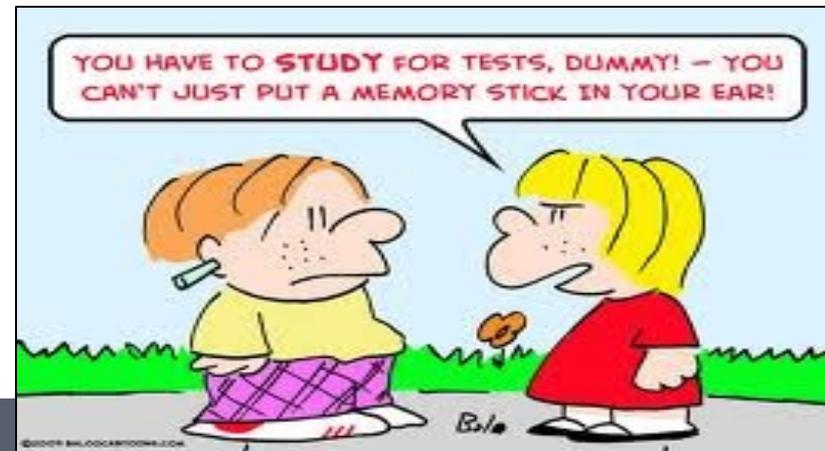




GLASBERGEN

"I forgot to make a back-up copy of my brain, so everything I learned last semester was lost."



