

Memory Basics

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Memory Basics

- In order to discuss issues related to memory and aging, we need to make sure we understand some basic memory principles.
 - Three stages of making memories
 - Three types of memories
 - Three memory processes

A Classic Memory Study

- Atkinson and Shiffrin (1968) asked participants to listen to a list of 20 words and then immediately write them down, in any order.
- What would a graph look like if we graphed the percentage of words recalled as a function of their position in the original reading?
- Would people recall the first words best? The middle words? Or, the last words?

Serial Position Curve

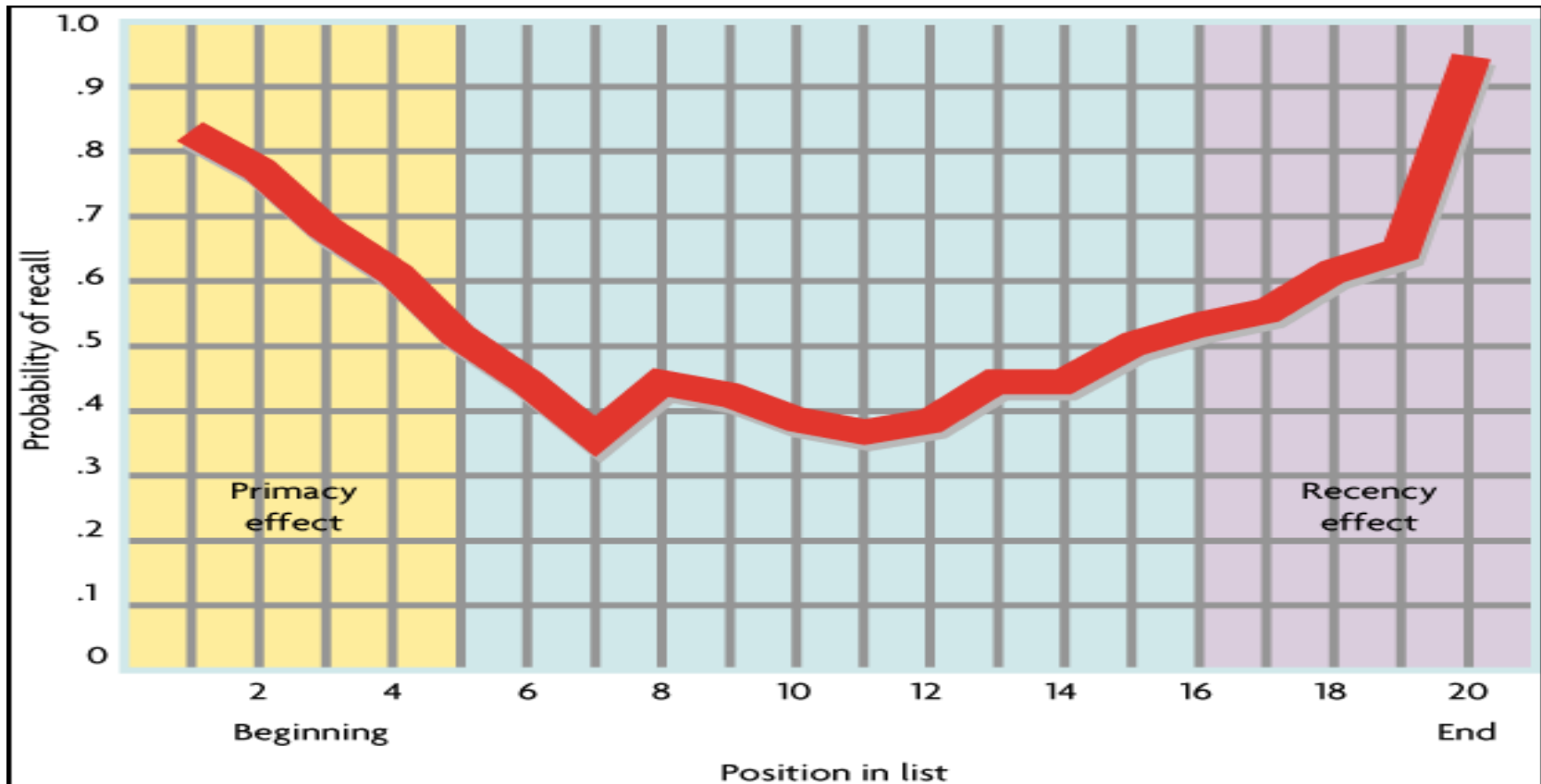


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This Can Inform Us About Why We Sometime Forget

