

Getting to Know Your Brain: Mastering an Imperfect Memory

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Short Icebreaker

Introduce yourself:

Name

Grade

Last Movie You Saw



Class Objectives

- a) Give you a brief overview of some physical structures in the brain involved in memory.
- b) Help you gain a basic understanding of the prevailing theory of how memory functions through encoding, storage, and retrieval.
- c) Show you the ways that memories can be inaccurate, highly biased, and in some cases completely false!

Class Outline

- Parts of the brain involved with memory
- How memory is made, kept, and accessed
- Distortion: how your memory isn't perfect
- Reconstruction: the “why” of our imperfect memory
- State Dependence: being practical with memory

Physical Structures

Cerebellum

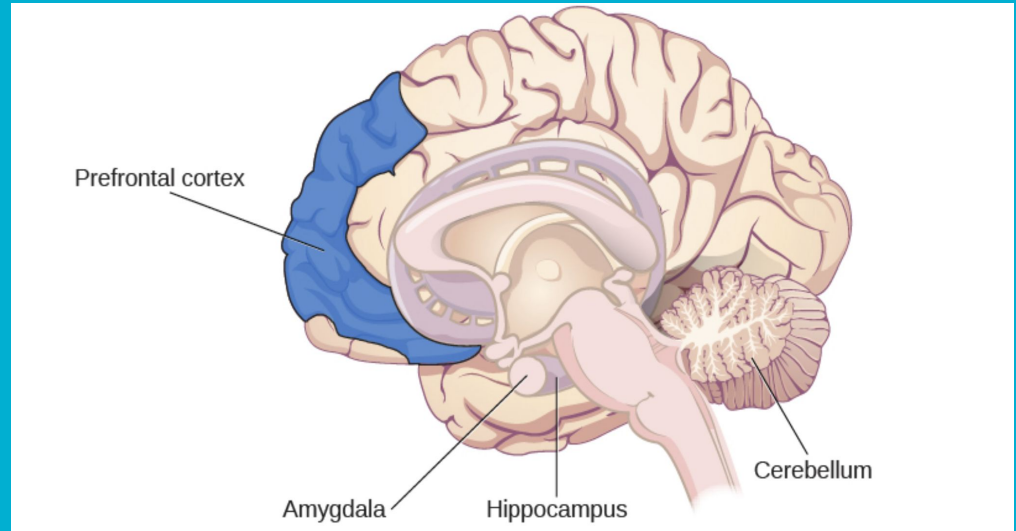
- create implicit memories
- related to procedural memory, motor learning

Prefrontal Cortex

- Information processing is associated with left frontal activity
- Retrieval of information was associated with the right frontal region

Amygdala

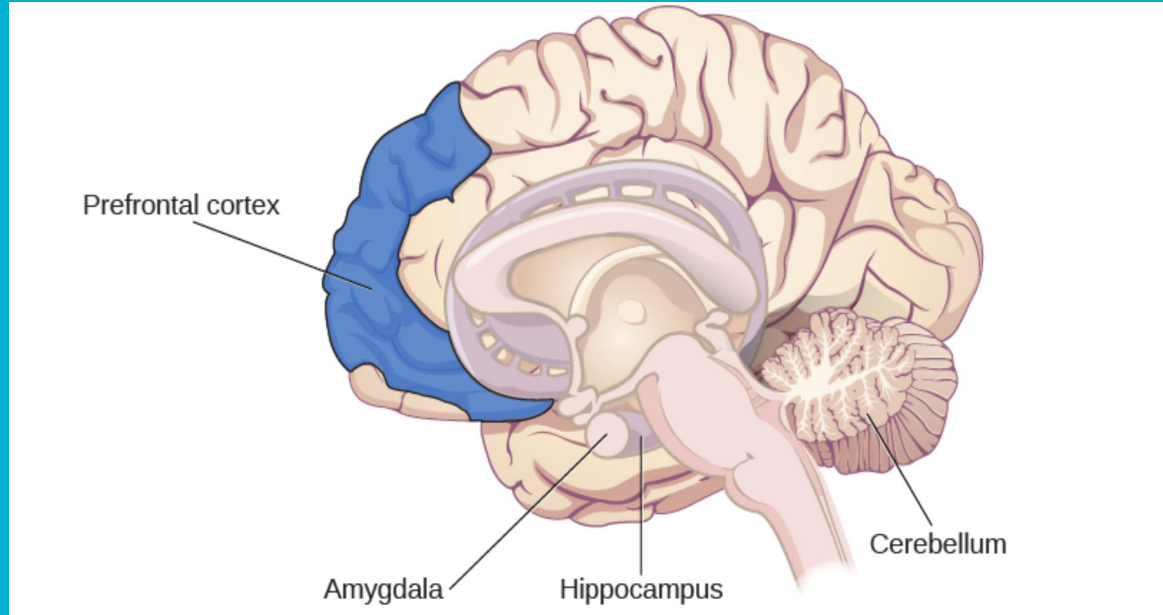
- regulate emotions
- memory storage is influenced by stress hormones