MEMORY

Olga Kramarova • PSY 369 • Fall 2019

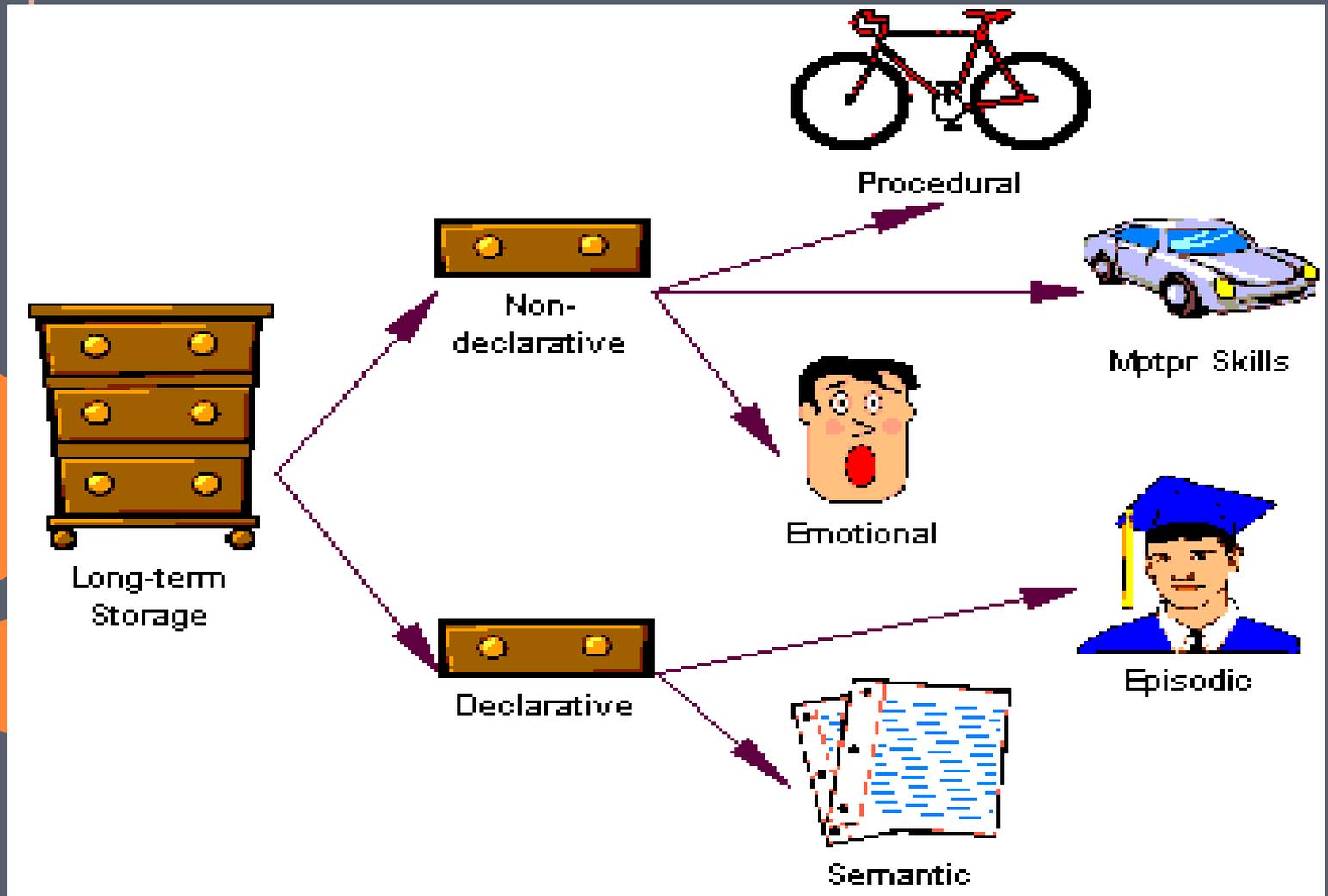
OVERVIEW

- **What is LTM? How does it differ from STM?**
- **Types of LTM**
- **Inputting info into LTM**
- **Retrieving info from LTM**
- **Brain & LTM**

