

TUESDAY, August 30, 2016

- **ESS: Unit VII – Cognition**
- **OBJ: SWBAT explain three parts of memory and how memory is stored**
- **OPENER: What can you remember?**
- **CLASSWORK: Review class procedures, Notes**
- **HOMEWORK: You'll Never Remember!**

Class Procedures



MEMORY

- Kim's Game

- Why is a phone number just 7 digits?

Working memory

Memory: Encoding and Storage

- Learning Objectives

- Describe sensory memory, short-term memory, and long term memory
- Describe the principles that underlie effective encoding, storage, and retrieval

What is Memory?

- The Persistence of learning over time

- Human Memory is good at:

- Information on which attention is focused
 - Information in which we are interested
 - Information that arouses us emotionally
 - Information that fits with our previous experiences
 - Information that we rehearse

The Three Parts of Memory

- Immediate, brief recording of sensory information into memory

Sensory



The Three Parts of Memory

Short-Term

- Immediate, brief recording of sensory information into memory

Sensory

- Things you have in your mind at the moment
- Also called "working memory"



The Three Parts of Memory

Short-Term

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graph LR; Sensory --> Short-Term; Short-Term --> Long-Term;
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- Immediate, brief recording of sensory information into memory

Sensory

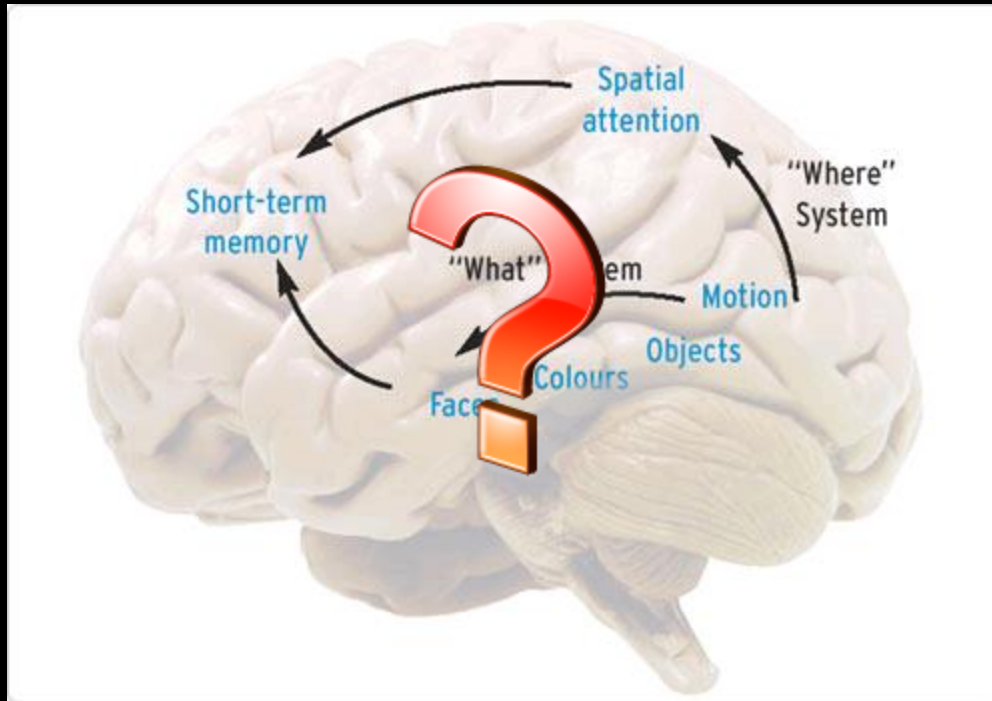
- Things you have in your mind at the moment
- Also called "working memory"

- FINAL DESTINATION!
- Relatively permanent and limitless storage of memories over a period of time

Long-Term

Memory

- Memory: A system that encodes, stores and retrieves information.



- While we are learning more about memory every day, psychologists still are unsure exactly what parts of the brain are involved and where it is all stored.

