Learning

“O! this learning, what a thing it is”

Shakespeare, The Taming of the Shrew, 1597

What is learning?

- A change
  that is observable

A change in behavior

How do we learn?

How do we learn?

- By Association
- Through Reward and Punishment
- By Observing others

Classical Conditioning

Pavlov: Experiments with the digestive system

US (food) ----- UR (salivation)

Neutral S (Tone) ------ No response

Neutral S (Tone) + US (food) --------- UR (salivation)
(repeatedly)

CS (Tone)----------Conditioned Response(salivation)

- Acquisition – the linking of the neutral stimulus to the unconditional stimulus.

- **Higher order conditioning** – a new neutral stimulus may become a new conditioned stimulus by being associated with a previously associated stimulus.

  Light + Tone

  Light ------ Salivation

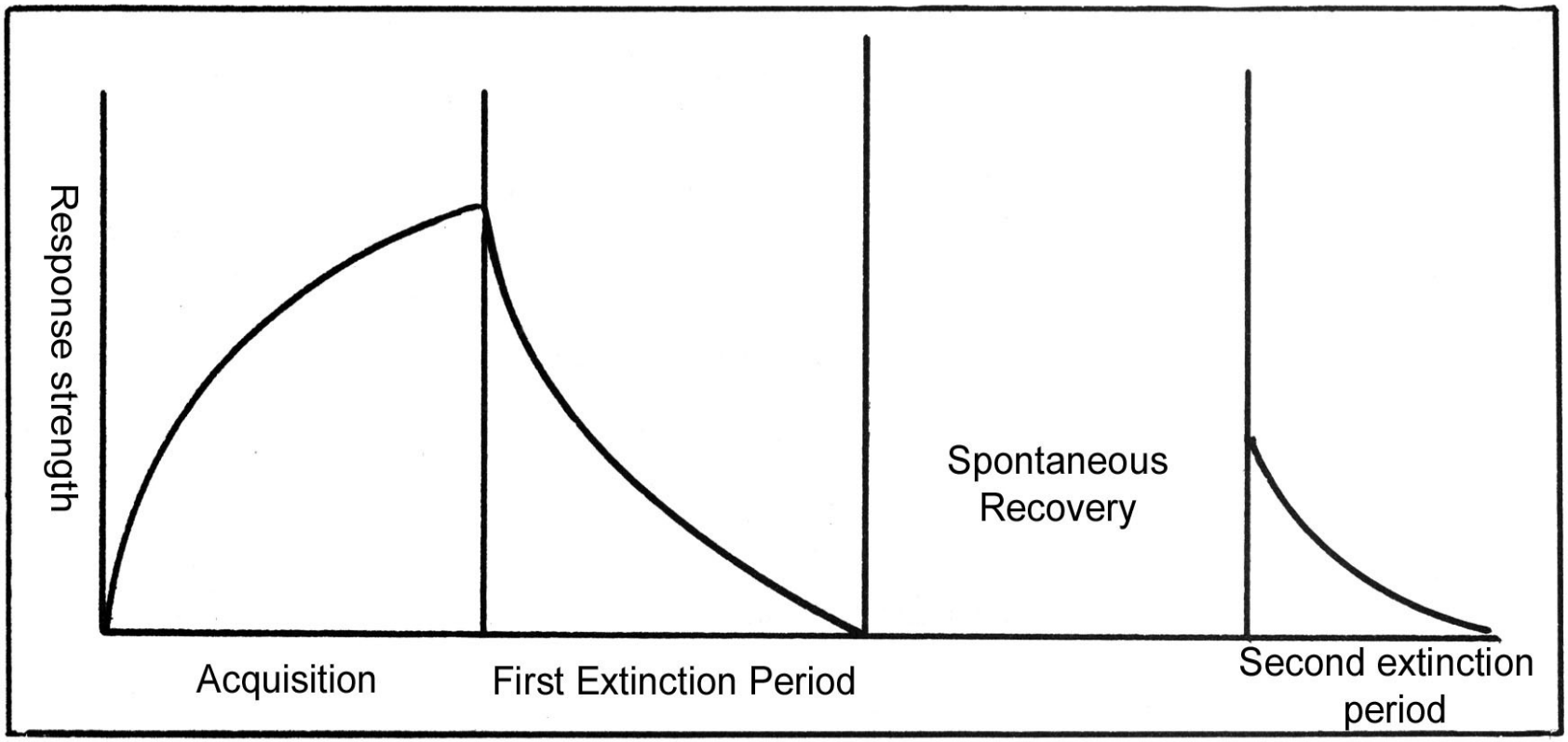
Also referred to as second order conditioning

Tends to be weaker than first order conditioning

Field (2006) cartoon characters (ice cream/brussels sprouts)

Olson & Fazio (2001) attitudes to Pokemon characters (positive/neg words)

- **Extinction** – diminished responding that occurs when the CS occurs repeatedly without the US
- **Spontaneous Recovery** – the reappearance of a weakened CR after a pause (suggesting that extinction was suppressing the CR rather than eliminating it)



http://www.intropsych.com/ch05_conditioning/extinction_and_spontaneous_recovery.html

- **Generalization** – the tendency for similar stimuli to the conditioned stimulus to elicit similar responses.