- The first words were rehearsed more and made it into **long-term memory**
- The last words were recalled at a higher rate because they were still in **short-term memory (immediate or working memory)**

Question

- What do you think would happen to the curve if we had people do another activity for one minute?
- Hint: either the primacy or the recency effect will go away.
- Yes, the recency effect disappears with a short delay.

The Effects of the Order in Which Words Were Read on Recall

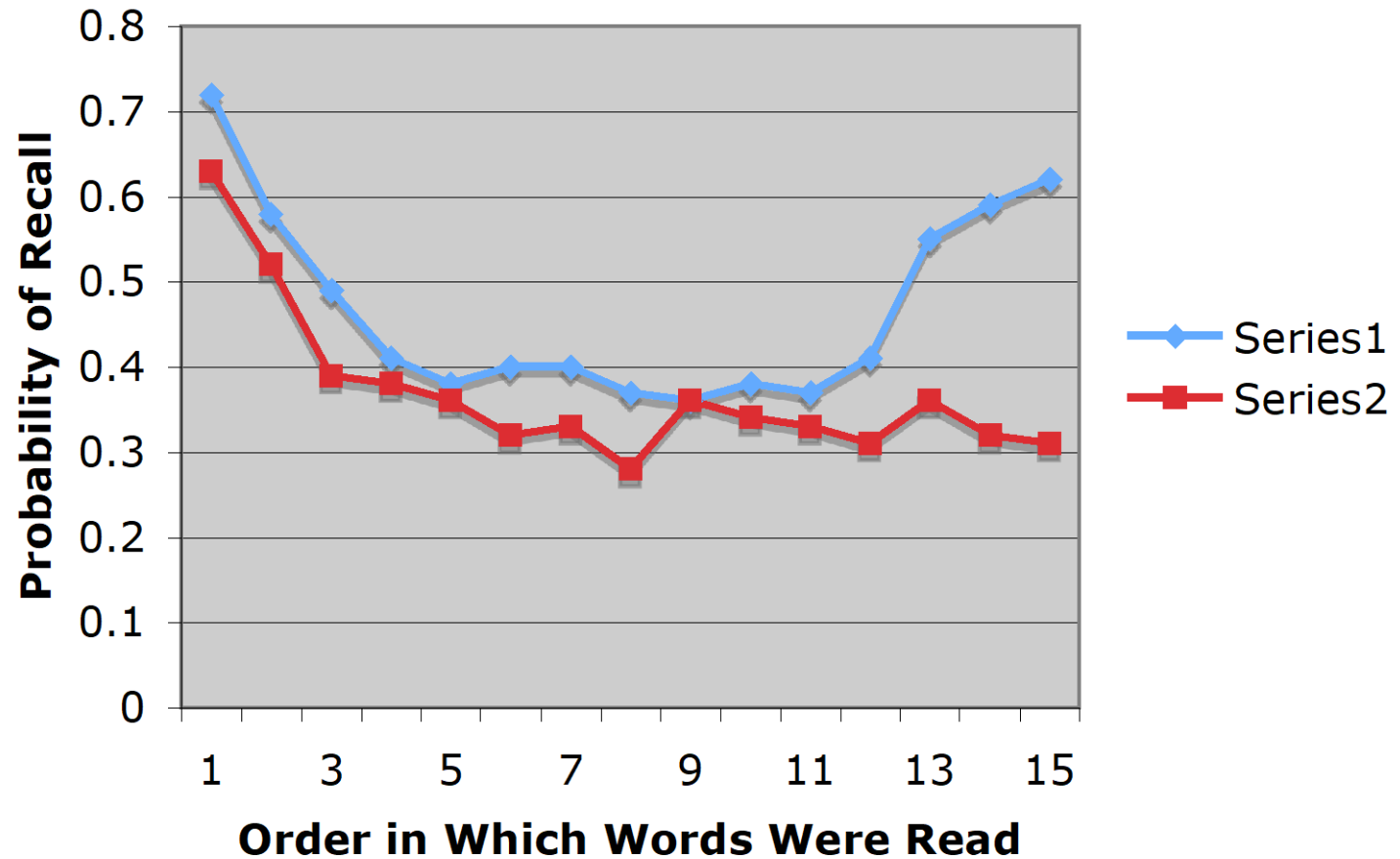
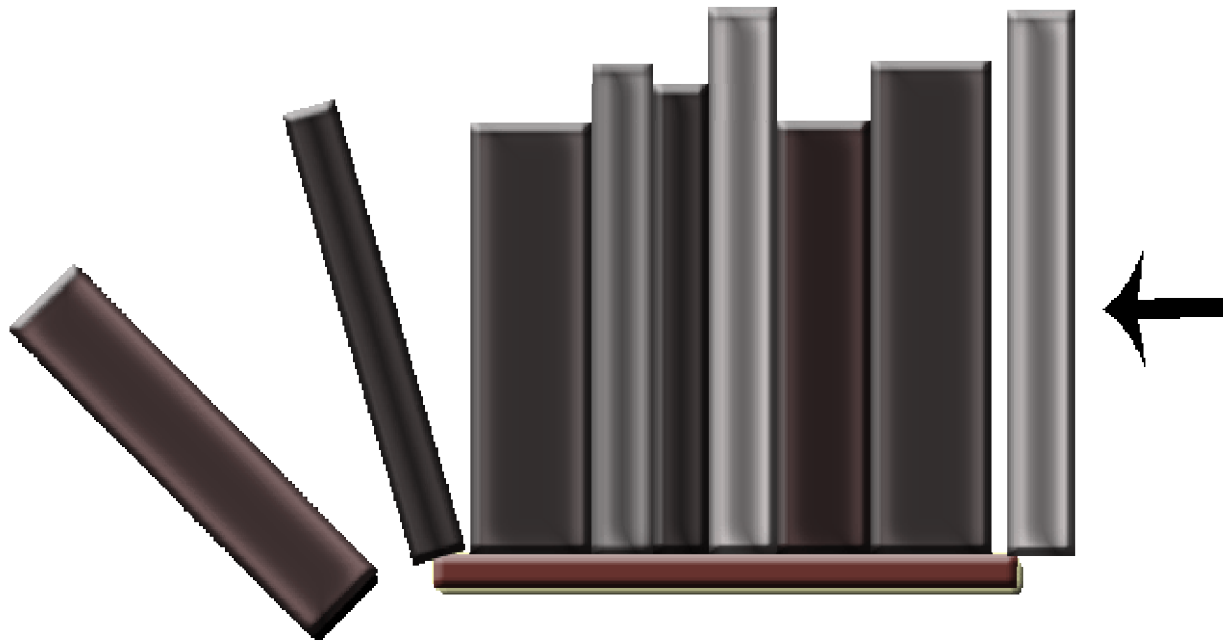