Physical Structures

Hippocampus

- Normal recognition memory
- Spatial memory
- Connects memories together
- Memory consolidation: new learning into long-term memory
- *Injury to this area leaves us unable to process new declarative memories.*



Case Study: Clive Wearing

On 27 March 1985 Clive Wearing contracted herpesviral encephalitis, a virus that attacked his central nervous system. Since then, he has been unable to store new memories. He has also been unable to associate memories effectively, or to control his emotions, exhibiting unstable moods.

Wearing developed a profound case of total amnesia as a result of his illness. Because of **damage to the hippocampus**, an area required to transfer memories from short-term to long-term memory, he is completely unable to form lasting new memories – his memory only lasts between 7 and 30 seconds.

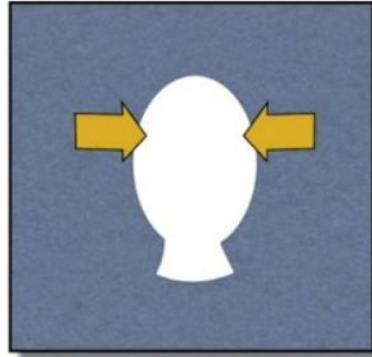
[VIDEO](#)

Melton's Learning and Memory Process



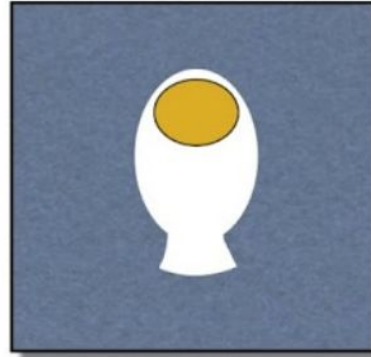
Attention

Sensory input is acknowledged and paid attention



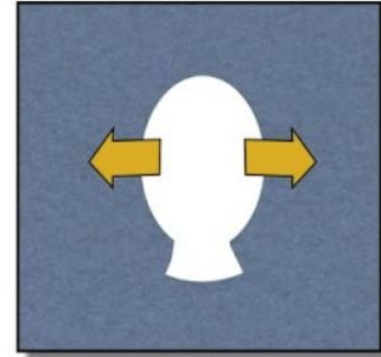
Encoding

These inputs are sorted and processed



Storage

Important inputs are maintained



Retrieval

Stored inputs are re-accessed when needed

Memory Exercise

Write down the most vivid memory that stands out to you when you think of your childhood

Small Group Discussion

“We’ve established that well-worn memories can be inaccurate. How accurate do you think your everyday memory is in comparison? More/less? By what degree? Why?”

Why aren't memories accurate?

Time

Familiarity vs Novelty

Filling in the Gaps of memory

Borrowing Personal Memory

Hot Air Balloon Experiment

Person inserted into a picture of a hot air balloon with PhotoShop-- a new memory is created for them



Common Cause of Distortion

Reconstruction of a memory

Small Group Discussion

“What are some implications for memory distortion?”

Example of Distortion



Summary of Distortion

All memories are reconstructed

-Events that were important to other people can be easily forgotten if they weren't important to us personally

-Sometimes witnesses aren't lying-- they are just telling it from their perspective, so it is necessarily altered

State-Dependence

Definition of state-dependence: “a condition in which memory for a past event is improved when the person is in the same biological or psychological state as when the memory was initially formed”

-American Psychological Association

Practical Applications of State-Dependence

Sleep

Practice tests

Studying in a physical location that is as close as possible to the testing location

Habits/memory tricks

Memory as a Skill

Memory palace-- create mental image of a familiar place, like your house; then plan out a path through that space, creating specific stops along the way; finally, place the items you want to remember at each of these stops

Something to Consider

Is there an upper limit on our long-term memory?

Short-term memory can only store a specific amount of information; is it the same for long-term, or do the different processes used for the two ensure that we have as much long-term memory space as we need?