

# Science of Psychology

PSY W1001 Section 2  
MW 8:40-9:55 Fall 2012



Wednesday, October 10  
Learning

# Announcements

- No lecture Monday, Oct. 15<sup>th</sup>
  - Make-up lecture TBA
- Exams returned Wednesday, Oct. 17<sup>th</sup>
  - Any questions about grading must be brought to our attention prior to the next midterm.
- Questions from last lecture?

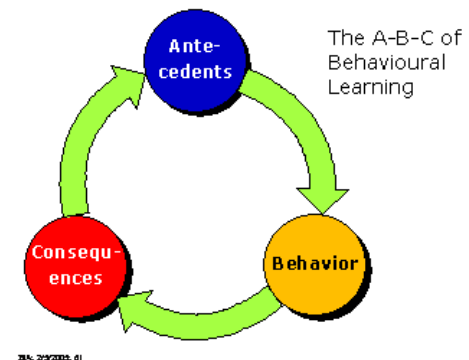
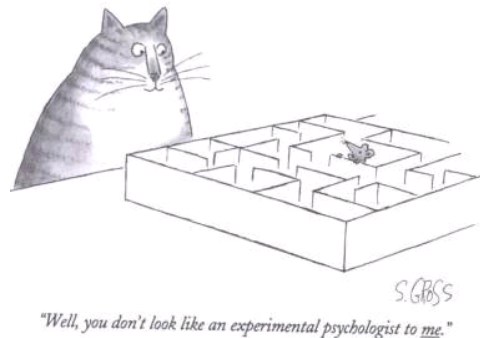
# Learning and Memory

- Differentiating learning and memory
  - The acquisition of information
  - The storage and retrieval of information



# Learning and animal models

- How does a rat learn to run a maze? How does a fish learn to navigate a river?
  - Study of animals: reveals same principles of learning that apply to humans
- Process of learning for a rat's maze learning = process of college student's learning of calculus
  - Except... easier to study the rodent!



# Basic Learning

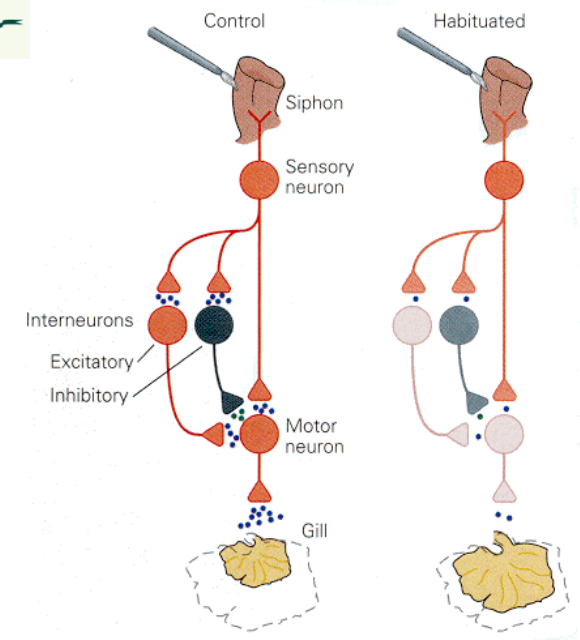
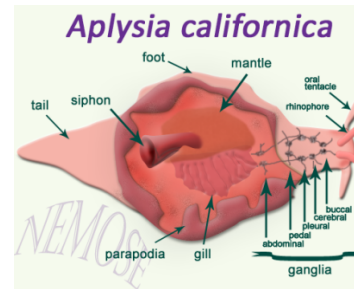
- What is important to predict in the environment?
  - Cues for biologically relevant events
  - Ignoring the irrelevant
- What can I do to cause an effect in my environment?

# Habituation

- *“Decline in response of organism’s response to stimulus once that stimulus becomes familiar”*
  - Ensures we attend to novel stimuli more closely than familiar (safe?) stimuli
  - Simplest form of learning

# Habituation as learning

- Learning – Experience that causes a permanent change
- Habituation
  - gradual reduction in responding



# Other Non-Associative Learning

- Dishabituation
  - Sensitivity to any change in the parameters of a stimulus to which one has previously habituated
- Sensitization
  - A given behavior increases in intensity as a result of some previous event.



