Chapter 6 – Learning and Memory and Umm… what did we study?

I. Definitions
   a. Learning = Change in behavior resulting from experience.
   b. Habituation = Repeated exposure to experience results in decreased response
   c. Sensitization = Increase in response after repeated exposure.
II. Pavlovian Conditioning
   a. Also called classical / respondent conditioning
   b. Terms
      i. CS (Conditioned Stimulus)
      ii. US, UCS (Unconditioned Stimulus)
      iii. CR (Conditioned Response)
      iv. UR, UCR (Unconditioned Response)
   c. Types
      i. Delayed Conditioning >> Start CS then ADD US.
      ii. Simultaneous Conditioning >> CS & US at the same time.
      iii. Trace Conditioning >> First CS then US.
      iv. Backward Conditioning >> First US then CS.
   d. Contiguity not important – Contingency is. Timing is everything.
   e. No conscious thought required.
   f. Extinction >> CS ceases to cause CR when the US and CS are no longer associated (when the US is stopped). NOT un-learning!
   g. Spontaneous Recovery >> Opposite of extinction. If US is resumed, CR will resume right away.
   h. Little Albert
      i. Baby from John Watson's Experiment.
      ii. Watson rang gong to scare kid after showing him a white rat (which isn't normally a fright-inducing animal to babies).
      iii. Baby became afraid of all white animals, as well as a Santa Claus beard (which was white)
   i. Taste Aversion
      i. A single exposure to training with taste will result in a condition.
      ii. Natural susceptibility to certain stimuli.
      iii. Light and sound will easily be associated with shock.
      iv. Taste will easily become associated with sickness.
      v. Body naturally knows the rules of its environment.
III. Operant Conditioning
   a. Operant = Voluntary behavior an animal emits to affect its environment.
   b. Thorndike / Law of Effect
   c. Trial & Error Learning
   d. Try everything, and remember only that which had positive effects.
   e. Skinner Box (Animal in cage with lever to produce reinforcer)
IV. Reinforcers
   a. Reinforcement = Anything that will increase the probability of a behavior that it follows.
   b. Cumulative Response Graphs
      i. Y-Axis is incremented after each response from the animal.
      ii. X-Axis represents time.
   c. FR (Fixed Ratio) 1 = 1 Response for re-enforcer. FR 2 = 2 Responses, etc.
   d. VR (Variable Ratio). Number of responses required to get re-enforcer varies.
      i. E.G.: Gambling on Slot Machines.
      ii. No post-re-enforcement pause – steepest graph.
   e. FI (Fixed Interval) >> A response after each set period of time results in a re-enforcer. Scalloped graph.
   f. VI (Variable Interval) >> Same as FI, but with a variable interval. Graph not as steep as VR. Constant slope.

