

Low level learning

- What is low-level learning?
- Habituation
- Classical conditioning
- Operant conditioning
- Who cares?

Learning

- We often set out to learn things.
 - This class, for example...
- Much learning occurs even when we do not intend to learn.
 - Learning routes to get places
 - Learning new words while reading
 - Learning how hard to throw a piece of paper to get it into the wastebasket at home.


Low-level learning

- Some learning is very subtle
- After a while, you might not notice the ticking of a loud clock.
- You might wince at the sound of a dentist's drill.
- You might learn what song comes next on a favorite album.
- These kinds of learning happen all the time.
 - It is important to be aware of their influences.

Types of low-level learning

- Habituation
- Classical conditioning
- Operant conditioning
- Can all be studied in humans and other animals.

Must everything be learned?

- Instinct: Innate behaviors
- Some behavior is built in
 - Pulling your hand from a hot stove
 - Sucking reflexes in children
 - Gag reflexes
- These innate behaviors might be quite complex
 - Sphex Wasp 

Wired to learn

- Animals are designed to learn certain things
 - A rat will learn that tastes go with nausea
 - A rat will learn that sounds go with pain

| | Nausea | Pain |
|-------------|--------|------|
| "Sweet" cue | Yes | No |
| "Click" cue | No | Yes |

- These are adaptive responses.
 - Humans are wired similarly
 - We get aversions for foods we eat that make us sick.

Habituation

- Here is a simple form of learning
 - Some *stimulus* causes a *response*
 - Repeated exposures to the stimulus will continue to elicit the response
 - The magnitude of the response will be attenuated.
- Example: Glass and dumpsters
- What is this good for?
 - Allows us to notice novel stimuli in the environment
 - Rat and food
 - If the rat eats an old food and a new food and gets sick, should he attribute getting sick to the old food or the new one?

Classical conditioning

- Classical conditioning involves forming an association between some stimulus and an existing reaction.
- A little terminology
 - Unconditioned Stimulus (US) produces a response
 - Unconditioned Response (UR) response to US
 - Conditioned Stimulus (CS) stimulus to be associated with US to produce response
 - Conditioned Response (CR) response to CS



Pavlov's dogs!

- Pavlov trained dogs to salivate at the sound of a bell
 - US--meat
 - UR--salivating
 - CS--bell
 - CR
 - Prior to conditioning, the bell would produce no salivating
 - By repeatedly pairing the CS and the US, the CS comes to predict the US, leading to the CR.

Extinction and Blocking

- If the US starts to appear without the CS
 - The response (CR) extinguishes
- The CS must be interpreted as a predictor of the US in order for conditioning to occur
 - Imagine: You're sitting in class
 - You see a flash, hear a tone, then get a shock
 - What if you see the flash alone later? Hear the tone?
 - What about this: You're sitting in class
 - You see a flash and get a shock
 - Then you see a flash and hear a tone and get a nasty shock.
 - Now, what if you see a flash by itself? Hear the tone?
 - This phenomenon is called *blocking*

Operant conditioning

- In Operant conditioning, there is no US
 - A CS is paired with a response
 - Learned through reinforcement
 - Behavior is reinforced, so it becomes more frequent
- Learned behaviors may or may not be desirable
 - May be used to teach a (new or old) dog new tricks
 - Superstitious behavior
 - Some fears
 - Operant conditioning and oncology

Schedules of reinforcement

- Not every presentation of the CS must be reinforced
- Think about gambling in Vegas
 - Imagine a slot machine that paid \$0.92 on every trial
 - Compare that to a machine that pays an average of \$0.92 for every dollar, but you win only once in a while
 - Which would you play for longer?
 - Intermittent reinforcement is most effective

So, why does this matter?

- Animals from humans to rats learn (some things) through conditioning
 - Helps us to see the continuity of psychology
- We should always consider the simplest explanation for an observation
 - If a behavior can be explained by conditioning, then a more complex explanation is not needed.
- No need to posit complex mechanisms for the fear of a dentist or the nausea experienced by cancer patients.