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Short-term memory is like a bookshelf: You put new books on one side and that pushes the oldest book off the other side. Your short term memory is like that, you put new ideas in and that pushes the oldest idea out. Unfortunately, our bookshelves are fairly small, probably holding less than seven books (depending on their size).



This Can Inform Us About Why We Sometimes Forget

- The last words were recalled at a higher rate because they were still in short-term memory.
- The first words were also recalled at a high rate because they were rehearsed more. The words at the beginning of the list actually made it into long term memory.
- The dip in the middle is due to:
 - Increased distracters
 - Lack of cognitive resources
 - Lack of rehearsal

How Can We Improve Memory?

- So how do we get information from short term memory into long term memory?
- Rehearsal, rehearsal, rehearsal....

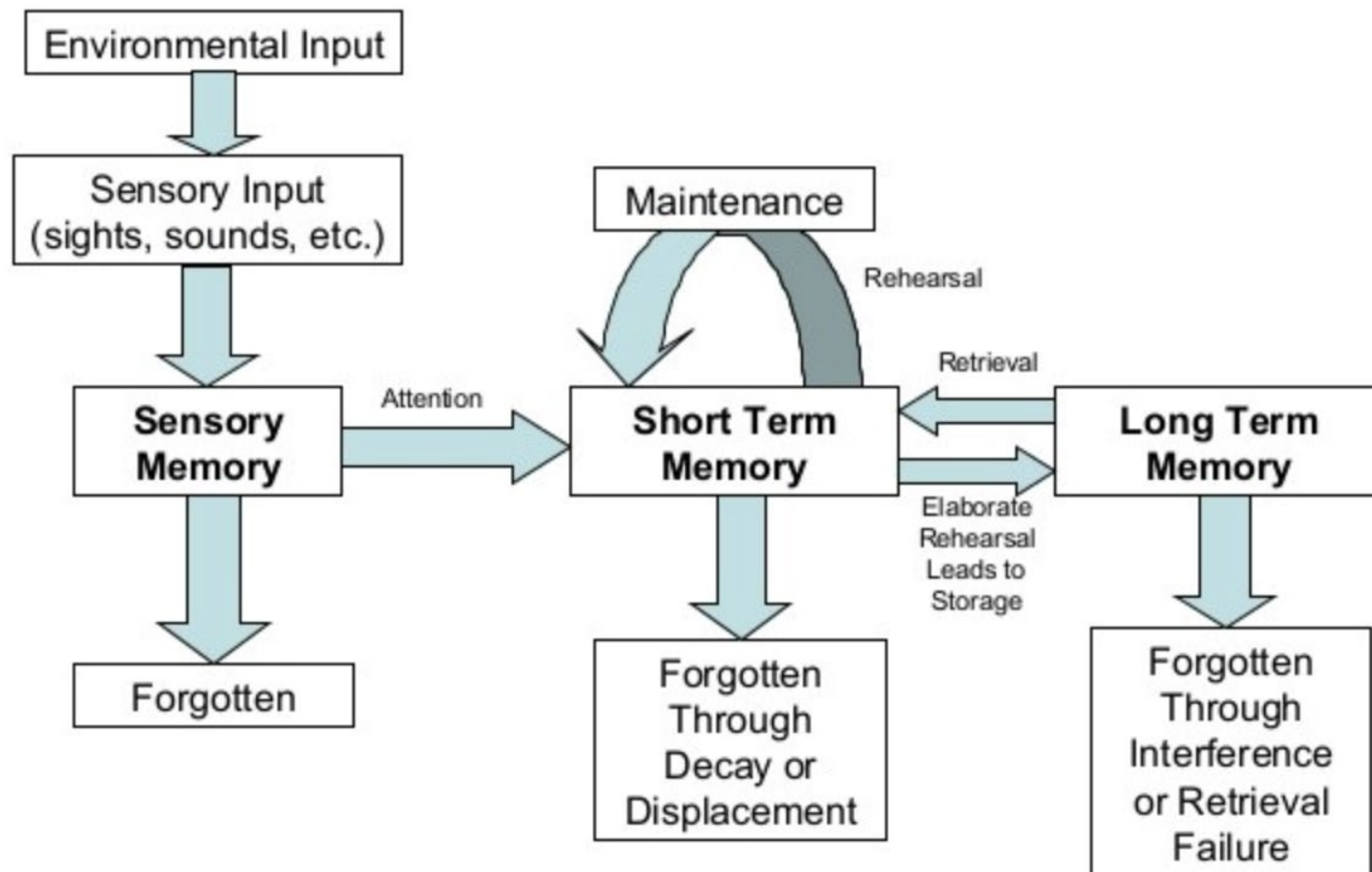
Information Overload?

- Miller (1956) estimated that adults can hold about seven items, plus or minus two, in their short term memory.
- How does the seven items, plus or minus two estimate related to learning, memory, and older adults?

A Great Memory Model

- How do humans learn and make new memories?
- The Modal Model of Memory helps explain how we make new memories.