# Associations!!!

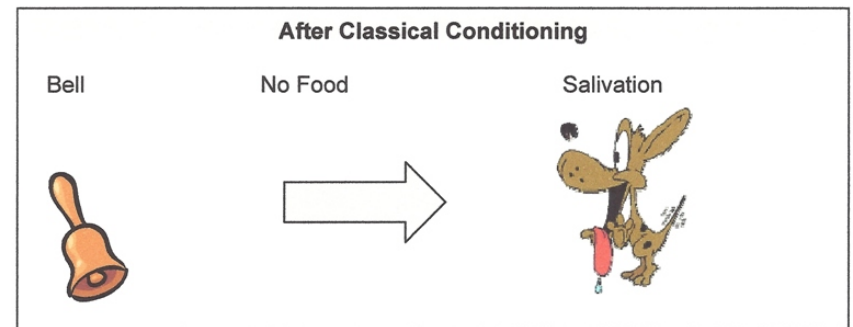
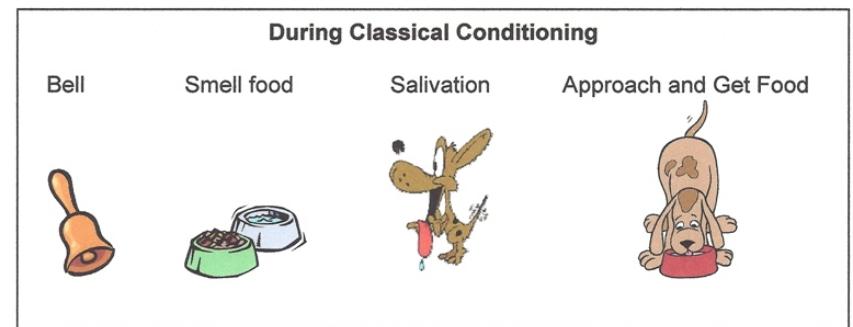
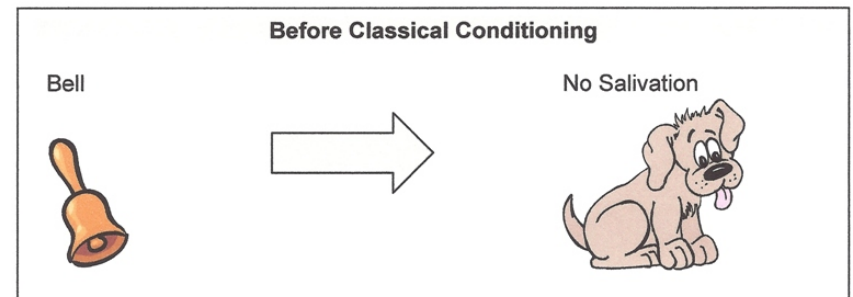
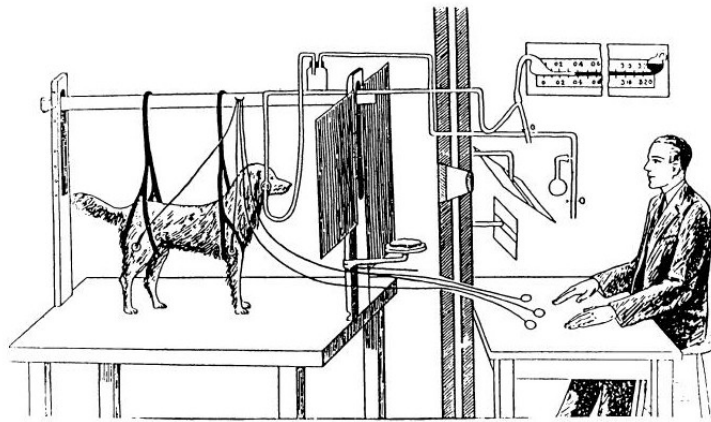
- What mechanisms are responsible for the complexity of learning?
  - Locke (1600s) and Berkeley (early 1700s)
    - Associations
    - We learn by *associating* one idea with another
      - The word “flower” with the smell and sight of a flower
      - The word “stove” with the sensation of heat
    - More complex learning → more associations
- *Remember the false memory demonstration?*

