basic elements & establishing a response
Classical conditioning in humans & selectivity

OPERANT CONDITIONING
How operant and classical conditioning differ
Basic elements, establishing a response, reinforcement & punishment
Learned helplessness
Biofeedback & neurofeedback

FACTORS SHARED BY CLASSICAL AND OPERANT CONDITIONING

Contingencies
Schedules of reinforcement
Extinction, spontaneous recovery, generalization, & discrimination
Higher-order conditioning & primary & secondary reinforcers

COGNITIVE LEARNING
Definition, latent learning, & cognitive maps
Insight & learning sets
Observational learning
Cognitive learning in nonhumans

Enduring Issues

How is learning influenced by an organism's inborn characteristics?
Enduring Issues

To what extent do organisms change over the course of their lives?

In what ways do the events that shape learning vary among different individuals?

How does learning influence how our body responds to disease?
Any relatively permanent change in behavior brought about by experience or practice.

LEARNING OBJECTIVE: Define learning.

Three Types of Learning

- Operant Conditioning
- Classical Conditioning
- Cognitive Learning

Classical Conditioning
**Classical Conditioning**

LEARNING OBJECTIVE: Describe the elements of classical conditioning, distinguishing between unconditioned stimulus, unconditioned response, conditioned stimulus and conditioned response. Describe the process of establishing a classically conditioned response, including the effect of intermittent pairing.

- Type of learning in which a response naturally elicited by one stimulus comes to be elicited by a different, formerly neutral, stimulus
- Discovered by Pavlov while studying digestion in dogs

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**OPEN YOUR BOOK**

**Pavlov and Classical Conditioning**

“A ringing bell does not usually make a dog’s mouth water, but after hearing the bell many times right before getting fed, Pavlov’s dogs began to salivate as soon as the bell rang. It was as if they had learned that the bell signaled the appearance of food, and their mouths watered on cue even if no food followed. The dogs had been conditioned... (Pavlov, 1927).”

—Page 156 (Morris and Maisto)

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**Elements of Classical Conditioning: New Reflexes from Old**
Neutral Stimulus
No Response
Unconditioned Stimulus
Unconditioned Response
Conditioned Response
Conditioned Stimulus

It takes repeated pairings of a US and a cue before the UR becomes a conditioned response.

Establishing a Classically Conditioned Response

Spacing of Pairings
Consistency of Pairings
Number of Pairings

Moderate spacing of pairings means quicker learning.

MODERATE
Pairing the CS and US on only some of the learning trials (intermittent pairing) reduces rate of learning and final strength of the learned response.

LEARNING OBJECTIVE: Provide examples of classical conditioning in humans, including desensitization therapy. Explain the statement that "classical conditioning is selective" and illustrate with examples of conditioned taste aversions.

**Phobias**

- **Learned through classical conditioning**
  - Little Albert

- **Unlearned through classical conditioning**
  - Peter
  - Desensitization therapy

**Classical Conditioning Is Selective**
Operant Conditioning

Type of learning in which behaviors are emitted (in the presence of specific stimuli) to earn rewards or avoid punishments
- Thorndike’s puzzle box

Elements of Operant Conditioning

- Emitted behavior (operant behavior): Designed to operate on the environment to gain something desired, avoid something unpleasant
- Consequence: Stimulus that follows an emitted or operant behavior
  - Reinforcers
  - Punishers
  - Law of effect
Establishing an Operantly Conditioned Response

**Skinner box**
- Limits the available responses, increasing likelihood that desired response will occur

**Shaping**
- Reinforces successive approximations to a desired behavior

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**Applying Psychology**

1. Identify “target” behavior.
2. Define target behavior precisely.
3. Monitor present behavior.
4. Select positive reinforcer that is contingent upon improvements in the target behavior.
**Positive reinforcers:**
Events whose presence increases the likelihood that ongoing behavior will recur

**Negative reinforcers:**
Events whose reduction or termination increases the likelihood that ongoing behavior will recur

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**A Closer Look at Reinforcement**

Any event whose presence decreases the likelihood that an ongoing behavior will recur

**Differences Between Punishment and Negative Reinforcement**

**Punishment**
- Adds something unpleasant to the behavior that preceded it

**Negative reinforcement**
- Removes something
- Strengthens the behavior that preceded it
In order for punishment to be effective it must be:
- Swift
- Sufficient without being cruel
- Consistent

Punishment also has drawbacks because it:
- Cannot unteach unwanted behaviors
- Can backfire by stirring up negative feelings
- Can teach aggression

Learned Helplessness

LEARNING OBJECTIVE: Explain what is meant by learned helplessness.

