Psychological Theories of Substance Abuse: Classical and Operant Conditioning

Psychology 470
Introduction to Chemical Addictions
Steven E. Meier, Ph.D.

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

Classical Conditioning
- Concepts come from physiology and reflexology
- Pavlov

Classical Conditioning Paradigm
- UCS → UCR
- Food → Salivation
- CS → UCS → UCR
- Bell → Food → Salivation
- CS → CR
- Bell → Salivation

Example of CC
- Emetine → Nausea/Vomiting
- Alcohol → Emetine → N/V
- Alcohol → Nausea/Vomiting

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

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
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**B State**

- The A state causes a second reaction
- B 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
- Gave dogs morphine
- Dogs feel good
- Dogs became addicted

<table>
<thead>
<tr>
<th>CS</th>
<th>UCS</th>
<th>UCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cage</td>
<td>Morphine</td>
<td>Feel good</td>
</tr>
</tbody>
</table>

| Later
| Cage | Stop giving Morphine | CS | NO UCS | 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