Learning

• Any relatively permanent change in behavior brought about by experience or practice
  – Permanent
  – Experience
  – Practice
Ivan Pavlov (1849-1936)

- Russian Physiologist
- Father = Village Priest
- Father-in-law = Priest
- Religion to Physiology (Charles Darwin, Origins of Species)
- St. Petersburg
Ivan Pavlov

- Classical Conditioning
  - A stimulus comes to elicit a response that it does not normally elicit
Ivan Pavlov

- Wanted to study digestion in dogs
  - Interaction between salivation and digestion
  - Dogs salivate when they eat and smell food
    - This is known as a reflex (it is not learned; it is involuntary)
Ivan Pavlov

• What did he discover??
  – Dogs salivate without proper stimulus
    • Stimulus is an environmental condition that evokes a response from an organism
  – Salivate at lab coats
    • Why?
      • Getting fed by a person in a lab coat
  – Will external stimuli affect salivation??
    • ….Its Classical Conditioning

“Gatsby has a bit of a drooling problem. Try to ignore it. He’s very sensitive about it!”
Ivan Pavlov

- Thought he could control salivation
  - Play a bell (neutral stimulus) before he gave the dog food
  - Bell could elicit salivation even when food was taken away
    - He had conditioned the dog to salivate when it heard just the bell alone
Ivan Pavlov- Vocabulary

• Unconditioned Stimulus (US)
  – Event that causes a response to occur (prior to conditioning)
    • Giving dog food
    • Doctor hitting our knee
Ivan Pavlov - Vocabulary

- Unconditioned Response (UR)
  - Response that occurs after the stimulus (natural/ involuntary, not learned)
    - Salivation is the UR
    - Food in front of the dog is the US
Ivan Pavlov - Vocabulary

- Conditioned Stimulus (CS)
  - Paired with the US
  - Bell tone paired with food to elicit conditioned response
Ivan Pavlov - Vocabulary

- Conditioned Response (CR)
  - Salivating after only the bell is ringing
RIN! RING!

IVAN PAVLOV'S DOWNSTAIRS NEIGHBOR
Ivan Pavlov

• He helped cure phobias…how??
Ivan Pavlov-Vocabulary

• Counterconditioning
  – A pleasant stimulus is repeatedly paired with a fear-evoking object, thereby counteracting the fear response
Basic Principles of Classical Conditioning

• The CS must come before the UCS
• The CS and the UCS must come very close together in time
• The neutral stimulus must be paired with the UCS several times before conditioning can take place
• The CS is usually some stimulus that is distinctive (stands out from other stimuli)
Generalization

- The tendency for a Conditioned Response (salivating) to be evoked by stimuli that are similar to the stimulus (objects that look like a bell) to which the response was conditioned
  - Rustling sounds in the bushes
  - Animals will still flee regardless of what is in the bushes
Discrimination

• Definition:
  – The tendency for an organism to distinguish between a Conditioned Stimulus (CS) and similar stimuli that do not forecast an Unconditioned Stimulus (US)
Discrimination

- 2 things that organisms must learn:
  - 1. Many stimuli that are perceived as being similar are functionally different
  - 2. They must respond adaptively to each
Discrimination

• Example:
  – In the first couple months of life, babies can discriminate their mother’s voice from those of other women
  – Babies will often stop crying when they hear their mother but not when they hear a stranger’s voice
Extinction and Spontaneous Recovery

- Extinction and Spontaneous Recovery are aspects of conditioning that help organisms adapt by updating their expectations or revising their representations of the changing environment.
Extinction

Process by which Conditioned Stimuli (CS) lose the ability to elicit conditioned responses (CR) because the CS are no longer associated with unconditioned stimuli (US)

- The CS no longer serves its predictive function
Extinction

- Pavlov- found that repeated presentations of the CS (bell) without the US (food) lead to extinction of the CR (salivation in response to the bell)
Spontaneous Recovery

- The recurrence of an extinguished response as a function of the passage of time
  - Example: Extinguish a response, wait a couple of days/weeks, present the CS again (bell), and the dog would salivate (CR)
Higher-Order Conditioning

• A previously Neutral Stimulus comes to serve as a CS after repeatedly being paired with a stimulus that has already become a CS
Higher-Order Conditioning

• Example:
  – Pavlov conditioned a dog to salivated (CR) in response to a bell (CS). He then repeatedly paired the shining of the light with the sounding of a bell. After several pairings, shining the light (the higher-order CS) came to elicit the response (salivation) that had been elicited by the bell (first-order CS)
Taste Aversion  
(a type of Classical Conditioning)

- A type of Classical Conditioning in which a previously desirable or neutral food becomes repugnant (repulsive) because it is associated with aversive stimulation (getting sick, eating too much)
  - Known as biological preparedness for animals who use it for survival