Chapter six
Learning

Classical Conditioning
Operant Conditioning
Cognitive-Social Learning
Biology of Learning

realworldpsychology

Things You’ll Learn in Chapter 6

- Why can simply hearing the drill in a dentist’s office—even if that drill is nowhere near you—make you feel anxious?
- How can decreasing the cost of fruit and vegetables lead to healthier eating?
- Why do gamblers have such trouble quitting, even when they continue to lose money?
- Does watching sex on TV increase the risk of teen pregnancies?
- Why can even young children recognize a picture of a snake much faster than a picture of a frog or caterpillar?

Learning versus Conditioning

Learning
Relatively permanent change in behavior or mental processes caused by experience

Conditioning
Process of learning associations between stimuli and behavioral responses

But—what is LEARNED can be UNLEARNED!!
**Key Terms: Classical Conditioning**

**Classical Conditioning**
Learning through involuntary paired associations; it occurs when a neutral stimulus (NS) is paired with an unconditioned stimulus (US) to elicit a conditioned response (CR).

- **Unconditioned Stimulus (US)**
  A stimulus that elicits an unconditioned response (UR) without previous conditioning.

- **Unconditioned Response (UR)**
  A learned reaction to an unconditioned stimulus (US) without previous conditioning.

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**Neutral Stimulus (NS)**
Stimulus that, before conditioning, does not naturally bring about the response of interest

**Conditioned Stimulus (CS)**
Previously neutral stimulus that, through repeated pairings with an unconditioned stimulus (UCS), now elicits a conditioned response

**Conditioned Response (CR)**
Learned reaction to a conditioned stimulus (CS) that occurs because of repeated pairings with a unconditioned stimulus
Using Classical Conditioning: 
*Identify NS, US, UR, CS, and CR*

- A researcher sounds a tone, then places a piece of meat into a dog’s mouth, causing it to salivate. Eventually, the sound of the tone alone causes the dog to salivate.
- While listening to a song on his car radio, a man accidentally bumped into a red car in front of him. Thereafter, whenever he sees a red car, he experiences a severe anxiety attack.
- A pregnant woman, experiencing morning sickness, vomits while eating at Burger King. Thereafter, she feels sick every time she drives by a Burger King.
- One morning while Micah is taking a shower in the dorm he hears someone flushing a nearby toilet and extremely hot water suddenly came rushing out of the showerhead causing Micah excruciating pain. A few minutes later, Micah hear's another toilet flush and he leaps out of the shower.

Watson’s Little Albert

Conditioned Emotional Response
Classically conditioned *emotional response* to a previous neutral stimulus (NS)
Why can simply hearing the drill in a dentist’s office – even if that drill is nowhere near you – make you feel anxious?

**Principle #1: Acquisition**

<table>
<thead>
<tr>
<th>Process</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition of basic classical conditioning</td>
<td>Process of forming a new response, in which the neutral stimulus (NS) and unconditioned stimulus (US) are paired to produce the conditioned response (CR).</td>
<td>You may hear a dentist’s drill but do not react to it.</td>
</tr>
<tr>
<td>Stimulus generalization</td>
<td>Stimulus generalization occurs when a stimulus similar to the original conditioned stimulus (CS) elicits a conditioned response (CR).</td>
<td>You may react to a similar noise (e.g., a fan) when you hear a dentist’s drill.</td>
</tr>
<tr>
<td>Stimulus discrimination</td>
<td>Stimulus discrimination occurs when a stimulus is different from the original conditioned stimulus (CS).</td>
<td>You may be able to distinguish between a dentist’s drill and other noises.</td>
</tr>
<tr>
<td>Extinction</td>
<td>Extinction occurs when a conditioned stimulus (CS) is presented along with a stimulus that does not elicit the conditioned response (CR).</td>
<td>You may respond less to a dentist’s drill after hearing it repeatedly.</td>
</tr>
<tr>
<td>Spontaneous recovery</td>
<td>Spontaneous recovery occurs when a previously extinguished conditioned response (CR) reappears.</td>
<td>You may feel more anxious after a break from dental visits.</td>
</tr>
</tbody>
</table>

**Stimulus Generalization**

Stimuli similar to the original conditioned stimulus (CS) elicit a conditioned response (CR)

**Stimulus Discrimination**

Only the conditioned stimulus (CS) elicits the conditioned response (CR)
Principle #4

**Extinction**
Gradual disappearance of a conditioned response (CR); occurs when unconditioned stimulus (US) is withheld whenever the conditioned stimulus (CS) is presented.

Principle #5

**Spontaneous Recovery**
Sudden, temporary reappearance of a previously extinguished conditioned response (CR).

Principle #6: Higher-Order Conditioning
Key Terms:
Operant Conditioning

How can decreasing the cost of fruit and vegetables lead to healthier eating?

Operant Conditioning
Learning through voluntary behavior and its subsequent consequences; reinforcement increases behavioral tendencies, whereas punishment decreases them.

Reinforcement
The adding or taking away of a stimulus following a response, which increases the likelihood of that response being repeated.

Punishment
The adding or taking away of a stimulus following a response, which decreases the likelihood of that response being repeated.