g. All animals, including humans behave according to the same graphs.
h. Positive Reinforcement = GIVING stimulus
i. Negative Reinforcement = WITHDRAWING stimulus (e.g. Pain Killers)
j. Intermittent Reinforcement
   i. Partial Reinforcement Extinction Effect (P.R.E.)
   ii. Hard to implement extinction on variable schedules. Animal will continue responding. (E.G. – Even if slot machine completely stops paying out, we'll still play for a long while.)
k. Conditioned Reinforcement
   i. Reinforcers that BECOME important to the individual, as opposed to Primary Reinforcers.
   ii. Primary Reinforcers meet biological needs.
   iii. Generalized Reinforcer (Type of Conditioned)
       1. Paired with MANY primary reinforcers.
       2. Main Example: Money
   iv. Token Economy
       1. Conditioned / Generalized Reinforcer
       2. Give tokens to reinforce good behavior; tokens can be traded for privledges.
       3. Studied in mental institutions.
       4. Allows for immediate reinforcement without actual immediate rewards.
   v. Premack Principle
       1. Reinforce behavior with low-probability using high-probability behavior.
       2. Look at baseline rate (how often does the behavior in question normally occur).
       3. Find a different behavior with a higher rate.
       4. Reinforce low-rate behavior with high-rate.
       5. Doesn't always hold true. Example: Sex is a much stronger reinforcer than eating, but occurs much less frequently.
   vi. Prompting >> Signal that sets occasion for behavior, and acts as a cue.
l. Shaping
   i. Gradually change which behavior you will reinforce.
   ii. First reinforce picking up one toy, then two, then three, then eventually the whole room.
   iii. Gradual successive proximations
m. DRL = Differential Reinforcement of Low Rate of Behavior. Don't re-inforce if behavior occurs too often.
n. DRI = Differential Reinforcement of Incompatible Behavior. When confronted with bad behavior, reinforce it's good counterpart. E.G. When the child plays with his food at the table, ignore him, but if he eats it, praise him.
V. Punishment
a. Anything that decreases the response of the behavior it follows.
b. Positive Punishment = GIVING stimulus
c. Negative Punishment (or Response Cost) = WITHDRAWING stimulus.
d. Avoidance / Escape
   i. Avoidance = Response prevents punishment
   ii. Escape = Response terminates punishment.
e. Problems with Punishment
   i. Use Reinforcement Instead.
   ii. Tends to be Temporary
   iii. Emotional Side Effects (Fear, aggression)
   iv. Context-Specific (Punisher becomes associated with punishment. Parents, for example, become associated with their punishments in the child's eyes, and he fears them)
   v. Modeling. Should children learn from it? How will they influence others behavior? With violence?

    f. Proper Punishment
      i. Consistency = Keep doing it.
      ii. Intensity is Important. More isn't always better.

VI. Discrimination
  a. NOT Racism / sexism etc.
  b. Ability to respond to differences in stimulus. Differentiation.
  c. Context. When is it appropriate to perform certain activities?
  d. Discriminative Stimulus (SD) moderates Response > Reinforcer behavior.

VII. Two-Factor Learning
  a. Both Pavlovian and Operant conditioning occur.
  b. Pavlovian Conditioning: Responsible for emotions. (Two stimuli become jointly associated.)
  c. Operant Conditioning: Reinforces emotions. (Consequences of a behavior affect future behavior.)
  d. Because avoiding an object (phobia) alleviates anxiety, the animal is more inclined to avoid it in the future.

VIII. Cognition >> Mental processes involved in thinking, knowing, perceiving, learning, and remembering, and the contents of those processes. Cognitive Psychology focuses on the mind, rather than behavior. Building "constructs" of the mind.

IX. Insight Learning
  a. Kohler (Gestalt Psychology).
  b. Example of monkey in room stacking items up to reach food.
  c. Fundamentally different from operant conditioning
  d. Challenged by Skinner & Epstien

X. Tolman
  a. Behavioral researcher who accepted cognitive thinking.
  b. Vicarious Trial and Error >> Run through a plan in the mind before exercising it.

XI. Cognitive Map
  a. Mental representation of physical space.
  b. You can get from A to B, and from A to C, so because you're keeping a mental map of the area you can also get from B to C.

XII. Cognitive Influences
  a. Rescorla (Researcher who proved "contingency" not "contiguity" in Pavlovian conditioning).
  b. Kamin – "Blocking."
    i. Condition animal to recognize that a flash of light precedes a shock.
    ii. Introduce a tone with equal predictive nature, and the animal may ignore it because light is already predictive.
  c. Overshadowing – Only one predictive stimulus is learned when both are presented equally sometimes.

