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# MEMORY PROCESSES – SENSORY MEMORY

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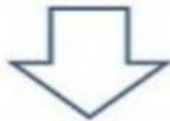
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- Memory refers to the processes that are used to acquire, store, retain, and later retrieve information. There are three major processes involved in memory: encoding, storage, and retrieval.
  - Human memory involves the ability to both preserve and recover information we have learned or experienced. As we all know, however, this is not a flawless process. Sometimes we forget or misremember things. Sometimes things are not properly encoded in memory in the first place.
  - Memory problems can range from minor annoyances like forgetting where you left your car keys to major diseases, like Alzheimer's and other kind of dementia , that affect the quality of life and the ability to function.

# Stages of Memory

Encoding



Storage



Retrieval

## MEMORY FORMATION

- In order to form new memories, information must be changed into a usable form, which occurs through the process known as *encoding*. Once the information has been successfully encoded, it must be *stored* in memory for later use. Much of this stored **memory** lies outside of our awareness most of the time, except when we actually need to use it. The *retrieval* process allows us to bring stored memories into conscious awareness.

# ORGANIZING MEMORY

- The ability to access and retrieve information from long-term memory allows us to actually use these memories to make decisions, interact with others, and solve problems. But how is information organized in memory?
- One way of thinking about memory organization is known as the semantic network model. This model suggests that certain triggers activate associated memories. A memory of a specific place might activate memories about related things that have occurred in that location. For example, thinking about a particular campus building might trigger memories of attending classes, studying, and socializing with peers.

# SENSORY MEMORY

- **Sensory memory** is the shortest-term element of memory. It is the ability to retain impressions of sensory information after the original stimuli have ended. It acts as a kind of **buffer** for stimuli received through the **five senses of** sight, hearing, smell, taste and touch, which are retained accurately, but very briefly. For example, the ability to look at something and remember what it looked like with just a second of observation is an example of sensory memory.
- The stimuli detected by our senses can be either deliberately **ignored**, in which case they disappear almost instantaneously, or **perceived**, in which case they enter our sensory memory. This does not require any conscious attention and, indeed, is usually considered to be totally outside of conscious control. The brain is designed to only process information that will be useful at a later date, and to allow the rest to pass by unnoticed. As information is perceived, it is therefore stored in sensory memory **automatically** and unbidden. Unlike other types of memory, sensory memory cannot be prolonged via **rehearsal**.

- Sensory memory is an ultra-short-term memory and **decays** or degrades very quickly, typically in the region of 200 – 500 milliseconds (1/5 – 1/2 second) after the perception of an item, and certainly less than a second (although echoic memory is now thought to last a little longer, up to perhaps three or four seconds). Indeed, it lasts for such a short time that it is often considered part of the process of **perception**, but it nevertheless represents an essential step for storing information in short-term memory.

- The sensory memory for visual stimuli is sometimes known as the **iconic memory**, the memory for aural stimuli is known as the **echoic memory**, and that for touch as the **haptic memory**. Smell may actually be even more closely linked to memory than the other senses, possibly because the **olfactory bulb** and **olfactory cortex** (where smell sensations are processed) are physically very close – separated by just 2 or 3 synapses – to the **hippocampus** and **amygdala** (which are involved in memory processes). Thus, smells may be more quickly and more strongly associated with memories and their associated emotions than the other senses, and memories of smell may persist for longer, even without constant **re-consolidation**.

- Experiments by **George Sperling** in the early 1960s involving the flashing of a grid of letters for a very short period of time (50 milliseconds) suggest that the upper limit of sensory memory (as distinct from short-term memory) is approximately **12 items**, although participants often reported that they seemed to “see” more than they could actually report.
- Information is passed from the sensory memory into short-term memory via the process of **attention** (the cognitive process of selectively concentrating on one aspect of the environment while ignoring other things), which effectively filters the stimuli to only those which are of interest at any given time.



Thank you