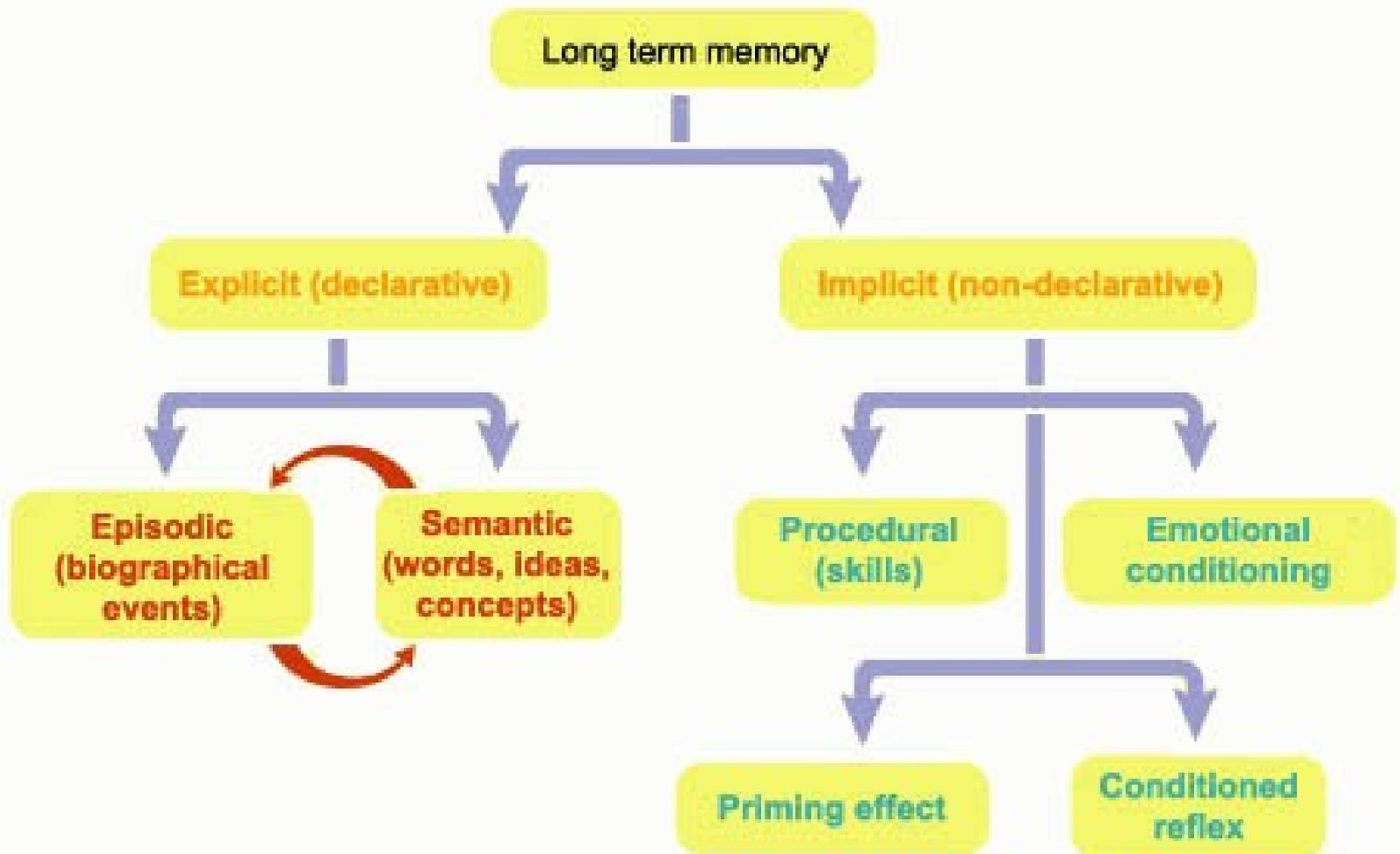
LONG TERM MEMORY

- Archive of information about past events in our lives and knowledge we have learned
 - Covers a span from 30 seconds ago to your earliest memories
 - Depends predominantly on semantic coding
 - We often use a combination of STM and LTM in daily experiences.
 - Ex: having a conversation, recognizing someone you know
 - **Serial-Position Effect** – memory is better for items at the beginning of presentation and at the end vs. middle
 - primacy – people have more time to rehearse items & transfer them to LTM
 - recency – information is still in person's STM/WM
 - Neuropsychological evidence shows that people can have functioning STM, but not LTM & vice-versa
 - What does this tell us?
- 

TYPES OF LTM



TYPES OF LTM



TYPES OF LTM

- **Declarative Memory** – conscious recollection of experiences/events
 - **Episodic** – personal events in your life
 - Involves *mental time travel* = self-knowing or **remembering**
 - **Semantic** – facts and knowledge
 - Involves **knowing** things such as vocabulary, numbers, concepts, etc.
 - Does *not* involve mental time travel
- We use a combination of both episodic & semantic memories
 - Knowledge makes up semantic memories, but we initially attain them through personal experience
 - **Personal semantic memories** – have personal significance and are remembered better
- Memory for the experience may fade, but semantic memory will remain

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LTM

- What is the starting point of information processing?
- Acquiring information and transforming into memory is called encoding.
 - Encoding (storing info) = LTM; Coding (represented info) = STM
- Transferring info from LTM back to conscious WM is called retrieval.
- Main goal of Cog. Psych – finding the relationship between *encoding* and *retrieval*.
- How do we attempt to remember things?
 - **Maintenance rehearsal** – maintaining info in memory through repetition without considering meaning or making connections....Example?
 - elaborative **rehearsal** – thinking about meaning of info and making connections to things you already know; *transferring* to LTM more effectively...Example?

LTM

- Level of Processing Theory

- Memory of information depends on how it was encoded or its depth of processing.

- **Shallow processing**: little attention to meaning; focusing mainly on physical characteristics

- **Deep processing**: involves close attention; focusing on an item's meaning and relating it to something else.

- Which type of processing will have better recall results?

- Transfer Appropriate Processing

- Memory performance is enhanced if type of task at encoding matches type of task at retrieval.

- Ex: The way information is presented in this class is the way you will be asked to recall it on an exam (fill in the blanks, give examples, etc)

LTM

- Additional Factors that Aid Encoding
 - creating images for items that need to be remembered
 - Relating a word/item/concept to yourself – **self-reference effect**
 - The “self” provides retrieval cue that link to the item, making it easier to remember
 - Generating material yourself, coming up with examples, asking questions, answering questions, etc. activate the the
generation effect
 - Organization of Information
 - We spontaneously and automatically organize information in our mind if it is presented randomly
 - Thus, memory can be improved if the original presentation of information is organized; it will be retrieved in an organized way, as well.