Three Stages of Making Memories



From: <http://www.slideshare.net/Snowfairy007/aqa-as-psychology-unit-1-memory>

What is affected as adults age?

- ***Sensory memory*** - not affected
- ***Short-term or working memory*** - affected
- ***Long-term memory*** - memories that were stored in the past are not affected unless there has been brain damage or late stage dementia. Making new long-term memories is affected.

Normal brain on left Severe Alzheimer's brain on right

Healthy Severe
Brain Alzheimer's

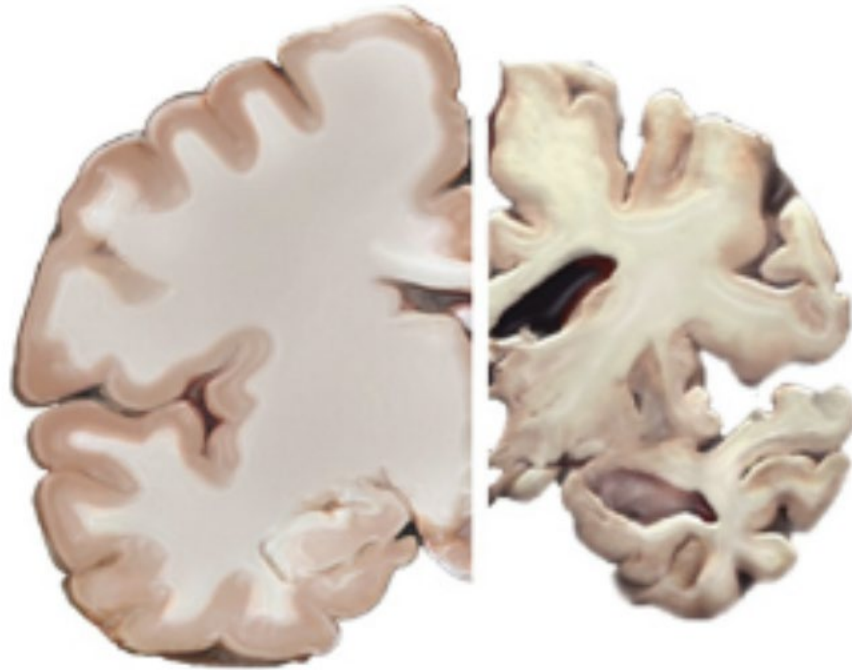


Image from: <https://www.nia.nih.gov/health/alzheimers-disease-fact-sheet>

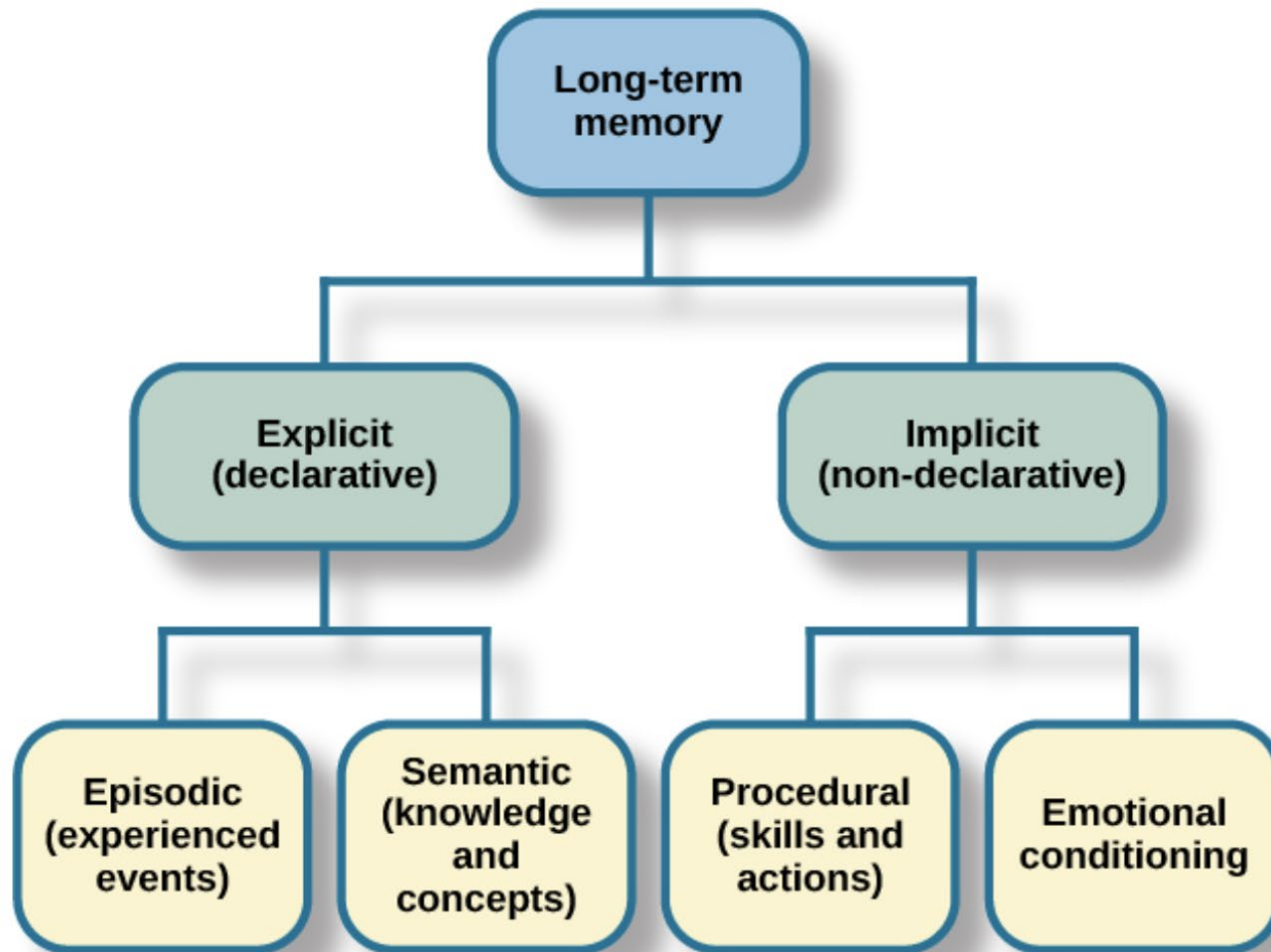
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Reserved

Any Memory Failure Can Be Attributed to One of the Three Memory Processes

- Encoding
- Storage
- Retrieval

What is affected as adults age?

- ***Encoding*** - affected
- ***Storage*** - not affected, in most cases
- ***Retrieval*** - well practiced memories not affected, proper nouns affected, verb generation affected with Alzheimer's disease



From: <https://open.lib.umn.edu/humanbiology/chapter/1-10-how-memory-functions/>

Three Types of Memory

- **Procedural** – implicit, nondeclarative, automatic
- **Semantic-declarative**, facts
- **Episodic**- declarative, autobiographical

Examples of Procedural Memories

- Using a quad cane
- Using crutches
- Using a wheel chair
- Putting brakes on a wheel chair
- Cutting food
- Using a spoon or fork
- Swallowing

Examples of Procedural Memories

- Toileting
- Sneezing into arm
- Putting glasses on
- Using a rolling pin
- Getting out of bed
- Getting in and out of a vehicle
- Brushing Teeth

Examples of Procedural Memories

- Flossing teeth
- Getting out of a chair
- Tying shoes
- Putting on any piece of clothing
- Putting a bike helmet on
- Using a door knob
- Using a computer mouse

There is a very predictable order of loss.

- First episodic is lost
- Then semantic is lost
- Finally, in some cases, procedural memories are lost
- That's an example of retrogenesis

Dissociation between implicit/explicit memory

- People with dementia and/or traumatic brain injury (TBI) can learn implicitly. Or, in other words, they can make new procedural memories.
- HM: mirror drawing figures

What is affected as adults age?

- ***Procedural*** - not affected
- ***Semantic*** - encoding affected some, storage and retrieval not usually affected
- ***Episodic*** - encoding affected, storage and retrieval not affected very much

Up Next

- Next, we will discuss ***Memory and the Aging Brain.***