# Memory and Cognition

## January 28, 2013

## Origin of Memory Research

* **Importance of Studying Memory**
  + False Beliefs – Hypnosis cannot actually recover lost memories or photographic memory is so rare so most researchers believe it does not exist.
  + Once you describe the experiment to you, can the artificial memory experiment actually apply to the real world? Known as **equilogical validity**.
* **Hermann Ebbinghaus**
  + First major scientific researcher of memory
  + Interested in the formation of new associations (link between concepts such as A->B)/ information. E.g. You associate grass with green.
  + Nonsense syllables (Consonant, vowel, consonant)
    - LUP, WAB, BOK, etc.
  + Procedure
    - Stage 1: Learned a list of nonsense syllables for serial recall test
      * **Serial Recall Test** – Must be recalled in the correct order of presentation
    - Retention Interval varying in time from hours to months
    - Stage 2: Relearned the list
  + Calculate Savings Measure
    - Savings = time at stage 1 – time at stage 2
    - That’s how Ebbinghaus defined memory retention
  + Principles Ebbinghaus Found
    - The more time he spent time the more he remembered :O
    - Forgetting Function
      * Varied the time interval between studying and test as well as the two stages
      * At what rate does forgetting occur?
        + The majority of forgetting occurs immediately after you learn something, then it levels off.
* **Memory Metaphors**
  + Plato compared memory to making a seal on wax. The strength of your memory is dependent on age, character of the person, impression, etc.
  + Memory compared to a cows digestive system
    - The passage of memory is compared to the passage of food through the stomach of a cow. Food for thought, digesting information, etc
  + Does that make a connection? Does that ring a bell? 1950s or so
* **William James**
  + Primary Memory
    - Everything that you are currently aware of.
    - We think of this as short-term memory.
    - Whatever is in your consciousness.
    - It is very easily able to be distracted
  + Secondary Memory
    - Everything you know but that which you’re not necessarily thinking about at that moment. Much more permanent and it’s much harder to be disrupted.

## Information Processing Model

* **Modal Model (Atkinson & Shiffrin, 1968)**
  + Assumptions
    - Consists of a series of sequential stages
    - Each stage receives information from preceding stage and then performs its unique function
  + Structures
    - **Sensory Memory**
      * Very brief memory system that holds everything that hits your senses. It may or may not be processed for memory.
      * *Iconic Memory* – Everything you see enters your iconic memory.
      * *Echoic Memory* – Everything you hear enters your echoic memory.
    - **Short-Term Memory**
      * Temporary storage system. Fairly limited capacity, short duration. You can keep information in your STM by refreshing it (repeating a phone number to yourself).
    - **Long-Term Memory**
      * Our relatively permanent, long-lasting, memory store. Essentially unlimited.
  + How information flows through the system (control processes)
    - Rehearsal
    - Encoding
    - Retrieval
      * Information is copied back into short-term memory. Tip of the tongue phenomenon is the sensation when we have you know a word that you’re searching for, but you cannot retrieve (recall) the whole word (but some) of it from your LTM.
  + Support for Modal Model
    - **Serial Position Effects**
      * *Primary Effect*
        + You can recall the first few items of the list (since you rehearse them). By the time you get to the 7th word something has to go, you’re less likely to remember the items in the middle most. Occurs because of LTM.
      * *Recency Effect*
        + You can recall the last few words as long as you don’t have a distractor. STM is responsible for recency effect.
    - **Types of errors in recall**
      * If you make a mistake when recalling information, the mistakes tend to be very different whether or not the information comes from your STM or LTM.
      * If you are presented a list of homophones visually (Hare, Ferry, etc) and then asked to recall it 20 seconds later (STM) then you’re likely to be based on sound (hair, fairy, etc)
      * If you are asked to do it after 5 minutes later it’s based on semantics (Rabbit, boat, etc)
    - **Anterograde Amnesia** (Inability to form new memories)
      * H.M.
        + Suffered from fairly severe epileptic seizures. They always started in his hippocampus, he probably would not of survived them had they not of removed his hippocampus. He didn’t have any more seizures, but he couldn’t form new memories. He shows recency effect but NO primacy effect.
      * Hippocampus