University of Idaho

Psychological Theories of Substance Abuse: Classical and Operant Conditioning

Psychology 470

Introduction to Chemical Additions

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Several Models

- Classical Conditioning
- Operant Conditioning
- Social Learning
- Cognitive Models

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Classical Conditioning

- Concepts come from physiology and reflexology
- Pavlov

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Classical Conditioning Paradigm

- UCS → UCR
- Food → Salivation

- CS, UCS → UCR
- Bell, Food → Salivation

- CS → CR
- Bell → Salivation

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Example of CC

- Emetine — Nausea/Vomiting
- Alcohol — Emetine — N/V
- Alcohol — Nausea/Vomiting

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Is General Across Organisms

- Occurs in
  - Dogs, rats, human fetuses, neurons
- Can appear in many environments. Classrooms, Restaurants, Woods

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Related Classical Conditioning Concepts

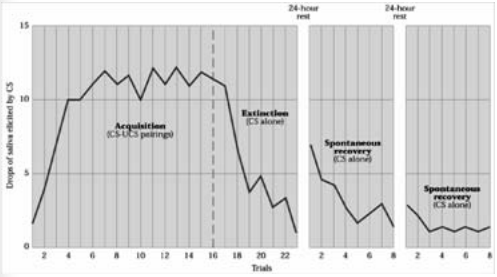
Extinction

- Is a decrease in some response due to repeated exposures of the CS
- Occurs when the UCS is not present.

Spontaneous Recovery

- After extinction has occurred, give a rest period, then present the CS again.
- Again, you get a CR but it is lower than the original CR.
- Can do several times

Spontaneous Recovery



Total Extinction

- When you present the CS after spontaneous recovery, but you get no CR

Spontaneous Recovery is Important for Relapse

- Doing fine
- See a cue or stimulus associated with where you used
  - Can generalize as well
- Causes cravings
- Why?

Generalization

- When a response is acquired to a CS, other CS's will also evoke the same conditioned response.
- In addition, the closer the new stimulus is to the original conditioned stimulus, the higher the probability that the response will occur.

Example

- Original CS
- Uses a red light — Get CR
- Orange red light — Same CR
- Yellow Red light — Less CR
- Yellow light — No CR

CS Must Act as a Cue

- The CS must provide the **most reliable** information about the occurrence of the UCS over other stimulus cues that may be present in the environment.
- It must predict the UCS the best.
- Other cues can also prevent or block the development of the CR.

Learning/Biological Aspects of Drug Craving

- Craving is an impulse to reinstate drug-taking
- Robinson and Berridge (1993) account of craving:
  - Addictive drugs activate the mesolimbic dopamine system
  - Stimuli that occur with dopamine activation (needles, mirrors, pipes, etc) acquire incentive salience
    - Stimuli are linked to drug action and become exciting
  - Exposure to (or thinking about) these drug-related stimuli results in craving for the drug

Saliency or Nature of the CS

- Stimuli will differ in their ability to become associated with the UCS.
- Some conditioned stimuli cannot become associated with the UCS
- Salience refers to the degree of associability of a particular CS to a UCS
  - Salient stimuli become associated
  - Nonsalient stimuli do not become associated

Opponent Process Model

- Soloman and Corbit
- All experiences produce an initial affective reaction called the **A** State
- Can be pleasant — Drinking alcohol
- Can be unpleasant — Taking an exam
- Strength depends on the intensity of the experience
  - The stronger the event, the more intense
  - the **A** state

B State

- The **A** state causes a second reaction
  - **B** State
- Is opposite of the **A** state
  - If **A** is positive, **B** is negative and vice versa
  - Pain during an examination creates a pleasurable relief response
- Solomon and Corbot contend biological systems initiate an opposing response to counter the initial effect of all events
  - (similar to sympathetic and parasympathetic systems)

Variables

- B stage is initially less intense than A
- B intensifies more slowly than A
  - Produces a adaptation effect or reduced response while the event occurs
- B diminishes more slowly than the A state
- So B continues after the A state is finished

