

Learning

Relatively permanent behavior
change that is acquired through
experience

Learning vs Maturation

- Not all behavior change is best described as learning
- Maturation (neuromuscular development) usually works together with experience to change behavior
- It speeds up the learning process

Two Forms of Simple Learning

- Classical (respondent) conditioning
- Instrumental (operant) conditioning

Classical Conditioning

- Pavlov's work with dogs
- Pavlov's apparatus

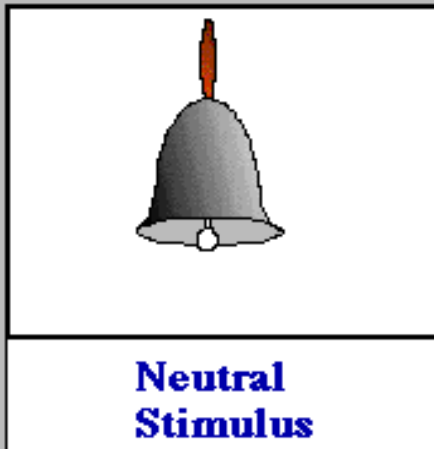
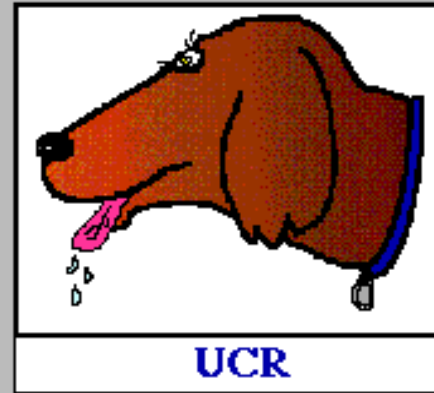
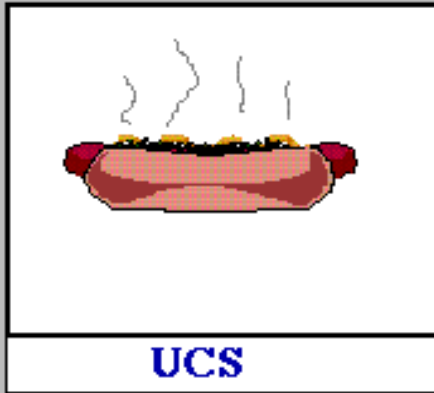


Pavlov's Classical Conditioning



Classical Conditioning

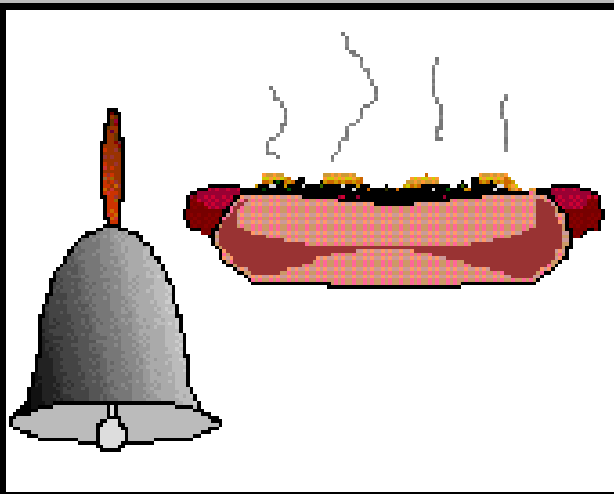
Before Conditioning



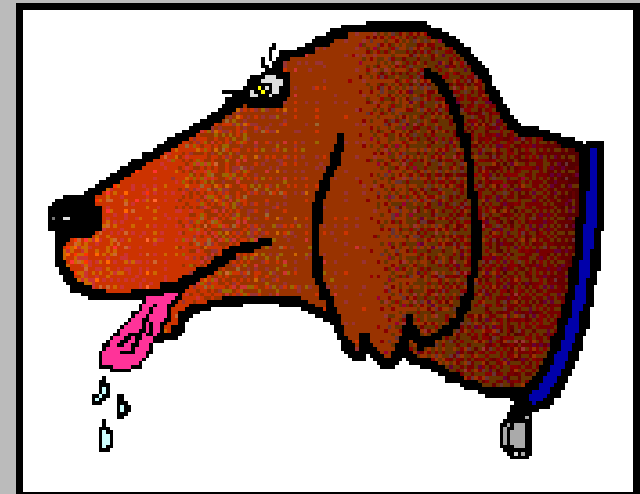
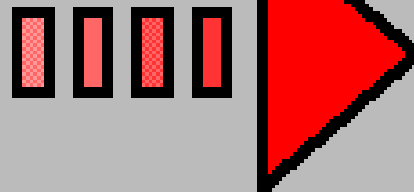
**UCS automatically produces UCR.
Neutral stimulus does not produce salivation.**