Memory's Three Basic Tasks

- According to the *information-processing model*, the human brain takes essentially meaningless information and turns it into meaningful patterns.
- It does this through three steps:
 - Encoding
 - Storage
 - Retrieval



3 Basic parts: encoding

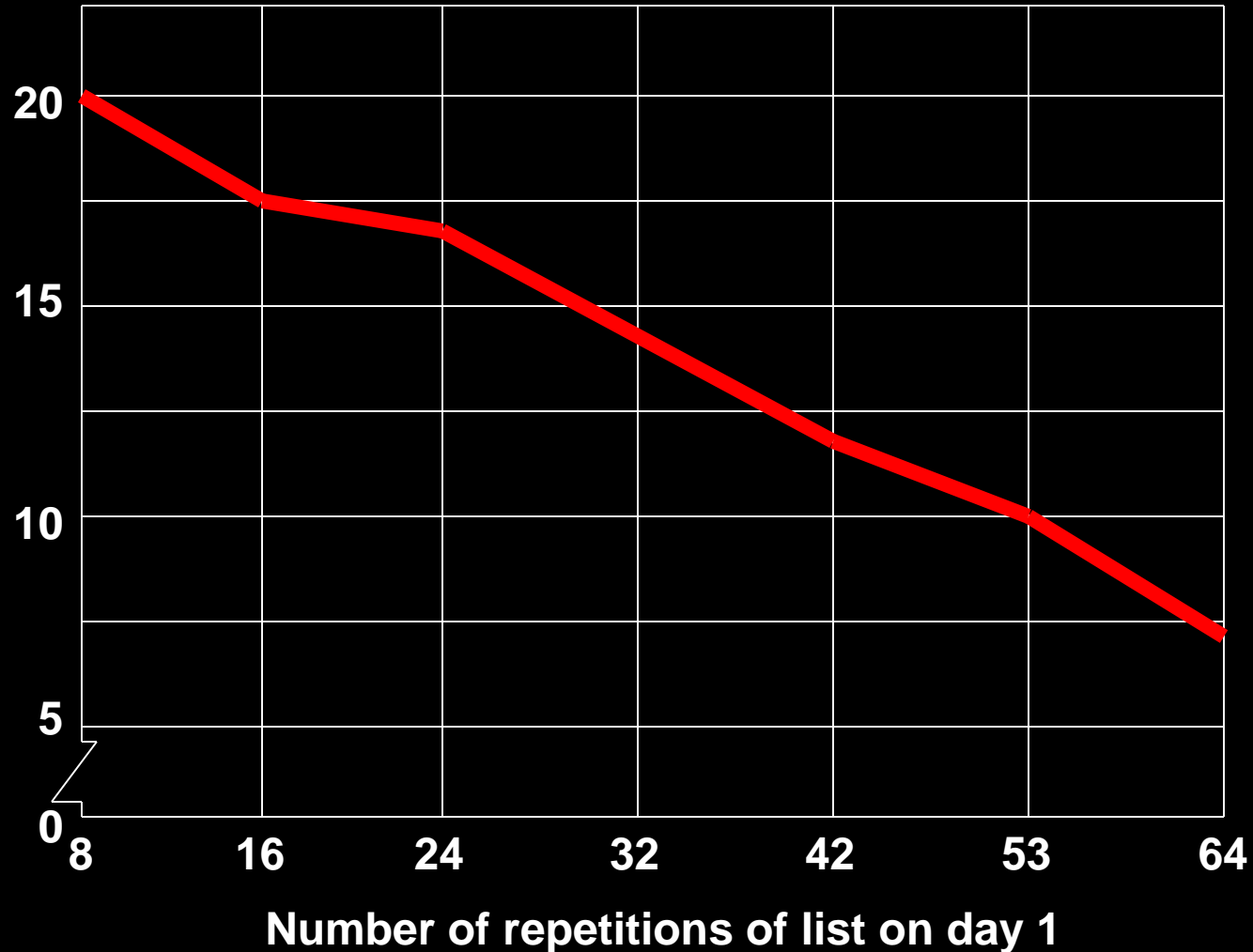
- *Encoding*: the modification of information to fit the preferred format for the memory system.
 - In most cases, encoding is automatic and happens without our awareness. Other encoding, however, like these notes, require extra encoding effort called *elaboration* to make the memory useful.

