LEARNING

CHAPTER 7

LEARNING GOALS

Define learning

Describe the basic elements of classical conditioning
  • Define the unconditioned stimulus, unconditioned response, conditioned stimulus, and conditioned response

Describe the basic elements of operant conditioning
  • Define reinforcement and punishment, both positive and negative
  • Describe schedules of reinforcement, shaping, and extinction of learning

Describe how organisms learn without direct experience
INTRODUCTION

Learning:

• is the shorthand for a collection of procedures, techniques and outcomes that produce a change in an organism’s behavior

Learning involves some relatively permanent change in the state of the learner

• Learning is based on experience
• Learning produces change
• Learning needs an overt behavior to demonstrate the change
LEARNING

Learning is a process that can be conscious (deliberate) OR unconscious

- Memorizing the names of President’s
- Associating logos

Learning and Memory

- Learning produces memories
- Memory also affects our learning
  - Makes it easier in some instances
  - Harder in others

Learning is important because we need it in order to adapt to the environment

OUTLINE

Introduction to Learning
Habituation & Sensitization
Classical Conditioning
Operant Conditioning
HABITUATION & SENSITIZATION

Repeated exposure decreases response – Habituation

- Learn to ignore
  - White Noise maker in the bedroom
- Notice novel stimuli
- Orient to novelty then ignore
- Adaptive?

Repeated exposure leads to vigilance and increased responding - Sensitization

- Negative outcomes
- Fear
- Adaptive?

OUTLINE

Introduction to Learning
Habituation & Sensitization
Classical Conditioning
Operant Conditioning
CLASSICAL CONDITIONING

SIGNALS

- One event “announces” another, it assumes the value of the other

Ivan Pavlov

- Won the Nobel Prize in Physiology in 1904 for his work on digestive processes in dogs
- Also discovered serendipitously classical conditioning
- Tone and food

CLASSICAL CONDITIONING

- **CS** = Conditioned (learned stimulus) (Bell)
- **US** = Unconditioned stimulus (one for which response is already present) (Food)
- **UCR** = Unconditioned response (naturally occurring response to US) (salivation)
- **CR** = Conditioned response (learned response to CS) (salivation)
CLASSICAL CONDITIONING

- With repeated pairing, a neutral stimulus can be linked with a US
- This stimulus becomes a CS

Prior to conditioning:
- Neutral stimulus (tone)
- UCS (food powder in mouth)
- (Orientation to sound but no response)
- UCR (salivation)

Conditioning:
- Neutral stimulus (tone) CS
- UCS (food powder)
- CR (salivation)

After conditioning:
- CS (tone)
- CR (salivation)
CLASSICAL CONDITIONING

PROCESSES OF CONDITIONING

Acquisition
Timing (Meaning)
- Delayed conditioning
- Trace conditioning
- Simultaneous conditioning – no learning
- Backward conditioning – no learning

Contingency
- Random presentation ≠ learning

Second-order conditioning
Extinction

Spontaneous Recovery

Classical Conditioning

Definition: learning that one event predicts another
Worksheet

**PROCESSES OF CONDITIONING**

**Stimulus Generalization**

- Spread of learning (association) to stimuli that are similar
- Adaptive to get learning without new process
- Little Albert and the learning of phobias
LITTLE ALBERT

APPLICATIONS

Disgusting situations
- Chocolate cake?
- Friend and stranger

Drug addiction
- Victims of overdose
- Environment is important

PTSD

Chemotherapy
- Anticipatory nausea
- Food aversions
OUTLINE

Introduction to Learning
Habituation & Sensitization
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WATSON’S EXTREME ENVIRONMENTALISM

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

• John Broadus Watson, 1928

OPERANT CONDITIONING

Law of Effect

• Edward Thorndike
• Cats in a box

CONSEQUENCES

• Trial and Error
• Organism must interact with the environment in order to produce a response
• Not reflexive
EXPERIMENTAL ANALYSIS OF BEHAVIOR

B.F. Skinner

Environment affect response

Operant Conditioning

• Modify the probability of a behavior as a result of its consequences
• Operant
A – B – C of behavior
  • Antecedent
  • Behavior
  • Consequence

REINFORCEMENT CONTINGENCIES

Reinforcer = ↑ probability of response
Punisher = ↓ probability of response

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Punisher = \( \downarrow \) probability of response

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**Reinforcer** = \( \alpha \) probability of response  
**Punisher** = \( \beta \) probability of response
REINFORCEMENT CONTINGENCIES

Reinforcer = \( \uparrow \) probability of response
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REINFORCEMENT PROPERTIES

Behavior analysts assume that all behavior continues due to reinforcement
- Super Nanny on television

Primary reinforcers
- Biologically determined
- Food, water, sex, candy

Conditioned reinforcers
- Neutral stimuli that acquire meaning through pairing with primary reinforcer
- Money, grades, approval, gold stars
- Token economies (Gold Star)
Instrumental Conditioning

Schedules of Reinforcement

Fixed Ratio: Reward comes after a particular number of responses, so animal pauses after reward receipt and then increases responding until next reward.
Instrumental Conditioning

Variable Ratio: Reward comes after a variable number of responses, so animal responds relatively continuously (since one reward can follow another).

Instrumental Conditioning

Fixed Interval: Reward comes after a specified period of time, regardless of responses. Animal learns this and responds right around the reinforcement time.
Instrumental Conditioning

Variable Interval: Reward comes after a variable period of time, regardless of responses. Animal responds at a relatively continuous rate.

SHAPING AND CHAINING

Shaping
- Successive approximations to the desired behavior are reinforced
- Progress must be defined

Escape-Avoidance
- Escape negative stimulus
- Avoid – give signal before negative stimulus starts
Superstitious behavior

- Do you have a ritual or superstitious behavior?
- What is it?
- Why do you do it?
- Do you play the lottery?
- Do you pick your own numbers or let the computer pick your numbers?
- Why might this have happened?
OBSERVATIONAL LEARNING

Vicarious learning
- Rats that were allowed to explore without reinforcement learned faster than naïve rats

Children imitate adult models
- Albert Bandura and the Bobo Doll

BOBO DOLLS
OBSERVATIONAL LEARNING

Characteristics of models
- Model is reinforced for behavior
- Model is liked
- Similarities with model
- Rewarded for paying attention to model
- Observer can imitate

Television, video games, and violence
- Debate in society about role models
- Psychic numbing
- Increased aggression