Classical Conditioning

During Conditioning



**UCS Paired
with neutral
stimulus**

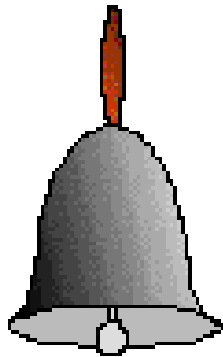


UCR

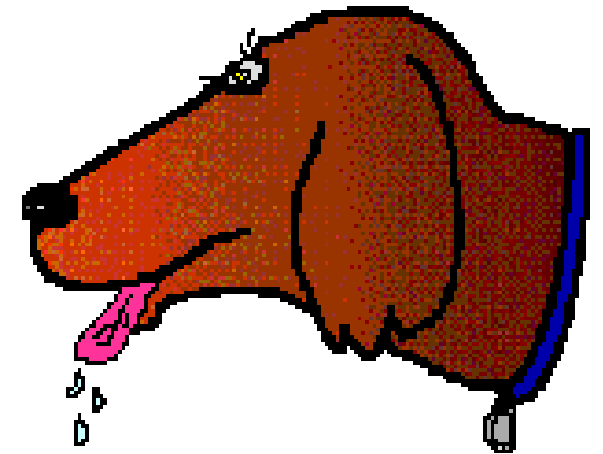
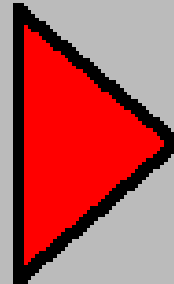
**UCS is paired with neutral stimulus.
UCS produces UCR.**

Classical Conditioning

After Conditioning



CS



CR

Neutral stimulus is now the conditioned stimulus.
It produces CR, salivation, which is similar to the
UCR produced by the Hot Dog.

Classically Conditioned Responses

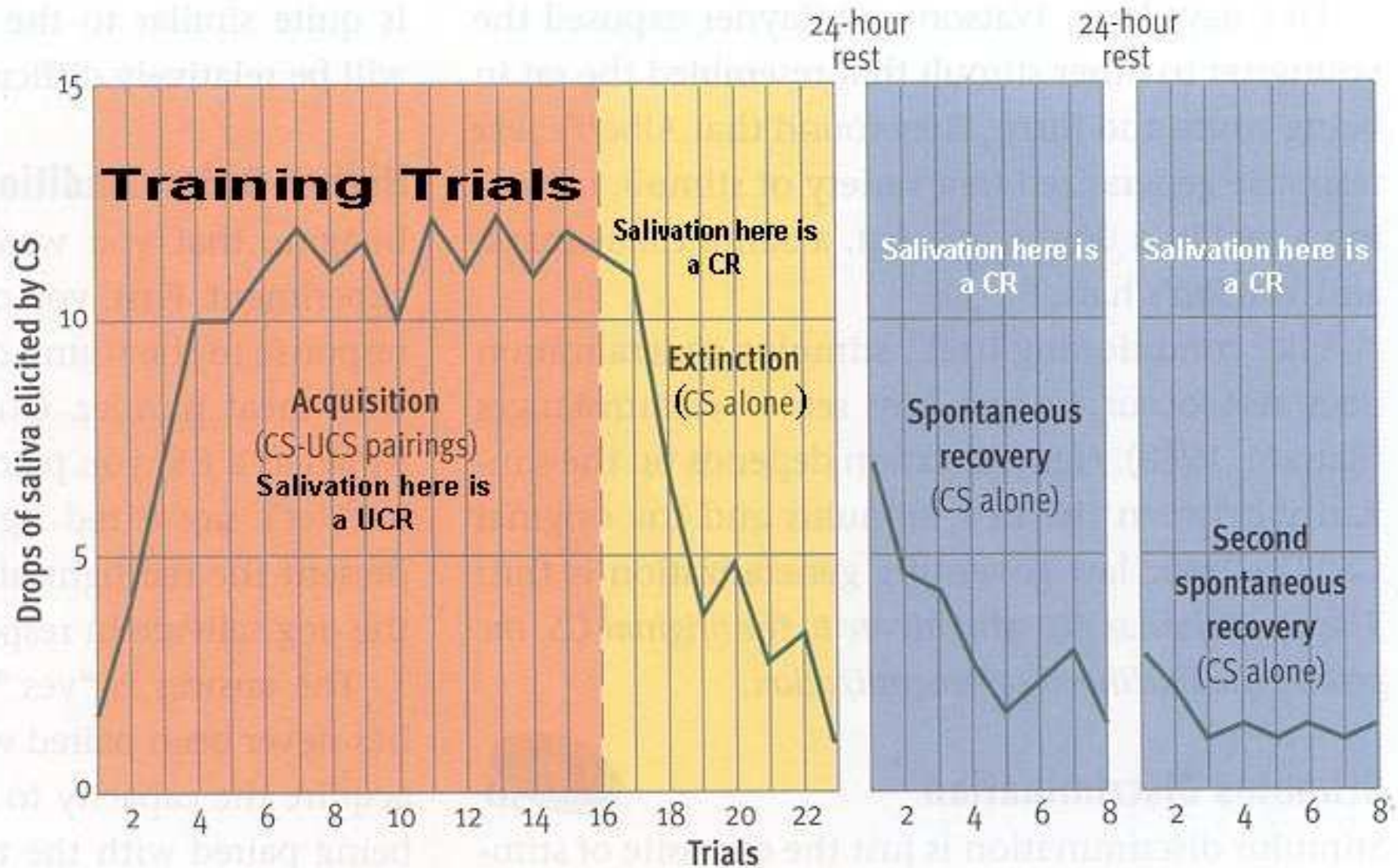
- Probably occur a lot in ordinary human life
- Examples of reactions that can be classically conditioned
 - eyeblink
 - heart rate
 - knee jerk
 - galvanic skin response (GSR)
 - conditioned emotional responses (CER's), e.g., phobias

