Learning from Experience

Overview
Understanding Learning
Classical Conditioning
Operant Conditioning
Observational Learning

Definition of Learning
- "Permanent" change
- Change in behavior or knowledge
- Learning is the result of experience
  - Psychological definition:

Pavlov: Classical Conditioning

- Stimulus - action/event
- Response - behavior
  - Involuntary/automatic responses: "respondents"
  - Typically involves reflexive or emotional behaviors
  - "unlearned" responses

In Pavlov's experiments, a stimulus that has no connection to behavior was beginning to control the salivating behavior of the dog...

How do NEUTRAL stimuli (ones that do not affect a given behavior) become NON-NEUTRAL stimuli?

ANSWER: BY LEARNING
How does a NEUTRAL STIMULUS become a Conditioned Stimulus?

In conditioning we repeatedly pair the NEUTRAL STIMULUS with the US. The US causes a UR.

Neutral Stimulus (footsteps) + US (food) → UR (salivation)

After many, many pairings, we present only the Neutral Stimulus. Now, the (formerly) Neutral Stimulus alone causes a CR.

Neutral Stimulus (footsteps) → UR (salivation)

Now we call the neutral stimulus a conditioned stimulus (CS) and the salivation to the CS the conditioned response (CR).

Once you have a CS, you can use it to create other CSs: Second Order Conditioning

Neutral Stimulus (footsteps) → US (food) → UR (salivation)

After conditioning:
CS → CR
footsteps → salivation

Neutral Stimulus (light) + CS (footsteps) → CR (salivation)

NOW USE THE ORIGINAL NEUTRAL STIMULUS, THE FOOTSTEPS, IN THE US ROLE

Neutral Stimulus (light) → SALIVATION
Light becomes a CS

Other processes in classical conditioning

- Generalization -
- Discrimination -
- Extinction -

Classical Conditioning Summary

- Classical conditioning: S elicits > R

- Not the case that a "new behavior" is learned - rather, an association is developed

- Primarily an influence on emotional behavior in humans
Contiguity Learning

- Learning by simple associations: Pairing
- Stimulus → Response
- Examples:
  - Golden Arches = McDonald’s
  - Times tables (7 x 8 = 56)
  - States & capitals (Lansing, MI)

Operant Conditioning

- Skinner and the ABC’s
- Consequences:
  - Reinforcement (+/-)
  - Punishment (+/-)
- Shaping, Successive Approximation
- Schedules of Reinforcement

Skinner: Operant Conditioning

- B.F. Skinner (1953) - principle of reinforcement
  - Focus on how NEW behaviors are acquired
  - Goal: increase or decrease frequency of behavior
  - Based on voluntary responses
- Operants - deliberate actions; voluntary and goal-directed responses
  - versus respondents: involuntary and automatic responses (classical conditioning)
- ABC - timeline: antecedents, behavior, consequences

Two Kinds of Regularities, Two Kinds of Learning

- Behavior that is automatic
  - CS → Response
- Behavior the "teacher" wants
  - Response (R) → Reinforcement

Pavlovian Learning (Classical Conditioning)

1. "Food is coming"
2. Occurrence of food
3. "If you press the keyboard, then food"

Operant (Instrumental) Learning

1. Occurrence of food does not depend on what animal does
2. Occurrence of food does depend on what animal does
Types of Consequences

- Something can be given (+) or taken away (-)
- **Reinforcement** - use of consequences to *strengthen* a behavior (i.e., such that it is more likely to occur)
- **Punishment** - use of consequences to *weaken* a behavior (i.e., such that it is less likely to occur)

Types of Reinforcement

- **Positive reinforcement**
  - Praise, Teacher attention
  - Rewards
- **Negative reinforcement**
  - Avoid the loss of privileges
  - Take away an aversive stimulus

Q: Do positive reinforcers have to be pleasant? Do negative reinforcers have to be unpleasant?

Negative Reinforcement

- A behavioral response *prevents or eliminates* an event
- The behavior becomes *more likely to occur*
- Examples:
  - Sam lies to his girlfriend when she asks if she looks fat to AVOID her screaming at him.
  - The squirrel runs up a tree to ESCAPE a predator.
  - You take an aspirin to ESCAPE or ELIMINATE a headache.

Reinforcement

- The definition of reinforcement is more precise than that of reward or the avoidance of something unpleasant. Specifically, reinforcement has occurred when 3 conditions have been met:
  a) A consequence is presented that is dependent on a behavior.
  b) The behavior becomes more likely to occur.
  c) The behavior becomes more likely to occur because and only because the consequence is presented dependent on the behavior.
Types of Punishment

- Presentation (Positive) Punishment
  - Detention
  - Extra work
- Removal (Negative) Punishment
  - Loss of recess
  - Loss of privileges

Schedules of Reinforcement

A. Continuous
B. Ratio - number of occurrences
  - Fixed vs. Variable
C. Interval - periods of time
  - Fixed vs. Variable

Applied Behavior Analysis

- Specify target behavior; Gather baseline data; Design intervention; Execute & evaluate
- Controlling Antecedents
  - Cues, signals, prompts about expected behaviors
- Increasing/decreasing response strength
- Praise & Ignore Approach
- Premack Principle
- Shaping & successive approximation
- Satiation
- Social Isolation
### Observational Learning

- Learning that occurs as a result of observing the experiences of others

- Consider: What would life be like if you could only learn through your own trial and error?

### Social Learning - Assumptions

- People can learn by observing others
- Learning may or may not lead to behavior change
- Behavior is goal-directed
- Behavior can be self-regulated
- Reinforcement & punishment have indirect effects on learning and behavior

### Social Learning Theory

- **Active vs Vicarious learning**
- **Elements of Observational Learning**
  - Attention
  - Retention
  - Production
  - Motivation
- **Modeling**
- Albert Bandura – Bobo doll video

### Summary of Learning

1. Classical conditioning: learn association between neutral event and automatic behavior. No “new” behavior is learned
2. Operant conditioning: the learning of voluntary behavior as a result of the consequences
3. Schedules of reinforcement can be used to establish behaviors, build persistence
4. Shaping and successive approximation can be used when behaviors are complex
5. Applied behavioral analysis involves many techniques but starts with specifying and observing a target behavior
6. Learning can take place through observation and modeling