Encoding

The more time we spend learning novel information, the more we remember.

Time in minutes taken to relearn list on day 2

Using 16 unrelated 3 letter sequences



Encoding-3 types

- When we are exposed to stimuli and encode information, we do it in three ways:

1. Semantic Encoding

- encoding of meaning
- including meaning of words

2. Acoustic Encoding

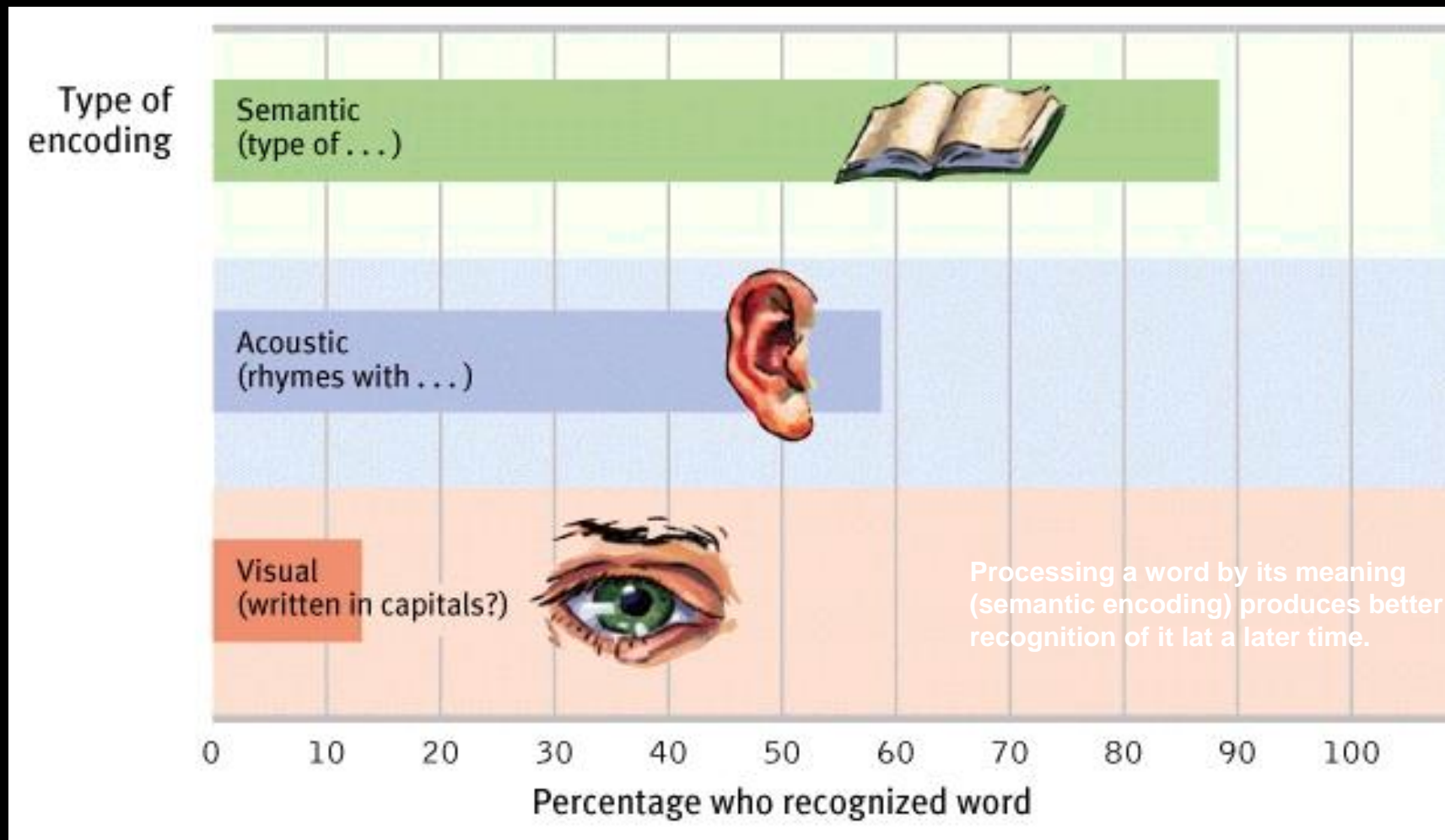
- encoding of sound
- especially sound of words