XIII. Memory
  a. Encode, Store, and Retrieve information for later use
  b. Ebbinghaus – Tested memory using nonsense syllables (Pov, Keb, etc), and measured the number of times subjects needed to read through the list before they could remember. Then how many times required to "relearn" it on subsequent sessions.
  c. Three Functions of Memory
    i. Encoding
      1. Input from environment is manipulated such that it can be stored.
      2. Elaboration >> Adding meaning to that input.
    ii. Storage >> Physical location in the brain holds the info until needed
    iii. Retrieval
      1. Recall >> Retrieving info directly.
      2. Recognition >> Identify info as part of memory, but not recalling directly. Ex: Multiple-choice questions on tests.
  d. Three Memory Systems
    i. Sensory Memory

1. Shortest term memory, stores info from senses.
2. If you close your eyes, you can still picture the image for a few seconds.
3. Echoic – Auditory
4. Iconic – Visual
   ii. Working Memory
1. Analogous to RAM in computers.
2. "Short-term memory."
3. Consciously processed.
4. May *define* consciousness – ie conscious beings have working memory, others don't.
5. Pre-frontal cortex.
6. Different types (eg Acoustic)
   a. Most short-term meory = Auditory.
   b. Deaf people have more visual, and "visualize" words being spelled out, rather than thinking of the pronounciation.
7. Limited Capacity
   a. 7 + or – 2 items. "Item" defined by meaning.
   b. Chunking >> Grouping items together to take up less space. Ex: one-two-three becomes one twenty-three.
8. Maintenance Rehearsal >> Repeating to Remember
9. Elaborative Rehearsal >> Attaching meaning to content. Not very effective with numbers.
   iii. Long-term memory.
1. Analogous to computer's hard disk.
2. Practically unlimited space.
3. Procedural memory >> "How to…" Ex: Riding a bike.
4. Declarative memory >> Anything that can be spoken or described.
   a. Episodic >> Personal history / info. Ex: First kiss, getting hit by a car, etc.
   b. Semantic >> Meanings of words and concepts.
5. H.M
   a. Hippocampus & Amygdala removed to cure seizures.
   b. Could now form NEW memories, but remembered everything from before the operation.
   c. Wouldn't remember meeting someone a few minutes later.
   d. Could learn new/complex procedures (writing backwards in mirror), but couldn't remember learning it.
6. Explicit Memory >> Consciously try to memorize.
7. Implicit Memory >> Learned automatically.
   iv. Forgetting.
1. Repressed memories – blocked out. Memories with high emotional content (Freud). Research shows opposite – high emotional content is remembered MORE easily.
2. "Flashbulb memories"
   a. Remembering exact details at the time of a traumatic event. Ex: Challenger, JFK Assassination, etc.
   b. Thought to be very accurate, but proved not to be particularly different.
   v. Interference
1. Proactive >> Memory learned EARLIER interferes.
2. Retroactive >> Memory learned LATER interferes.
   vi. Primary effect >> Remembering information from the beginning of a list.
   vii. Recency effect >> Remembering information from the END of a list.
   viii. Constructive Memory
1. Way of saving resources by not remembering all details.
2. Source & Credibility easily forgotten.

3. Elizabeth Loftus research & misinformation. Post-event misinformation mixed with event information.
            4. "Lost in shopping mall" experiment – made group of adults believe that they had been lost in a shopping mall as children (Loftus).
    ix. Mnemonic Devices
            1. Memory Tools.
            2. Chunking.
            3. Studying related concepts together.
            4. Focus on the major points of a topic, and fill in the holes.
            5. Method of Loci >> Compare items to memorize with landmarks on a familiar route (only useful for lists).
            6. Narrative Story >> Use a poem/story as aide.
            7. Peg Word System
                a. Use pre-existing list of words as a guideline for remembering lists.
                b. Ex: 1 = Bum, 2 = Shoe, etc.
            8. Acrostics
                a. Forming a sentence using the first letters of items in a list.
                b. Please Excuse My Dear Aunt Sally (Parenthesis, Exponents, Multiply, Divide, Add, Subtract)
            9. Acronym
                a. Form a word from the first letters of items in a list.
                b. HOMES   Huron, Ontario, Michigan, Eerie, Superior.