Basic Phenomena

- Acquisition
- Extinction
- Inhibition or Active Suppression
- Reconditioning
- Spontaneous Recovery
- Disinhibition
- Stimulus Generalization
- Stimulus Discrimination

Acquisition, Extinction, & Spontaneous Recovery in Classical Conditioning

Slide 11



Extinction

- A conditioned response can be weakened or eliminated when the CS is repeatedly presented in the absence of the UCS
 - Think of an example of when it might be useful to weaken a CR
- Are Conditioned Responses ever completely “extinct”? How can you tell?

Inhibition or Active Suppression

- Pavlov believed that extinction didn't mean *unlearning* something so much as it meant that something *new* had been learned:
 - To *inhibit* the previously learned response
 - The connection between the CS and CR remains intact on some underlying level
- Three phenomena support this idea:
 - Reconditioning
 - Spontaneous recovery
 - Disinhibition

Reconditioning

- A CR that has been extinguished can be reconditioned by presenting further reinforced trials.
- Usually requires fewer trials than for the original conditioning
 - Shows that original CR was not completely extinguished

Spontaneous Recovery

- The reappearance of a conditioned response following a rest period after extinction
- Also shows that the original CR was not completely extinguished
- Spontaneous recovery would be a breakdown in inhibition during an extinction “rest period”

Disinhibition

- The sudden recovery of a response during an extinction procedure when a novel stimulus is introduced
 - Example: Imagine that you have a problem with test anxiety, and your anxiety has started to die down while you are taking a test. If someone walks into the test late, you may experience a resurgence of your anxiety level.
- This shows that the CR is still there, ready to return if inhibition is interrupted in some way

Other Conditioning Phenomena

- It's not very efficient to have to totally learn a conditioned response to every single conditioned stimulus that's similar.
- At other times, it's important only to make the conditioned response to a very particular stimulus.
- Thus we observe
 - Stimulus generalization
 - Stimulus discrimination

Stimulus Generalization

- Stimulus Generalization:
After a CR has been trained to a CS, that same CR will tend to occur to similar stimuli without further training. The greater the similarity, the stronger the response will be.
 - Example: Little Albert (Watson and Raynor, 1920)



Stimulus Discrimination

- A subject learns to respond to the CS but not to a similar stimulus because the CS was paired with a US, but the similar stimulus was presented without the US
- Example:
 - Dog learns to salivate to CS tone at a particular pitch and initially generalizes response to a lower pitched tone
 - If UCS is only presented with higher tone, dog soon learns to salivate only with the higher tone