  Pavlov – different tone also worked

  (Pollak et al, 1998 – Abused vs control children response to an angry face)

- **Discrimination** – the learned ability to distinguish between a Cs and a stimuli that may be similar but does not signal a Ucs

  (2 tones)

- Biological Predispositions:

Are the laws of learning universal ?

Each species' predispositions prepare it to learn the associations that enhance its survival.

Garcia & Koelling (1966) Taste Aversion associated with sickness among rats (delayed sickness)

Gustavson et al, (1974, 76) coyotes & wolves – poisoned sheep carcasses

Prevented baboons from raiding gardens

- Many response can be conditioned to many stimuli in many organisms

- Illustration of how learning can be studied objectively.

  salivary response measured in term of cubic centimeters of saliva

Applications of Classical Conditioning

- Drug Users – the places, the people associated with a high
- Immune responses

Watson & Rayner - ‘Little Albert’ 11 month old

white rat with a loud noise

Maxwell House Coffee Break

Advertizing

- Pair a neutral stimulus (product) with an affective stimulus (UCs) repeatedly

  Paint (Brand) + Happy Family ---------- Happiness

  Paint Brand ---------- Happiness

(Attention, Attitude, Purchasing Probability)

Maggi

De Beers Diamonds

“Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select--doctor, lawyer, artist, merchant-chief, and, yes, even beggarman and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors.”

John. B. Watson, *Behaviorism*, 1930

Operant Conditioning

- Known also as instrumental conditioning – some action of the learner brings about a change in the environment that makes the action more or less likely to occur in the future.
- Reinforcement - consequence
- Positive Reinforcement – that follows a response and increases the likelihood that the response will be made again – Reward

- Punishment – follows the response and decreases it’s likelihood of occurring.

  fines, spanking
- Omission of Reinforcement – stop the reinforcement to decrease the likelihood of the behavior occurring.

  time out, no TV, no ipad
- Negative Reinforcement – a response that terminates an unpleasant consequence (neg reinforcement)

  (e.g. noise)

- **Thorndike** - ***The law of effect*** principle suggests that responses closely followed by satisfaction will become firmly attached to the situation and therefore more likely to reoccur when the situation is repeated.

- Cats in a Puzzle Box
- Mazes

- **B.F. Skinner** – Skinner Box
- **Behavior Shaping** – reinforcers gradually guide the animal's behavior towards a desired behavior –

  successive approximations develop complex behaviors

  Rats have been taught to sniff out land mines

  Dogs that lead the blind

- Continuous Reinforcement – every time the response occurs
- Partial Reinforcement – intermittent reinforcement (fishing, gambling)

Schedules of Reinforcement

- Fixed Ratio Schedules – reinforce behavior after a fixed number of responses

  High levels of responding

- Variable Ratio Schedule - reinforce behavior after a variable number of responses

  High levels of responding

- Fixed Interval Schedule - reinforce behavior after a fixed time period

  Stop start pattern (rapid responding near reinforcement)

- Variable Interval Schedule - reinforce behavior after a variable time period

  Slow steady responding

- Latent learning – learning that becomes apparent only when there is some incentive to demonstrate it

- Cognition – expectancy

- Applications

Breland & Breland - animal training school taught 15,000 animals from 140 species

School - Teaching machines and textbooks that would shape learning in small steps, immediately reinforcing correct responses

Work – reward specific achievable behaviors

“How much richer would the whole world be if the reinforcers in daily life were more effectively contingent on productive work?” Skinner

Sports – reinforce small successes then gradually increase the challenge – golf, baseball

How to use it as a guide

- State your goal in measurable terms and announce it
- Monitor how often you engage in your desired behavior (log it)
- Reinforce the desired behavior
- Reduce the rewards gradually

Classical Conditioning	Operant Conditioning
Learns association bet events	learns assoc bet its behavior and
(over which they have no control)	resulting consequences
Response involuntary automatic	voluntary

Observational Learning

- Modeling - observing and imitating models

- Mirror Neurons - Rizzolatti, Parma Italy

  macaque monkeys – some neurons in the inferior frontal cortex that responded when the monkey picked up a peanut also responded when the monkey saw a person pick up a peanut

- 10% of neurons have this mirror property in the inferior frontal cortex and inferior parietal cortex
- Turns out humans have mirror neurons too
- The human brain has multiple mirror neuron systems that specialize in carrying out and understanding not just the actions of others but their intentions, the social meaning of their behavior and their emotions.
- "We are exquisitely social creatures," Dr. Rizzolatti said. "Our survival depends on understanding the actions, intentions and emotions of others.”

“Everyday experiences are also being viewed in a new light. Mirror neurons reveal how children learn, why people respond to certain types of sports, dance, music and art, why watching media violence may be harmful and why many men like pornography.”

- "Mirror neurons provide a powerful biological foundation for the evolution of culture,“ Patricia Greenfield.

- Bandura – Bobo Doll Experiment

  Child watches an

  Adult model - behaves aggressively with a Bobo doll – 10 mins - pounds, kicks and throws it around the room

  “Sock him in the nose ……. Kick him”

 Then child is taken to another room with toys

  then told that they need to keep these toys for other children

Then brought back into this room with the Bobo doll

- TV violence
- Viewing violence
- Violent Video Games

- Prolonged exposure to violence desensitizes viewers
- Implications