

PSY 101 Exam 3 Notes

Disclaimer: All notes have been taken by me using Dr. Poulin's lecture slides, and any images are also taken from his slides to better represent certain information/concepts.

Memory

1. Overview

- **Memories:** thoughts, experiences, or associations from the past
- **Memory:** the *process* of making and using memories (a process by which stimuli, thoughts, experiences become memories)
 - **Encoding:** "deciding" which stimuli get stored
 - **Storage:** representing information in the brain
 - **Retrieval:** accessing memories for later use (such as, trying to remember someone's name; you know it, but you need to *retrieve* the information)



- Memory is selective. Class example: nobody remembers what they ate for dinner on July 13, 2012, but Dr. Poulin does because his wife went into labor that day. It is a date of personal relevance, so he is more likely to remember the events clearly.

2. Encoding

- Memories can be encoded in three sequential stages:
 - Sensory memory
 - Stimuli appear in **sensory memory**
 - ❖ Sensation itself is *very* briefly "replayed" thanks to pre-processing in sensory cortical areas
 - ❖ e.g., sights (**iconic memory**; like the picture of the tree and the boy) and sounds (**echoic memory**)
 - ❖ Any time you see an image, it is retained in your visual sensory memory (iconic) for at most a few seconds
 - ❖ Any sounds you hear are stored for up to three seconds in the auditory cortex (for instance, when somebody asks you a question very quickly, and you respond "what?" because you didn't understand, the brain processes their question by replaying it in the auditory cortex before they can ask again, and you respond properly)
 - Working (short-term) memory
 - If stimuli are the target of attention, they are represented in **working memory**
 - The section of your memory for information that is currently in use (memory you are actively using at that moment)
 - Unlike sensory memory, working memory is *selective*, and limited in its capacity of how much you can actively hold at one time
 - ❖ Limited capacity (7±2 units of information)→ example: number sequences from class; most people could successfully write the 5-, 6-, and 7-numbered sequences, but very few could write the 8- or 9-numbered sequences
 - This capacity increases when you are well-rested and energetic, and decreases when you are tired
 - Real-life applications: phone numbers, license plates, etc. Things that people need to have in their memory, and a 7-numbered license plate or phone number is at the general limit of what we can remember
 - ❖ Limited duration (~30 seconds)→ we cannot remember longer than that. Example: if someone gives you their number and you don't have anything to

write it down or put it in your phone, you start repeating it to yourself until you do. This puts it in sensory memory because you keep hearing yourself saying the number in your head (echoic memory)

- Long-term memory
 - Some information makes it into **long-term memory**
 - ❖ Anything successfully remembered longer than 30 seconds to 2 minutes, is by definition, long-term memory
 - Essentially unlimited in capacity and duration; could potentially last forever in theory
 - **Automatic processing**: effortlessly remembering certain features of the environment
 - ❖ Spatial position; where the information is
 - ❖ Temporal position (sequence); the order in which things occur. Example: someone asks you about your day, you automatically just tell them what happened from the morning to the night, *in order*, rather than the opposite, or a scattered account of your day
 - ❖ Frequency; how often the information is presented. Example: seeing a friend in passing multiple times in one day
 - ❖ Emotionally intense events
 - “Flashbulb memory”
 - Examples: remembering exactly what happened during 9/11. If an event was emotionally charged enough to affect you profusely, you will remember in excruciating detail where you were, how you felt, what you were doing, etc.
 - **Effortful processing**: forming memories deliberately
 - ❖ Types of effortful processing:
 - **Repetition/rehearsal**; flashcards for studying. Effective, but inefficient
 - **“Chunking”**; break the information into groups. Each group can be subdivided as well. Example: trying to remember the order and names of the planets. Break them into groups of the inner and outer planets, focus on each group in isolation, and then combine the two groups. Effective, and very efficient; easily digested information that is easier to remember.
 - ✓ **“Chunking” into hierarchies** of information make it much easier to remember
 - **Linking information into sensory data**: combining with visual/auditory aids is very effective
 - **Linking information with other concepts (semantic encoding)**: principle behind mnemonic devices to remember names (PEMDAS, for instance)

3. Storage

- How information is stored depends upon the kind of memory- **explicit** or **implicit**
- **Explicit memory**: memory for facts and events
 - Includes **episodic** (experiences) and **semantic** (facts, concepts) memory
 - Encoded via (but not stored in) the hippocampus
 - Damage to the hippocampus prevents you from being able to form new explicit memories (facts and experiences)
- **Implicit memory**: memory for skills, conditioning (Pavlov’s dogs associating bell with meat powder is an implicit memory, for instance)
 - Encoded via (but not stored in) the cerebellum
- Where? Apparently, throughout the brain (association areas)
- At the neural level, as **long-term potentiation**
 - New or strengthened connections; when learning occurs, this happens

- Increased likelihood that when one neuron fires, an adjacent one will be affected
- Memory consists of increasing levels of functional neuron pairing, or long-term potentiation

4. Retrieval

- Retrieval requires you to encounter information related to a memory; the key to retrieving a memory is to be presented with information related to something in long-term memory, so you can pull out that information. For example, on a test, the questions relate directly to what you study (obviously), so you remember the material
- Recognition- facilitated by:
 - Encountering the same information again (you will quickly realize you already know it), the simplest form of retrieval.
- Recall- facilitated by:
 - Reversing the encoding process. An example is chunking: grouping the information separately will help you remember. You can also use sensory aids: using diagrams as a visual aid, for instance
 - Mood congruence: you are more likely to remember things depending on your mood. If you're sad, it's easier to remember very sad events in life rather than happy memories. This is actually why depression is so hard to treat successfully, because people tend to wallow in sadness and self-pity without being able to remember anything else
 - Matching encoding physiological state: if you are in a high arousal state, you will remember highly aroused experiences versus low aroused experiences
 - Semantic congruence: you are more likely to remember words that relate to each other. Class demonstration: people remember thread, pain, thimble, syringe, but it comes with a negative side effect. Many people wrote down the word needle, when Dr. Poulin didn't say it...

5. Memory Errors

- False memories: we sometimes fill "gaps" in memory with information that seems to "make sense" (like the word needle).
 - Humans are hardwired to find patterns in the world, so it makes more sense to us. Thus, we find patterns to keep the flow of information going smoothly.
 - This isn't a problem in our day to day life, because we have a strong grip on reality.
 - However, certain situations take advantage of this tendency. For instance, if you are being interrogated by a police officer, you may create a false memory if you are constantly being bombarded with specific questions about a crime.
 - Elizabeth Loftus was interested in this during the 1970s-80s. She explored the possibility that witnesses or potential suspects may have created false memories because of this tendency. She also explored the possibility that childhood abuse victims may have falsely reconstructed suppressed memories under the guidance of therapists.
 - Example: one of her studies involved graduate students go to the train station. One brought a large brown bag and sat down. Another assistant came over and pretended to grab a tape recorder from the bag, and ran away. A third assistant came and made a scene about the 'theft', and a crowd came to help, and the student took their phone numbers for insurance purposes. Two weeks later, one student calls the crowd to ask about the event pretending to be an insurance claims representative, and half the people said they did see the tape recorder, but it did not exist! People provided details, fully believing they had seen this. All these people heard one piece of false information and combined with some vague information from the grad students, they reconstructed their own memories
 - The process described above can build on incorrect information to create false memories
 - This is called the **misinformation effect** (Loftus)
 - False memories facilitated by **source amnesia**
 - Remembering semantic information but forgetting episodic information about semantic memory acquisition (for instance, after two weeks, the crowd learned about