Learning

- Definition
  - Change in behavior or knowledge as a result of experience or instruction
  - Occurs at biological (brain) and behavioral level

- Why we care:
  - Learning is core to our existence, ability to change, functioning, and adaptation

Learning Theory

- Interest in understanding how and why learning occurs
  - Types
  - Consequences
  - Biology
  - Ontogeny/phylogeny
- Focus first on simple forms then test to see if they generalize
Types

- Habituation
- Sensitization
- Classical conditioning
- Instrumental conditioning
- Cognitive learning

Types

- Habituation
- Sensitization
- Classical conditioning
  Learning occurs implicitly

Habituation:

- a decrease in the strength of a response after repeated presentation of a stimulus
- One of simplest forms of learning
Prairie Dog Calls When Humans Walk Past

Number of Calls

Sonora Desert Trail Bend, Oregon Park

- Sensitization:
  - respond more strongly over time to repeated dangerous, irritating, or both stimuli

Time spent withdrawn after touch (1 versus multiple)

By Kandel, who won Nobel prize for work on habituation/sensitization
Classical Conditioning

Before Conditioning

Bell -------------------------------> No salivation
(neutral stimulus)

Food -------------------------------> Salivation
(unconditioned stimulus) (unconditioned response)
(us) (ur)

During Conditioning

Bell ------------------ Food -------> Salivation
(neutral stimulus) (us) (ur)
After Conditioning

Bell → Salivation
(conditioned stimulus) (conditioned response)
(cs) (cr)

Classical conditioning

- Repeatedly pair a neutral stimulus with an unconditioned stimulus (US) -- a stimulus that elicits a reflex response
- A reflex response is one that is carried out without thought or will—it is automatic
- Conditioned Stimulus (CS): Prior to conditioning, the neutral stimulus does not elicit the reflex response; after repeated pairing, it does (i.e., it becomes the CS)

That’s great, but does it work with humans?

- Yes, it is a general learning principle
  - Works with lots of different unconditioned stimuli and responses
During Conditioning

sound -----> i-clicker image -----> attend to question
(neutral) (us) (ur)

After Conditioning

Sound ------------------------> get ready for question
(cs) (cr)

Classical Conditioning:
“Jim’s experiment”

~2 min video clip
http://www.snotr.com/video/183

Major Extensions

- Second-order conditioning
- Generalization
- Extinction
- Spontaneous recovery
First- & Second-Order Conditioning

Tone (CS) → Food (US)

This is an example of first-order conditioning. The CS (Tone) will elicit saliva after a few trials.

Now, pair: Light → Tone

This is an example of second-order conditioning. The second CS (Light) will come to elicit saliva.

Generalization

Once trained to respond to a specific CS, will also respond (though not as strong) to stimuli closely-related to the CS.

Watson & Little Albert

- Experiments with baby demonstrate the “power” of learning
- Excellent example of classical conditioning and generalization

www.youtube.com/watch?v=FMnhyGozLwE
Watson & Little Albert

- Noise (US) leads to Crying (UR)
- Pre-pairing, the rat (Neutral) is interesting
- Post pairing, the rate (CS) leads to escape efforts (CR)
- Generalization: Albert tried to escape from
  - Bunnies
  - Dogs
  - Watson in rat mask

Extinction

If the CS is repeatedly presented in the absence of the US, CR will gradually disappear.

Spontaneous recovery

- After extinction, has the CR been completely eliminated?
  - No: An extinguished response will spontaneously recover after a pause.
Some real-world (economic) examples

Advertising: "pairing" jeans or cars with sexy images

Violence: habituation and classical conditioning

- Playing Videos → Happy
- War/Violence → Anxiety
classical conditioning

Habituation

- With repeated exposure to violent images in games, television, other forms of media, response (anxiety) decreases