Important Figures in Operant Conditioning

Thorndike
Law of Effect
Thorndike’s rule that responses that produce a satisfying effect are more likely to occur again, whereas those that produce a discomforting effect become less likely to occur again.

Skinner
Extended Thorndike’s law to more complex behaviors. Emphasized that reinforcement and punishment should always be presented after the behavior of interest has occurred.

It’s about the CONSEQUENCES!

Reinforcement Strengthens Behavior

Positive = add stimulus
Negative = take away stimulus
Why do gamblers have such trouble quitting, even when they continue to lose money?

Uses of Partial Reinforcement

**Shaping**
A training method where reinforcement is delivered for successive approximations of the desired response.

How might operant conditioning be at work in each example?
- Increasing the cost of smoking—often by increasing taxes on cigarettes—reduces smoking rates (Cavazos-Rehg et al., 2012; Wilson et al., 2012).
- Patients with chronic pain receive biofeedback from a machine that beeps or lights up when their internal body functions are in a specific desirable range.

Q3

Q3
MORE ABOUT PUNISHMENT...

DECREASES the likelihood of a response

Punishment Weakens Behavior

Negative Reinforcement

- Reinforcement follows good behavior
  - Positive reinforcement gives reward
  - Negative reinforcement removes undesirable stimulus
  - Child got an A! Two examples of reinforcement?

- Punishment follows bad behavior
  - Positive punishment gives punishment
  - Negative punishment removes desirable stimulus
  - Child got an F! Two examples of punishment?

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Let’s Practice

Side Effects of Punishment

- Passive aggressiveness
- Avoidance behavior
- Inappropriate modeling
- Temporary suppression versus elimination
- Learned helplessness
- Rewarded and perpetuated aggression

Is the Target Behavior Being Reinforced or Punished? Is it Positive or Negative?

Scenario #1
Child screams for candy in store.
Dad buys candy.
Child screams for candy next visit.

The TARGET BEHAVIOR: Child Screaming

Scenario #2
Child screams for candy in store.
Dad buys candy.
Child screams for candy next visit.

The TARGET BEHAVIOR: Dad Buying Candy
So, how might you STOP your child from screaming in the grocery store?

Comparing Classical and Operant Conditioning

Differentiating Classical/Operant Conditioning

For your assigned examples, decide whether the situation is an example of classical or operant conditioning.

I. If you decide the situation seems to be an example of classical conditioning, you should label the UCS, UCR, CS, and CR.

II. If you decide the situation seems to be an example of operant conditioning, you should identify whether it is positive or negative reinforcement, or positive or negative punishment

Situation 1: The rat that can turn off a light
Situation 2: Baby loves his mother
Situation 3: Patient steals food
Situation 4: Johnny makes Mom flinch
Situation 5: Mrs. Jones won't argue
Using Psychology at Work: Using reinforcement and punishment

How do I motivate employees and increase productivity?

• Provide clear directions and feedback
• Use appropriate timing
• Be consistent

Emphasizes the roles of thinking and social learning in behavior

COGNITIVE-SOCIAL LEARNING

Cognitive Learning

Insight Learning
The sudden understanding or realization of how a problem can be solved

Latent Learning
Hidden learning that exists without behavioral signs

Cognitive Maps
Mental image of a three-dimensional space that an organism has navigated
Observational Learning

Learning new behaviors or information by watching and imitating others (also known as social learning or modeling).

Does watching sex on TV increase the risk of teen pregnancies?

• Teenagers who watched high levels of televised sexual content were twice as likely to become pregnant or get a partner pregnant compared to teens who watched low levels (Chandra et al., 2008).

Four Key Factors in Observational Learning
Learning creates new 
synaptic connections in 
the cortex and wide 
networks of brain 
structures!

Mirror Neurons

- Believed to be responsible for human empathy and imitation
- Found in several key areas of the brain
- Help us identify with what others are feeling and to imitate their actions
- It is still unknown how these neurons develop

Video: Cell Scouts

Mirror Neurons and Imitation

Neuroscience and Learning

- Thicker cortex
- Increased nerve growth factor
- More developed synapses
- More dendritic branching
- Improved test performance

... In rats
Mirror Neurons

- Spectators at sporting events slightly move their arms or legs in synch with the athletes
- Children and adults with autism or schizophrenia often misunderstand verbal and nonverbal cues of others

Why can even young children recognize a picture of a snake much faster than a picture of a frog or caterpillar?

- Phobias to stimuli and situations that could cause injury is adaptive to our survival:
  - Ex: Snakes, darkness, spiders, heights
- Humans have innate ability to more quickly recognize a snake compared to other (nonlife-threatening) creatures (LoBue & DeLoache, 2008; Young, Brown & Ambady, 2012).
- Research found 16% of people afraid of clusters of holes because dangers can lurk there (Cole & Wilkins, 2013)

Evolution and Learning

- Biological Preparedness
  The innate readiness to form associations between certain stimuli and responses.
- Instinctive Drift
  The tendency for conditioned responses to revert (drift back) to innate response patterns.
- Taste Aversion
  Classically conditioned negative reaction to a particular taste that has been associated with nausea or other illness