Learned helplessness: Failure to take steps to avoid or escape from an unpleasant or aversive stimulus that occurs as a result of previous exposure to unavoidable painful stimuli
Learning Objective: Describe how biofeedback and neurofeedback can be used to change behavior.

Biofeedback: technique using monitoring devices to provide precise information about internal physiological processes (i.e. heart rate, blood pressure), to teach people to gain voluntary control over these functions.

Neurofeedback: biofeedback technique that monitors brain activity with the use of an EEG to teach people to gain voluntary control over their brain wave activity.

Factors Shared by Classical and Operant Conditioning

1. They involve learned associations.
2. Responses are under control of stimuli in the environment.
3. Responses will gradually disappear if not periodically renewed.
4. New behaviors can build upon previously established ones.
The Importance of Contingencies

LEARNING OBJECTIVE: Describe the importance of contingencies in both operant and classical conditioning.

Classical Conditioning

- Contingency between CS and US; CS signals that US is about to happen
  - CS must come before US
  - CS must occur in close proximity to US

Operant Conditioning

- Contingency between responses and consequences
  - Schedules of reinforcement: contingencies between responses and rewards
    - Partial reinforcement = longer-lasting behavior
    - Continuous reinforcement = behavior does not last as long

Schedules of Reinforcement: FR

LEARNING OBJECTIVE: Differentiate between the four schedules of reinforcement in operant conditioning and their effect on learned behavior.

- Fixed Ratio: Correct response is reinforced after a fixed number of correct responses
  - Rapid, steady response rate with short pauses
Schedules of Reinforcement: VR

VR: Varying number of correct responses must occur before reinforcement
- Rapid rate without pauses

Schedules of Reinforcement: FI

FI: Correct response is reinforced after a fixed length of time has passed
- Increase in response before reinforcement, long pauses after

Schedules of Reinforcement: VI

VI: Correct response is reinforced after varying amounts of time
- Slower, steady rate
Extinction and Spontaneous Recovery

LEARNING OBJECTIVE: Describe the processes of extinction, spontaneous recovery, generalization, and discrimination in classical and operant conditioning.

**Extinction:** Decrease in the strength or frequency, or stopping, of a learned response because of:
- failure to continue pairing the US and CS (classical conditioning)
- withholding of reinforcement (operant conditioning)

**Spontaneous recovery:** Learned response suddenly reappears on its own

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**Extinction & Spontaneous Recovery in Classical Conditioning**

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<th>CS-US paired</th>
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**Amount of spontaneous recovery**

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**Extinction in Operant Conditioning**

Extinguishing operantly conditioned responses depends on a number of factors:

1. Strength of the original learning
2. Pattern of reinforcement
3. Variety of settings in which the original learning took place
4. Complexity of the behavior
5. Learning through punishment vs. reinforcement
Stimulus Control
Control of conditioned responses by cues or stimuli in the environment

- Occurs in classical conditioning?
  - YES ✓ NO ___
- Occurs in operant conditioning?
  - YES ✓ NO ___

Stimulus Generalization
Stimulus generalization: Transfer of a learned response to different but similar stimuli

- Occurs in classical conditioning?
  - YES ✓ NO ___
- Occurs in operant conditioning?
  - YES ✓ NO ___

Response generalization: Giving a response that is somewhat different from the response originally learned to that stimulus

- Occurs in classical conditioning?
  - YES ✓ NO ___
- Occurs in operant conditioning?
  - YES ✓ NO ___

Stimulus Discrimination
Learning to respond to only one stimulus and to inhibit the response to all other stimuli

- Occurs in classical conditioning?
  - YES ✓ NO ___
- Occurs in operant conditioning?
  - YES ✓ NO ___
New Learning Based on Original Learning

LEARNING OBJECTIVE: Explain what is meant by higher order conditioning and differentiate between primary and secondary reinforcers.