3. Visual Encoding

- encoding of picture images

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Encoding-Levels of Processing



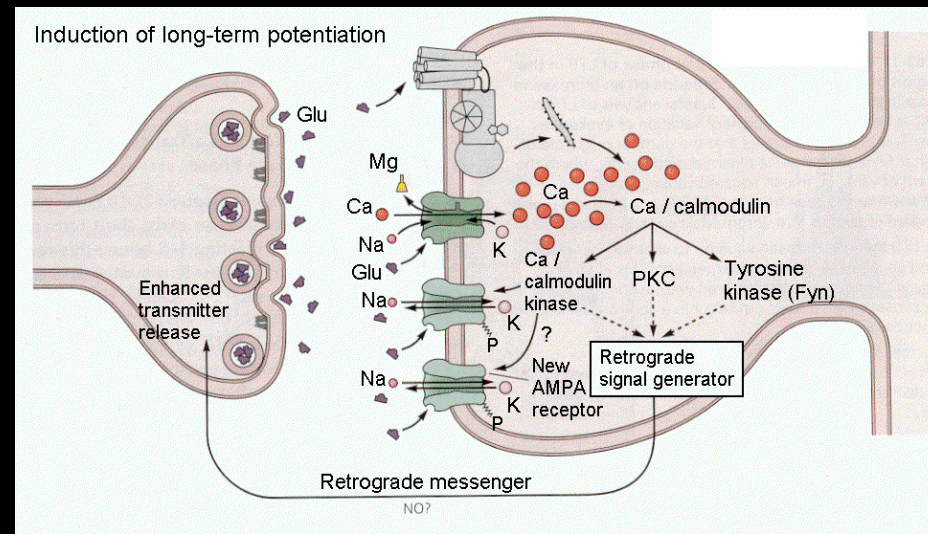
3 basic parts: storage

- *Storage*: the retention of encoding material over time.
 - In terms of storing material, we have three stages of memory
 - Sensory Memory
 - Working Memory (short-term memory)
 - Long-term Memory

Synaptic Changes and storage

- One physical change in the brain during memory storage is in the synapses.
- Memories begin as impulses whizzing through the brain circuits, leaving a semi-permanent trace.
 - The more a memory is utilized, the more potential strength that neuron has, called long-term potentiation.
 - Neural basis for learning and remembering associations

