Chapter 5

Finishing up Classical Conditioning

Underlying Processes & Practical Applications

Chapter 5 Lectures Outline

- Underlying processes in Pavlovian conditioning
  - S-R vs. S-S learning
  - Stimulus-substitution vs. Preparatory-response theory
  - Compensatory response model
  - Rescorla-Wagner model
- Practical applications of Pavlovian conditioning
  - Understanding the nature of phobias
  - Treating phobias
  - Aversion therapy

S-R vs S-S Learning

- S-R (stimulus-response learning)
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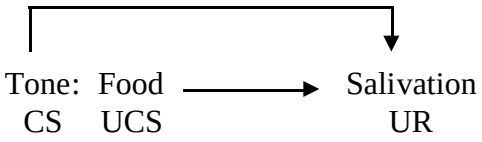
Example

When a tone and food are presented together, the tone becomes associated with the salivation that occurs to the food. A direct connection is created between the CS and UR such that the CS elicits the same response as the UR

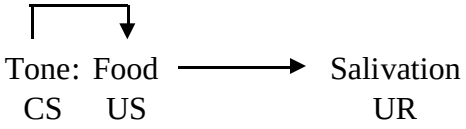


S-R vs S-S Learning cont.

- S-S (stimulus-stimulus learning)

Example

When a tone and food are presented together, the tone generates a mental representation of the food and, as result of this representation, salivation occurs. A direct connection is created between the CS and US such that the CS elicits (same) similar response to the UR

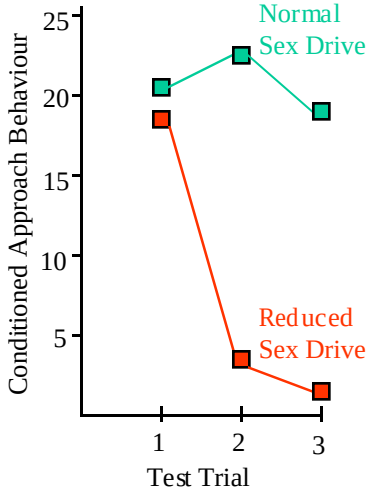


The evidence for S-S vs. S-R learning

- Holloway & Domjan (1993)
  - Evaluate the vigour of responding by *reducing* the motivation to respond to the US
    - Sexual Pavlovian conditioning with a male quails
    - Males motivated to copulate with receptive females
    - Light : Receptive Female (10 trials)
    - Light → Males Very Motivated (approached the light!!!)
    - Half the males - brightness in lab changed to reflect winter conditions when birds do not copulate (reduced sex drive group)
    - S-R model predicts the CS (light) is
    - If S-R is correct, reducing motivation to perform UR (light) should

Holloway & Domjan (1993) - Results

- Reduction in motivation →
- Contrary to predictions of S-R learning mechanisms because
- Best explained by S-S theory because this does not involve learning a specific UR
- S-S theory – association is learned between CS and mental representation of US



Conclusions: S-R vs. S-S theory

- Some evidence for both theories
- Majority of evidence is for S-S theory, particularly simple Pavlovian processes

That brings us to WHY does Classical Conditioning exist?

- Perhaps it is there to help get us ready for things that are going to happen!
  - Stimulus-substitution theory - Pavlov (1927)
  - Preparatory-Response theory - Kimble (1961)

Stimulus-substitution theory

- Stimulus-substitution theory - Pavlov (1927)
  - S-S theory of conditioning
  -
  - CS should elicit the same response as the US
    - Light (CS) : Food (US) → Salivation (UR)
    - Light (CS) → Salivation (CR)
  - But…shouldn't the dog try to eat the light???

Stimulus-substitution theory

- Jenkins & Moore (1973)
  - Food - pigeons peck with open beak, closed eyes
  - Water - pigeons peck with closed beak, open eyes
    - Light (CS) : Food (US) → Peck (UR)
    - Light (CS) : Water (US) → Peck (UR)
  - According to Stimulus-Substitution hypotheses
    - Pigeons should peck at the lighted key paired with food with
    - Pigeons should peck at the lighted key paired with water with

Stimulus-Substitution cont.