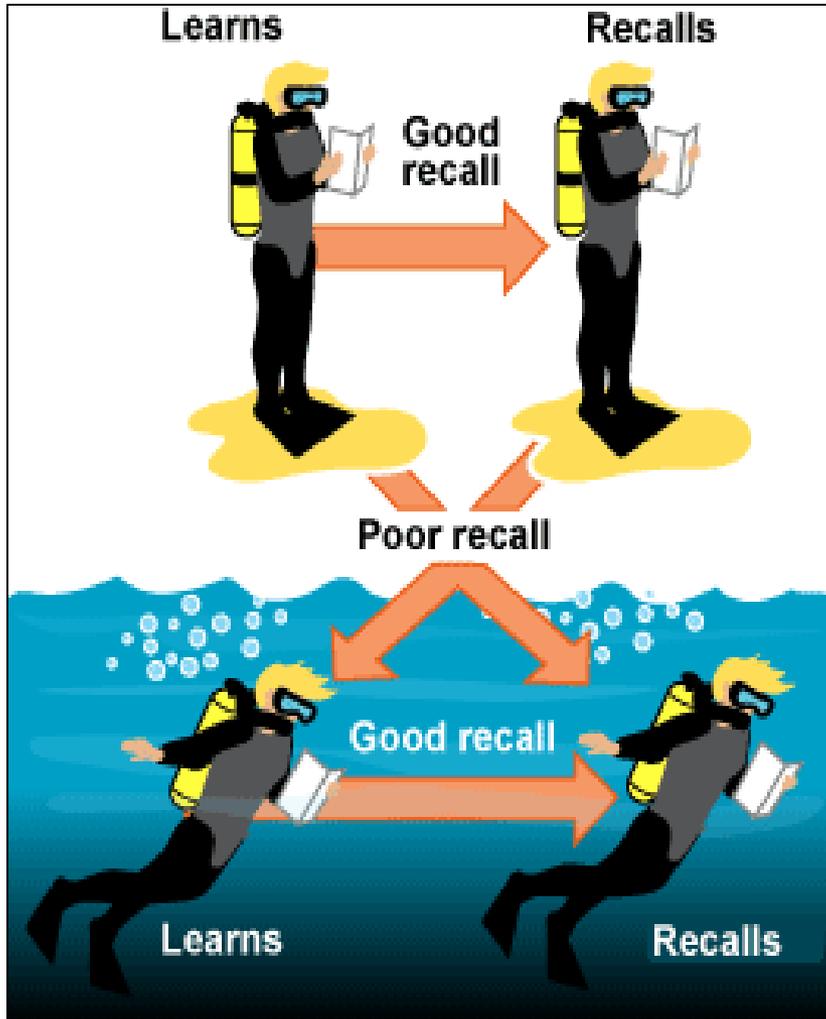
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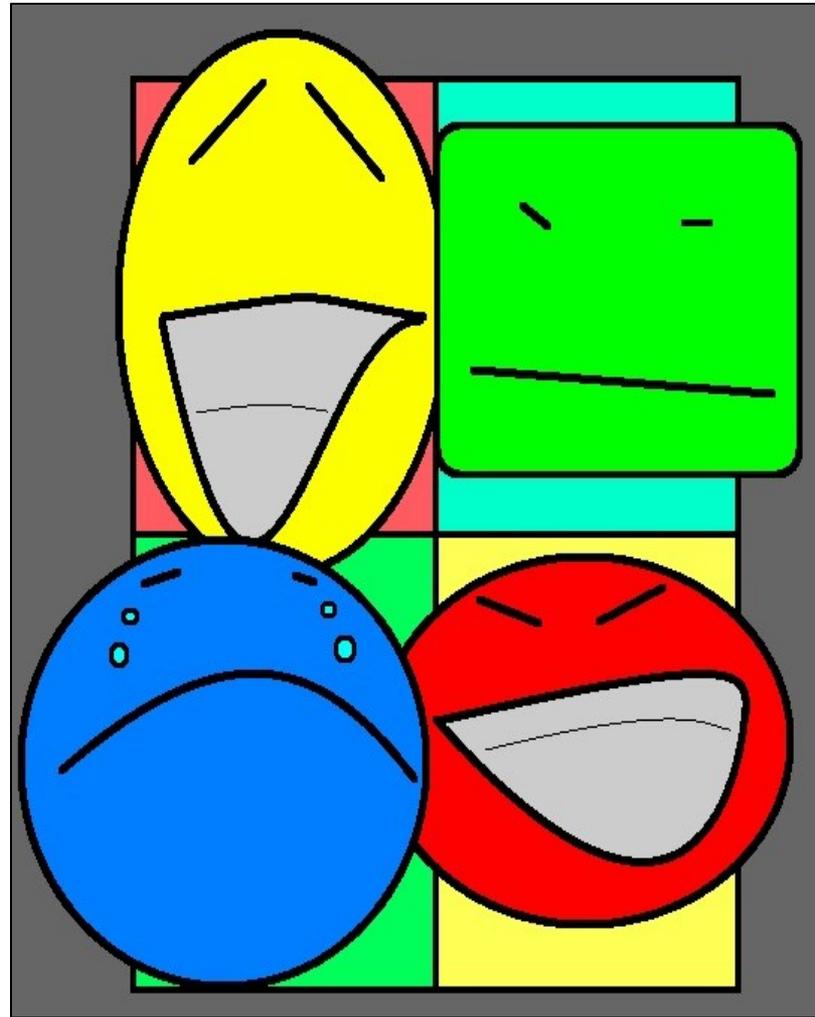
RETRIEVING INFO FROM LTM