This stuff gets super complicated...keep it simple for now

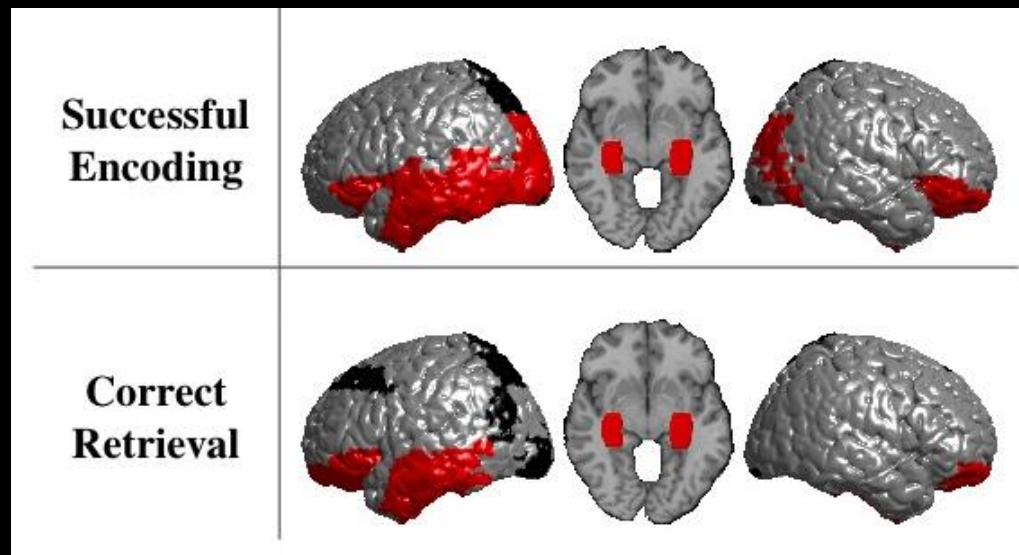


Strengthening Ltp

- Research suggests that the best way to remember things is to study them and then sleep!
- Once LTP has occurred, even passing an electrical current through the brain will not erase well stored memories.
 - More recent memories will be be wiped out
 - People who have a concussion and cannot remember what happened just before or after the injury have not had a chance to “consolidate” their memories to the long-term

3 basic parts: retrieval

- Retrieval: The locating and recovering of information from memory.
 - While some memories return to us in a split second, other seemed to be hidden deeper, and still others are never “recovered” correctly.

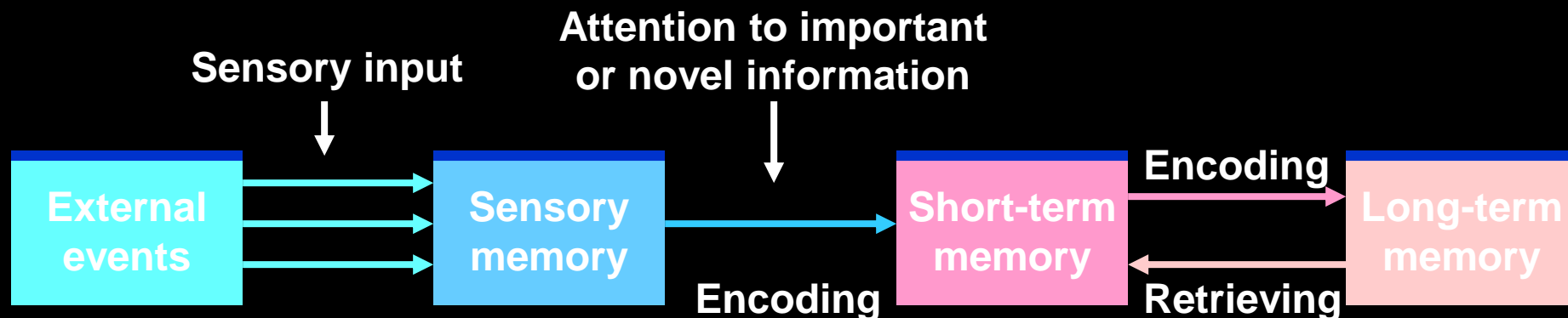


Eidetic imagery

- Eidetic imagery is a technical term for a photographic memory.
- Eidetic imagery can recall a memory in minute detail and portray the most interesting and meaningful parts most accurately. These images can last as short as a brief moment, or as long as days.
- Eidetic imagery tends to be more common in children, and seems to decline as a person's language abilities increase

3 stages of memory

- We encode information and store it in one of three types of memory, depending on what we need the information for.
- Our memory works like an assembly line, and before information can make it to our long-term memory, it must first pass through sensory memory and working memory.



Sensory memory

- Sensory memory is the shortest of our memories and generally holds sights, sounds, smells, textures and other sensory information for a fraction of a second.
- Sensory memory holds a large amount of information, far more than ever reaches consciousness.
 - ◉ Sperling's experiment: letters in rows, tone to indicate which row to recall.
- Sensory memories lasts just long enough to dissolve into the next one, giving us the impression of a constant flow.