MODULE 31

STUDYING AND BUILDING MEMORIES
Fact: Cognitive revolution in psychology occurred in the 60s and 70s and helped dethrone behaviorism as the dominant perspective in psychology.
Memory:

- We are what we remember.
- How do we remember countless voices, sounds, songs, tastes, smells, textures, faces, places, happenings, etc.?

https://www.youtube.com/watch?v=tESffhWs8I0
HOW DOES MEMORY WORK?

Psychologists create *Memory Models* to explain how we form and retrieve memories.

We use different “models” to explain memory.

*Information Processing Model*: 3 stage model that compares human memory to a computer’s operations.

Computers process information sequentially, our dual track mind processes information simultaneously (parallel processing).

Example: in the cafeteria, you process info about (1) the people you see, (2) the sounds of voices, and (3) the smell of food.
STUDYING MEMORY

Information Processing Model:

Three step process in how memory works

1. : The processing of information into the memory system.

2. : The retention of encoded material over time.

3. : The process of getting the information out of memory storage.
STUDYING MEMORY

ENCODING

- What you do when you are trying to learn something.
- Increase attention and intention while encoding.

Typing info into a computer

Getting someone’s IG name at a party.
STUDYING MEMORY

STORAGE

- Create mnemonics/associations to help store info.
- Pressing command S and saving the info.
- Remembering someone’s IG name after you leave the party.
Find cues, use external memory aids.

Finding your document and opening it up.

Going on IG the next day and typing in wrong IG names. (Retrieval failure!)
Atkinson and Shiffrin’s three stage model of memory, describes 3 different memory systems characterized by time frames:

- **Stage 1-__________ Memory (encoding):** is a brief representation of a stimulus while being processed in the sensory system.

- **Stage 2-__________ Memory (storage):** (STM) is working memory that holds a few items briefly.
  - Limited capacity (7 items +/- 2)
  - Duration is about 30 seconds

- **Stage 3-__________ Memory (storage):** (LTM) is large capacity and long duration.
EXTERNAL STIMULI

Sensory memory
Briefly retains the information picked up by the sensory organs

Short-term memory
Temporarily holds information in consciousness

Long-term memory
Can retain information for long periods of time, often until the person dies
THREE STAGE PROCESSING MODEL OF MEMORY: SENSORY MEMORY

- the immediate, very brief recording of sensory information in the memory system.

- Sensory memory relates to memories taken in by the senses. It is divided into ________________________.

Sensory Memories

The duration of sensory memory varies for the different senses.

- Iconic
  0.5 sec. long
- Echoic
  3-4 sec. long
- Hepatic
  < 1 sec. long
THREE STAGE PROCESSING MODEL OF MEMORY: SHORT TERM MEMORY

- activated memory, holds a few items briefly before it is stored or forgotten.

- From here we encode it through *rehearsal*.

- Capacity of STM
  - Holds about 7 (+ or -2) items for about 20 seconds.
  - We recall digits better than letters.

http://www.psychologistworld.com/memory/test1.php
http://www.garyfisk.com/anim/lecture_stm.swf
THREE STAGE PROCESSING MODEL OF MEMORY: SHORT TERM MEMORY

- Maintenance Rehearsal:
  
  continuously repeating the to-be-remembered information
STUDYING MEMORY

THREE STAGE PROCESSING MODEL OF MEMORY: SHORT TERM MEMORY

- STM is NOT just a small, brief storage place.
- STM is an *active desktop* where your brain processes information, making sense of new input and linking it with LTM.
- The active processing that takes place in this stage is called your _________________. (Example: linking the information you’re reading with prior knowledge.)
STUDYING MEMORY

THREE STAGE PROCESSING MODEL OF MEMORY: LONG TERM MEMORY

- Long term memory (LTM):
  - Effortful processing into LTM
    - chunking
    - form associations w/mnemonic devices!
  - Effortless(ly) automatically processed into LTM
    - state dependent (emotional/amygdala)
    - flashbulb memories
Our mind operates on two tracks, even with memory!

**Effortful processing:**

- episodic memories (birthdays)
  - our LTM of facts and experiences we *consciously* know and can verbalize.

**Automatic processing:**

- procedural memories (how to ride a bike)
  - our long term memory for skills and procedures to do things by previous experience without that experience being consciously recalled.
With conscious experience and practice, we learn and remember things.

How does Sensory Memory work?

- momentary sensory memory of visual stimuli, a photograph like quality lasting only about a second.

- momentary sensory memory of auditory stimuli.

- If you are not paying attention to someone, you can still recall the last few words said in the past three or four seconds.

“echolalia”

http://www.garyfisk.com/anim/iconic.swf
What are some strategies that can help us remember new information?

- **Chunking**
  - organizing items into familiar, manageable units.
  - Enables us to recall things more easily.
  - For example: Phone numbers 305-3000, Social Security Numbers, Address?

- **Mnemonics**
  - memory aids, especially those techniques that use vivid imagery and organizational devices.

- **Hierarchies**
  - systems in which concepts are arranged from more general to more specific.
Implicit memories include:

- ▉ (how to ride a bike, play an instrument, tie a shoelace)
  - automatic skills and classically conditioned associations among stimuli.

Without conscious memory, we automatically process info about:

- space (visualizing the location of information in a book)
- time (being able to remember the sequence of your day and where you misplaced your hydroflask)
- frequency (effortlessly keeping track of things. “That’s the fifth time she’s worn that outfit this week!”)
STM VS. LTM

<table>
<thead>
<tr>
<th>Types of Memory</th>
<th>Storage Capacity</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>STM or Working</td>
<td>7+2 items</td>
<td>Fades in 10-12 seconds, lasts up to 30 seconds if unrehearsed</td>
</tr>
</tbody>
</table>

LTM:

<table>
<thead>
<tr>
<th>Type of Memory</th>
<th>Storage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-Term Memory</td>
<td>Infinite</td>
<td>Infinite</td>
</tr>
</tbody>
</table>

Types of LTM:

- Nondeclarative (procedural) memory
- Declarative memory
- Semantic Memory
- Episodic Memory
- Prospective Memory
BUILDING MEMORIES: ENCODING

DISTRIBUTED PRACTICE PRODUCES BETTER LONG TERM RECALL

- We encode better when we ________________!

- Therefore, ________________(massed practice)!

- Spacing effect:
  - the tendency for distributed study or practice to yield better long-term retention than is achieved through massed study or practice.

- Testing effect:
  - enhanced memory after retrieving, rather than simply rereading, information.

"Those who learn quickly also forget quickly." - Ebbinghaus
LEVELS OF PROCESSING

- **Shallow processing:**
  - encoding on a basic level such as a word’s letters or, word’s sound.

- **Deep processing:**
  - encodes semantically based on the meaning of the words.
  - The more meaningful, the better our retention.

- **How do we process information?**
  - *Visual Encoding:* the encoding of picture/visual images.
  - *Acoustic Encoding:* the encoding of sound, especially the sounds of words.
  - *Semantic Encoding (best level of recall):* the encoding of meaning.
MEMORY ACTIVITY: MEMORIZE AS MANY WORDS AS YOU CAN!

SHARK, DREAM, CRIB, PILLOW, CLOCK, BED, NIGHT, QUILT, FATIGUE, REST, SLEEP, ARTICHOKE, RELAX, BLUE, PAJAMA, BLANKET, SHEEP, WAKE, DARK