Two Interpretations of Classical Conditioning

- Stimulus substitution

- Pavlov's view that the CS comes to substitute for the UCS, i.e., a simple association (S-S) is developed between the two so that the CS works the same way as the UCS
- Problem: CR is not identical with UR (e.g., weaker) so literal substitution is not occurring

- S-S expectancy

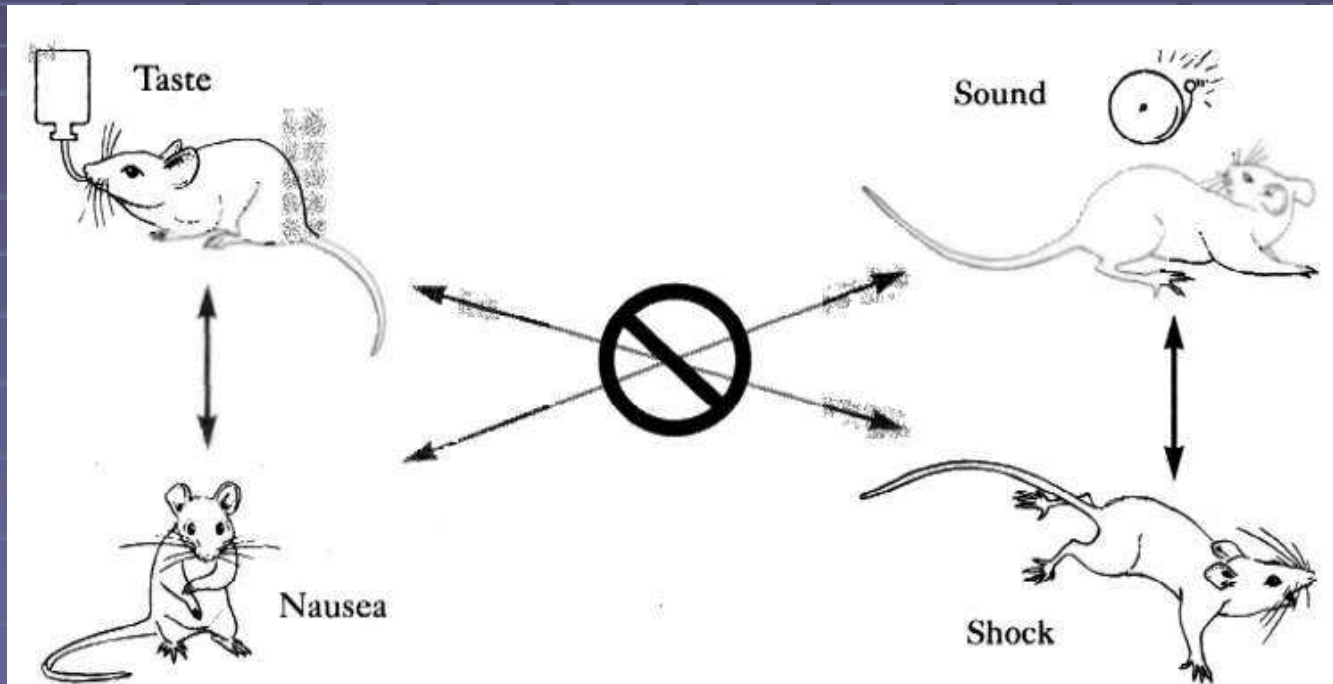
- Tolman's view that CS becomes simply a signal that UCS is to follow and so only generates an expectancy
- Support for this view comes from work by Rescorla & Wagner showing that it's not the # of pairings but the predictive value of the pairings that produces conditioning
- Problem: Even though subject knows UCS will not follow, still experiences CR (e.g., conditioned fear)

Two Major Assumptions of Pavlov

- What is learned is an association between two stimuli (S-S)
 - Modern version: CS become associated with a *mental representation* of the UCS
- *Any* CS will be linked to *any* UCS as long as they repeatedly occur together in time
 - Not correct, as shown by the phenomenon of *biological preparedness*

Biological Preparedness

- Sauce Béarnaise Syndrome and Garcia's taste aversion work



23 Biases in taste aversion learning. Although white rats can easily learn that certain taste cues will be followed by sensations of nausea and that certain sounds will be followed by skin pain caused by shock, they have great difficulty forming learned associations between taste and consequent skin pain or between sound and subsequent nausea. *Source: Garcia et al. [423].*