# *How do we learn about our environment?*

- Demonstration

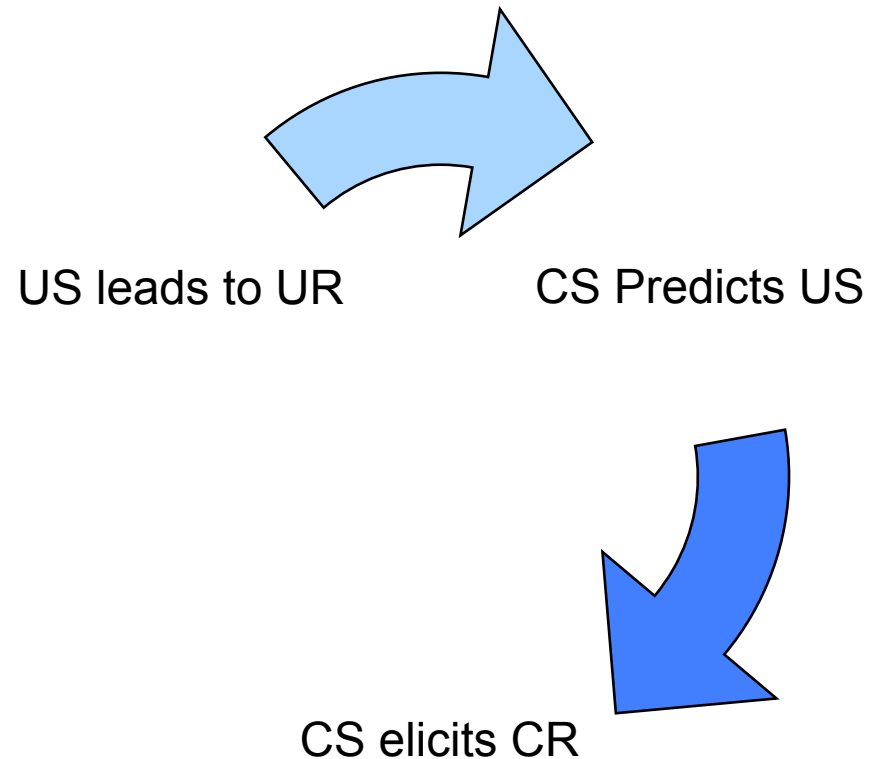
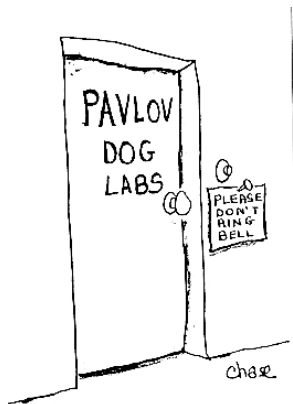
# Pavlovian Conditioning

- How to predict something important



# Formal Pavlovian Conditioning

- Classical Conditioning
  - Learning to predict biologically relevant events
    - Conditional Stimulus (CS)
    - Unconditional Stimulus (US)
    - Unconditional Response (UR)
    - Conditional Response (CR)



# Classical Conditioning Redux

Unconditioned stimulus (US) →

Unconditioned response (UR)

CS → US → UR

CS → US → UR

CS → US → UR

After many repetitions...

CS → CR (like the UR)

# Classical Conditioning in the real world

- When psychology runs amok.....
- Definitions from example:
  - US
  - CS
  - UR
  - CR
- The CR is not always identical to the UR

# Cool Stuff about Classical Conditioning

- Second-order conditioning
  - A second CS is paired with the first CS; the second CS will also elicit the CR
- Extinction
  - The CS is presented by itself until eventually it fails to elicit the CR
  - THIS IS NOT FORGETTING!
    - Extinction is an active learning process
      - More on this later
- Spontaneous Recovery

# More Cool Stuff

- Stimulus Generalization
  - Similar CSs can elicit the CR
- Discrimination
  - Specific stimuli elicit the CR

