Announcements

- Next Aplia due *Tonight*
- Exam on Wednesday (April 2)
- Review after class today, 5:30 pm, room 130 ILC

Last time… Classical Conditioning

Conditioning… The Office Style

Conditioned Stimulus (CS) → Conditioned Response (CR)
UnConditioned Stimulus (UCS) → UnConditioned Response (UCR)

Operant Learning

I. Operant Conditioning

A. Basic premise: behavior that is rewarded is more likely to be repeated; that which is not rewarded is not

   1. History: began with Thorndyke (1898)
Thorndike’s Law of Effect

This law states that rewarded behavior is likely to occur again.

Rewarded Behavior likely to recur

So ….. If we can exceed 120 students in attendance next Monday, every person in attendance gets one free attendance point!

Operant Chamber

Using Thorndike’s law of effect as a starting point, Skinner developed the Operant chamber, or the Skinner box, to study operant conditioning.

B. Basic Phenomena

1. Generalization and Discrimination
   a. Generalization – make response in other similar situations
   b. Discrimination – don’t make the response in other similar situations

   Example follows…
Generalization

Our story begins inside during winter, with a houseplant

Scene 2: Months later, outside during summer

Discrimination

The cat on the lap…
Eating at Table
Sitting Pushed Back at Table

B. Basic Phenomena

2. Shaping: successive approximations are reinforced until the desired behavior is obtained
   a. This is main process of training pets
   b. It can work remarkably well

B. Basic Phenomena

3. Chaining: chain together a series of rewarded behaviors to produce complex behaviors

Shaping and Discrimination and Chaining in Action…

But how often and consistently should one give rewards?

Schedules of Intermittent Reinforcement

www.youtube.com/v/XdXXBnfYSQ
Schedules of reinforcement

- Continuous vs Partial
  - Continuous faster for learning
  - Partial more resistant to extinction

Partial reinforcement schedules

- Interval schedules
  - Fixed Interval (FI): interval is always same between trials (Homework collected only on Fridays)
  - Variable Interval (VI): interval length varies (Homework collected at unpredictable intervals)

- Ratio Schedules
  - Fixed ratio (FR): Ratio always same (Parent capitulates after fifth request)
  - Variable ratio (VR): Ratio varies (Slot machine pays after unpredictable number of plays)

Four types of partial reinforcement schedules

- Variable = smooth rates of responding
- Fixed = "scalloping"

Human Skinner Boxes

Variable Ratio Reinforcement is highly resistant to extinction

The Operant World...

- Generalization – same response to similar stimuli
- Discrimination – learn different responses to similar stimuli
- Shaping – reward successive approximations
- Chaining – string together already learned behaviors
- Superstition Learning – "learn" associations that don’t in reality exist

Basketball Superstitions
Michael Jordan’s Superstitions

While playing for the Chicago Bulls the five-time MVP wore his University of North Carolina shorts under his uniform in every game. Jordan led UNC to the NCAA Championships in 1982 and believed the mesh marvels brought him luck. In order to cover his lucky pair, Jordan began wearing longer shorts, which inspired a trend in the NBA.

Who, us? Superstitious?

The Great Hiccup Cure Survey

The Main Point

There may be valid mechanisms behind many of these (e.g. breath alteration to change diaphragm movement)

But there may also have been additional elaborations learned that are not essential, and they become part of the ritual

Operant Chamber

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D. Operant Conditioning: Types of Reinforcers

1. Positive Rxfx: REWARD!!
2. Negative Rxfx: Termination of an aversive condition. NOT PUNISHMENT!
3. Punishment: Presentation of an aversive condition – often good only in short term, or to stop a behavior
4. NOTE:
   1. positive and negative rxfx are used to increase a desirable behavior
   2. punishment is used to decrease an undesirable behavior
<table>
<thead>
<tr>
<th>Increase behavior</th>
<th>Remove stimulus from environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive reinforcement (Administer reward)</td>
<td>Negative reinforcement (Remove something unpleasant)</td>
</tr>
<tr>
<td>Decrease behavior</td>
<td>Negative punishment (Remove something desirable )</td>
</tr>
</tbody>
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**Email as combination of positive and negative reinforcement**

**Inadvertent reinforcement of undesirable behaviors**

[www.youtube.com/v/BMbww-nCVQg](http://www.youtube.com/v/BMbww-nCVQg)

**Basic Phenomena of Operant Conditioning (continued)**

5. **Gradient of Reinforcement:** Strength of reinforcement is inversely proportional to Time between Response and reinforcement

**The Parental Grocery Store Checkout Dilemma**

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**II. Avoidance learning (Phobias) as combination of CC and OC**

A. **CC:** Generalization & Failure of Extinction in Simple Phobias
B. **OC:** Avoiding the dogs is reinforcing; negative rewarding
Classical Conditioning of Phobias

- **Conditioned Stimulus (CS):** Dog
- **Conditioned Response (CR):** Fear!!
- **UnConditioned Stimulus (UCS):** Bite
- **UnConditioned Response (UCR):** Fear!

Operant Reinforcement

- Sight or thought of dog creates aversive state. (Classical)
- Escape or avoidance of the dog reduces or eliminates the aversive state = negative reinforcement (Operant)

Little Albert

- Sight or thought of white animal creates aversive state. (Classical)
- Escape or avoidance of the animal reduces or eliminates the aversive state = negative reinforcement (Operant)

III. Application of Associative Principles--Token Economies

- A. Contingencies set up: rewarded and non-rewarded behaviors
- B. Prisoners/Mental Patients/school children given tokens if desired behaviors performed
- C. Tokens later good for privileges, cigarettes, candy, magazines, etc.
- D. Efficacy

Classes as a Token Economy

- Points don’t have inherent value
- Points contribute to grades
- Grades don’t have inherent value, but good grades …
  - create other desirable outcomes (positive reinforcement)
  - avert undesirable outcomes (avoid punishment or nonreinforcement)

Class and Clickers as a Token Economy

- Attendance is defined as a desirable behavior (it’s good for learning)
- Attendance is rewarded with points (a token)
- Lack of attendance is not rewarded
- Fraudulent behavior (faking attendance) is punished
One more Operant Conditioning Case…

This mathematical horse got famous for being capable of a variety of arithmetic and literate feats, reporting his conclusions by tapping the ground with his hoof. However, the psychologist Oskar Pfungst did a variety of experiments on Clever Hans, demonstrating that that horse was picking up unconsciously-generated cues from his questioners, and working from those when to stop tapping. What Clever Hans's owner, Wilhelm von Osten, had inadvertently done was some operant conditioning; giving Hans a piece of carrot whenever he had tapped the right number of times. The horse then learned to associate his master's getting subtly tense with when to continue tapping, and his master's getting relieved with when to stop. Pfungst even went on to demonstrate that he could do what Clever Hans had done, picking up subtle cues from his human experimental subjects.