- Once memories are effectively encoded and physiologically stored, we bring them back to STM/WM by process of retrieval.
 - Failures of memory = failure of retrieval
 - **Retrieval cues** - Things that help you retrieve a stored memory due to association or links to other things
 - Ex: Location = physically returning back to a place where you had the thought can help you remember it
 - Hearing? Smell?
 - free recall vs cued recall
 - **Free recall** - recalling a stimulus without presence of any other info
 - **Cued recall** - presented with cues to aid in recall of previously experienced stimuli
 - **Encoding Specificity** - we learn information together with its context
 - Best recall occurs if encoding and retrieval occur Text
 - **State-Dependent Learning** - learning that is associated with
- 

RETRIEVING INFO FROM LTM



Encoding Specificity



State-Dependent Learning

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MEMORY & THE BRAIN

- Where in the brain do memories *form*?
 - Physiology of memory begins at the **synapse**
 - Nerve impulses travel down axon
 - Neurotransmitter is released to next neuron
 - Synapse is activated and causes structural changes; neurotransmitter release
 - increased firing
 - Memory = structural synaptic changes + synthesis of new proteins
 - **long-term potential:** enhanced firing of neurons after repeated stimulation > structural changes > enhanced responding
 - Memory is not permanent
 - _____ - memory is susceptible to change each time it is retrieved...is this good or bad? Why?
 - Amnesia - loss of memory
 - **Retrograde Amnesia** - loss of memory for events _____
 - **Anterograde Amnesia** - loss of memory for events _____
 - Is memory for recent events more or less fragile than memory for remote events?
- 