Example

- Smoking Pleasure A state
- Arousal of B (withdrawal) due to A begins
- B state and tolerance causes the A state to diminish so you need more
- When you stop smoking, A (pleasure) declines and you experience the B state (withdrawal)
- B ultimately decreases over time

Example 2

- UCS UCR
- CS UCS UCR
- CS CR

- CS acts as a cue (Hotel- will take drugs, slow system down) A state
- System compensates to the UCS (Morph.)
- Need more drug to get same effect (tolerance) down reg.
- System compensates for the drug (B state)
- Change the cue (home) (No A State)
- Same amount of drug
- Overdose

Conditioned Withdrawal

Wikler and Prescor
Placed dogs in a distinctive cage CS
Gave dogs morphine UCS
Dogs feel good UCR
Dogs became addicted

CS UCS UCR
Cage Morphine Feel good

Later
Cage Stop giving Morphine CS NO UCS
Places them in withdrawal state (Detox) Extinction

Months later
Place dogs in distinctive cage CS No UCS
Dogs experience withdrawal symptoms shaking, hypothermia, increased emotionality (Cravings)

Relates to

- Spontaneous Recovery
- Opponent Process

Treatment Alternative

- Childress et al.
- Exposed cocaine addicts to stimuli they associated with drug taking
  - Videotapes of their cooking procedures
  - Listening to cocaine talk
  - Handling Paraphernalia
- Measured withdrawal and craving responses
- Over time cravings and withdrawal responses decreased with repeated exposures

KEY

- Present stimuli under controlled settings
- Not on the street
- Use cognitive imagery or similar techniques.

Conclusions

- Classical conditioning is extremely important to addiction
- Follows classical models
- Has major implications in biological systems models
- Has high reliability
- Has high validity
- Uses experimental research techniques

Operant Conditioning Models

- Comes out of the writing of B.F. Skinner
- Has some similarity to Classical Conditioning
- Focus is on the consequent stimulus

Operant Conditioning

- Positive Reinforcement
  - Add something following a response and behavior increases
  - Hanging out, take cocaine, feel good
  - Next time you hang out you take cocaine again

Negative Reinforcement

- Remove something following a response and the behavior increases
  - Two types
    - Escape
    - Avoidance

Escape

- If you perform a behavior to escape from something aversive, the next time the situation occurs, you will do the same behavior
  - Begin craving for a drug, take drug, stops cravings
  - Next time you crave, you take the drug again.

Avoidance

- Here you do something to prevent the problem from occurring in the first place
- Take the drug to prevent the cravings from happening in the first place.

Summary on Reinforcement

- Reinforcement is very powerful
- Have brain systems that are tied into reinforcement systems
  - Medial Forebrain Bundle
  - Uses Dopamine

Positive Punishment

- Here you add something following a response and the behavior decreases
- Examples
  - You drink, you drive, you get arrested and thrown in jail. You never drink and drive again
  - Take ecstasy, have a bad experience, never take ecstasy again.

Negative Punishment

- Again Two Types
- Response cost
- Time out

Response Cost

- Here you loose a goodie after you make some response
  - High School Drinker
  - Drinking beer
  - Gets an MIP and is fined $100
  - Stops drinking beer

Time Out

- Time Out from Positive Reinforcement
- Here you are removed from the situation where you are getting reinforcement.
  - Child is at a party
  - Parent takes the child away from the party. Child becomes embarrassed.
  - No longer goes to parties.

Example

- Have a person using a controlled drinking model.
- Person gulps drinks
- Is removed from the bar setting
- Stops gulping drinks so they can stay with friends

Summary on Punishment

- Is also very effective in controlling behavior
- However, is impacted by lots of variables
- Needs to be:
  - Given rapidly (within one hour)
  - Severe (not intense)
  - Initially every time
    - Parent knows what their kid is doing
    - Parents let each other know about their kid

Reinforcement and Punishment

- Are very effective in controlling or changing behavior
- Are tied into biological systems
- Models have high reliability and validity
- Works in all organisms
- When applied appropriately, can effective control behavior
- Has a huge literature under many conditions