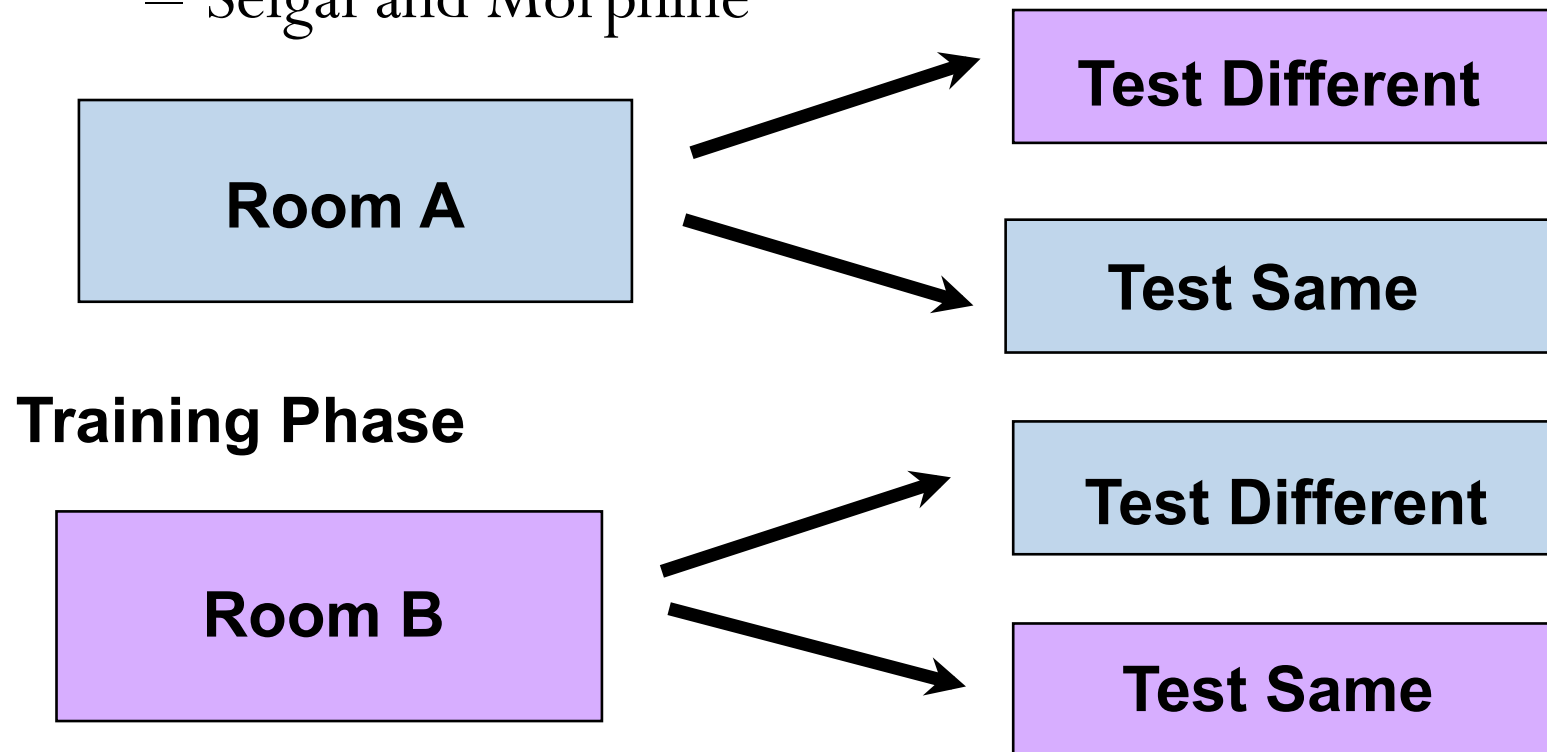


# And Even MORE Cool Stuff

- Conditioned emotions
  - e.g., fear
  - May be at the base of some phobias
- Establishment of compensatory responses
  - The body may use the CS to “prepare” for a CR
  - Often seen in body’s ability to anticipate drug administration

# Drug Conditioning

- Conditioned Tolerance
  - Seigal and Morphine



# Study Questions

- What is the difference between learning and memory?
- Why is it valuable to use animal models to study learning?
- What is the difference between non-associative and associative forms of learning?
- How can basic processes of non-associative learning be biologically useful for an animal?
- What is habituation?
- What is dishabituation?
- What is sensitization?
- How are habituation, dishabituation, and sensitization similar and different to one another?
- How did neuroscientists use the animal model of *Aplysia californica* to study habituation?
- In your own words, describe what is meant by associative learning.
- How was classical conditioning discovered? Describe the experiments that were being done that led to this discovery.
- What are the key components of classical conditioning? (US, UR, CS, CR) Be able to describe each of these components. Also, be able to identify each of these from descriptions of different experiments.
- Define the US, UR, CS and CR in the example of Jim classically conditioning Dwight.
- What is second order conditioning? Give an example from both a class demonstration and from “real life”.
- How can classical conditioning explain the development of a phobia?
- What is extinction? What is spontaneous recovery? Give examples of each of these.
- How do we know that extinction is not the same thing as forgetting? Think about how PTSD is evidence of this?
- (1) Explain how PTSD is a type of classical conditioning. (2) How might psychologists use the principles of classical conditioning to treat the disorder?
- What is the difference between stimulus discrimination and stimulus generalization? Give a “real world” example of a discriminative stimulus