MEMORY & THE BRAIN

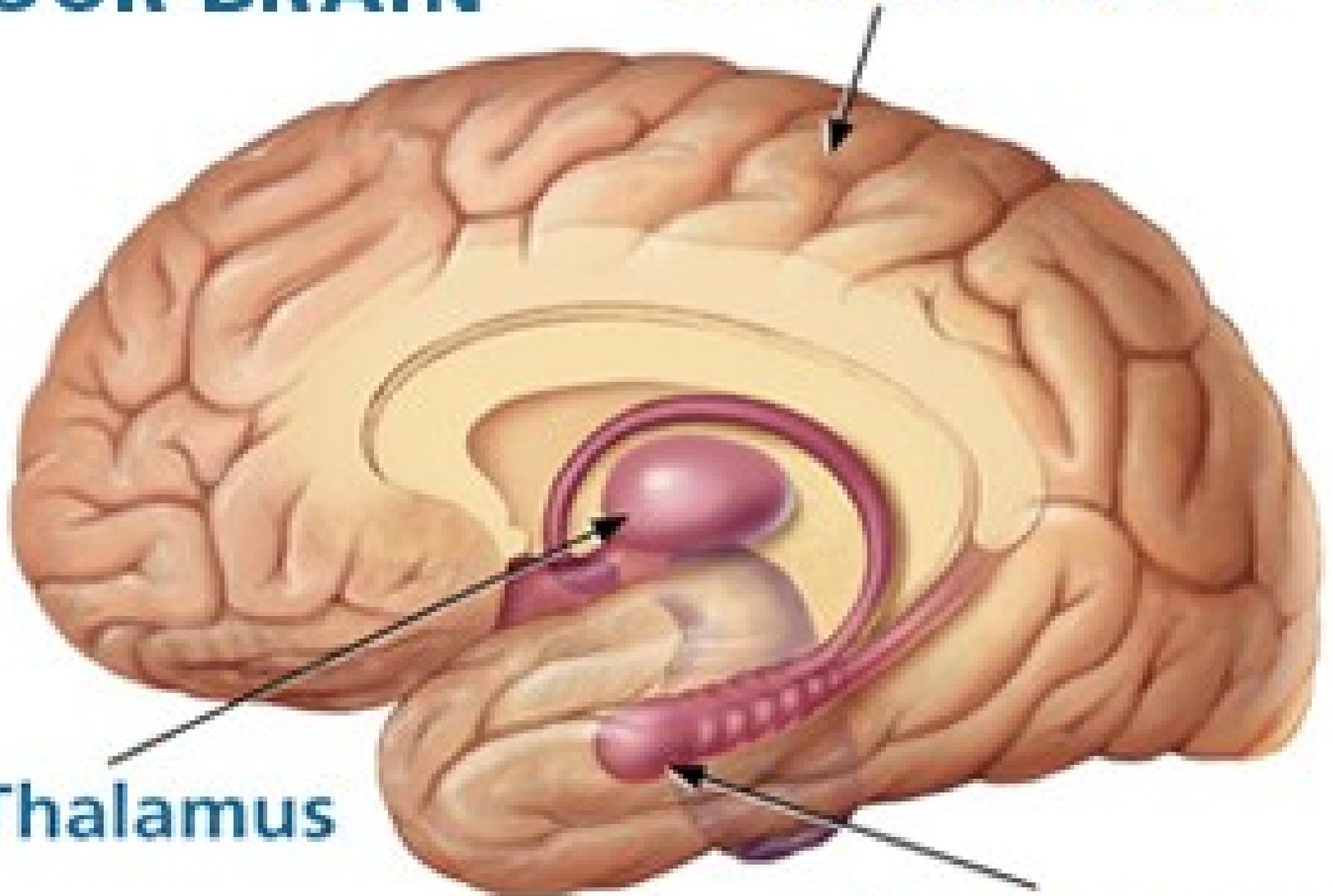
- Before memories become resistant to disruption, they must be **consolidated**, or transformed into a more permanent state.
- Consolidation occurs on two levels: **synapse and system**
 - **Synaptic consolidation** - occurs at the synapse; *minutes time*
 - **Systems consolidation** - involves *gradual reorganization* of circuits and brain regions (weeks/months/years)
- **Standard Model of Consolidation**
 - Memory retrieval depends on the hippocampus during consolidation
 - Retrieval depends on the entire cortex *after* consolidation...Activation is distributed across various areas
- **Reactivation** - hippocampus replays neural activity associated with a memory; connects the HC with cortex
 - Occurs during sleep or relaxed wakefulness
 - Eventually, cortical connections become strong and HC is **not** necessary
 - Recent memories = HC; Remote memories = Cortex; System

MEMORY & YOUR BRAIN

Cerebral Cortex

Thalamus

Hippocampus



MEMORY & THE BRAIN