**Higher order conditioning:**
Conditioning based on previous learning

- Conditioned stimulus serves as an unconditioned stimulus for further training

**Before Conditioning**

**New Learning Based on Original Learning**

**Primary reinforcers:**
Reinforcers that are rewarding in themselves

**Secondary reinforcer:**
Reinforcers whose value is acquired through association with other primary or secondary reinforcers

**Summing Up**

“The main difference between... (classical and operant conditioning) is that in classical conditioning, the learner is passive and the behavior involved is usually involuntary, whereas in operant conditioning, the learner is active and the behavior involved is usually voluntary.”

– Page 176 (Morris and Maisto)
Cognitive Learning

Learning that depends on mental processes that are not directly observable

- **Latent learning**: Learning that is not immediately reflected in a behavior change
- **Cognitive map**: A learned mental image of a spatial environment that may be called on to solve problems when stimuli in the environment change

**LEARNING OBJECTIVE**: Define cognitive learning and how it can be inferred from evidence of latent learning and cognitive maps.

Latent Learning and Cognitive Maps
Insight and Learning Sets

**Insight:**
Learning that occurs rapidly as a result of understanding all the elements of a problem

**Learning set:**
The ability to become increasingly more effective in solving problems as more problems are solved

Learning by Observing

**Observational (or vicarious) learning:**
Learning by observing other people’s behavior based on the punishment and rewards others receive

**Vicarious reinforcement (or punishment):**
Reinforcement or punishment experienced by models that affects the willingness of others to perform the behaviors they learned by observing those models

Learning and Performance

**Learning can occur without performance.**
Albert Bandura

Social cognitive theory
The Bobo doll experiment (1965) illustrated the influence of modeled aggression on preschool children.

- Children imitated aggressive behaviors they observed.
- This had important implications regarding unintentionally teaching aggression to children.

Results of Bandura’s Study

Cognitive Learning in Nonhumans

LEARNING OBJECTIVE: Give examples of cognitive learning in nonhumans.

Experiments have revealed that animals are capable of various forms of cognitive learning through:

- observing others
- experiencing pairing of stimuli and responses
- acquiring behaviors in response to rewards and punishments
Lecture Activities

Classical Conditioning in the Classroom
Let's see if we can set up and test a scenario for classically conditioning a simple reflex, right here in the classroom.
Pair up!

Tony is 6 years old, with a father who is usually busy with work, and who leaves most parental decisions to Tony’s mother. Recently, Tony has begun to disobey his mother’s instructions, which causes Tony’s father to spank him and lecture him about obedience. Afterwards, Tony disobeys his mother even more than before. What conclusion(s) can we reach?

A. The Law of Effect is not really a law, because it does not explain Tony’s behavior – Tony is doing the behavior more even though the behavior is being punished.
B. The Law of Effect does explain Tony’s behavior – Tony is being rewarded for his behavior, so it happens more often.
C. Tony likely has a psychological disorder that leads to this behavior.
D. Tony’s parents are relying on classical conditioning instead of operant conditioning.
What shape would you like?

Using strict behavioral principles, let’s see if we can shape someone into performing a very simple behavior here in class. We’ll need a victim...

Negative Reinforcement vs. Punishment

In small groups, decide which of the following illustrates negative reinforcement or punishment. Discuss your rationale.

1. Playing less aggressively in a soccer game to avoid a red card.
2. Being thrown out of a soccer game for playing too aggressively.
3. Mailing your income tax in on time to avoid a late penalty.
4. Losing some of your money to pay a late penalty for filing your taxes after April 15th.
5. Obeying your parent, before she reaches the “count of three,” to avoid punishment.

Do we repeat the past?

What was your experience with punishment and reward growing up? Were you rewarded for good grades? How about spankings for misbehavior? How did your parents encourage and discourage your behaviors? Will you punish and reward like your parents?
How strongly do you agree or disagree with the following statements? Why?

1. My behavior is affected by what I see on television and at the movies.
2. My emotions are affected by what I see on television and at the movies.
3. My thoughts are affected by what I see on television and at the movies.
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