- Results
  - Pigeons tried to eat the lighted key paired with food
  - Pigeons tried to drink the lighted key paired with water
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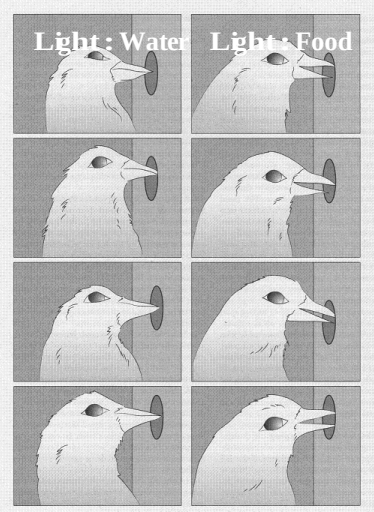
- Does the CS elicit the same response US (i.e., is the CR the same as the UR)???



Preparatory Response Theory

- Preparatory Response Theory
  –
- Sometimes the CR can be different, or even the *opposite* of the UR

Preparatory Response Theory

- Faneslow (1989)
  - Rats placed in cage and administered foot shocks
    - Phase 1
      - Foot-Shock (US) → Jump (UR)
      - Tone (NS) : Foot-Shock (US) → Jump (UR)
    - Test Phase
      - Tone (CS) →
  - Suggests CS has not *become* the US
  - Perhaps evolutionary explanation
    - Jump to actual bite; freeze (hide) in anticipation

Preparatory Response Theory

- Preparatory Response Theory
  - The purpose of the CR is to
  - Can explain topographical similarity of some CS to US
    - Metronome : Food → Salivate
    - Metronome → Salivate
  - Can explain topographical dissimilarities
    - Foot Shock → Jump
    - Tone : Foot Shock
    - Tone → Freeze

Compensatory Response Model

- The compensatory *after-reactions* to the US are elicited by the CS
  - Pre-conditioning phase
    - Shock (US) → Increased Heart Rate (UR)
  - Conditioning phase
    - Tone(NS) : Shock (US) → Increased Heart Rate (UR)
    - Tone (CS) → Increased Heart Rate (CR)
  - Extended conditioning trials
    - Tone(NS) : Shock (US) → Increased Heart Rate (UR)
    - Tone (CS) →
- Can be explained by

Compensatory Response Model

- Compensatory after-reactions to a US
- Purpose of this is probably to
  - If compensatory processes came before the US –more effective in minimising effects of US
- Because CS elicits compensatory responses to counter effects of US –

Compensatory Response Model & Drug Tolerance

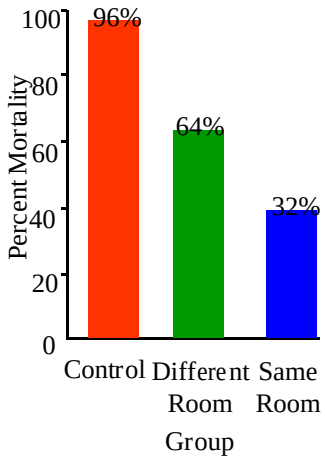
- Some CSs (neutral stimuli) begin to signal that the drug is coming
- Therefore, when you see these CSs, your heart rate lowers, etc., thus moderating the effects of the drug (once you ingest it)
  - Examples of some CSs for alcohol or drug use?

Compensatory Response Model & Drug Overdose

- Siegel, Hinson, Krank & McCully (1982)
  - Rats injected with heroin every second day for 30 days
  - Alternate days injected with dextrose (sugar) solution
  - Administered either in home room or different room
  - Half received heroin in home room; dextrose in other room; other half received opposite injecting room order
  - Heroin intake increased each day
  - Third group of rats (controls) received dextrose only in both rooms
  - Test – double dose of heroin given to all animals
    - Half experimental group in room where heroin normally received; half in other room; control group also got double dose
  - DV = mortality

Drug Overdose - Results

- Context cues where the same room group normally received drug
- When large heroin dose administered in new context
- *Opponent-process theory*
  - a-process direct effect of the drug
  - b-process conditioned to the contextual cues (room)



More Evidence for this theory

- McCusker and Brown 1990
  - Alcohol-expected vs. alcohol-unexpected environments (e.g. drinking at the office vs. drinking in a bar)
    - Implications for drinking and driving
    - Implications for drug overdose fatalities

Compensatory Response Model

- Drug tolerance
  - Repeated use of drug in specific context → b-process becomes stronger → reduced net effect of drug → need increased quantity of drug for same effect
  - Repeated experience with drug results in less of a 'high' (a-process)
- Drug withdrawal
  - With repeated exposure to the drug in specific context, the b-process increases in strength & duration
  - a-process ceases immediately but b-process declines slowly
  - Negative effects of b-process become extreme → withdrawal

Compensatory Response Model