

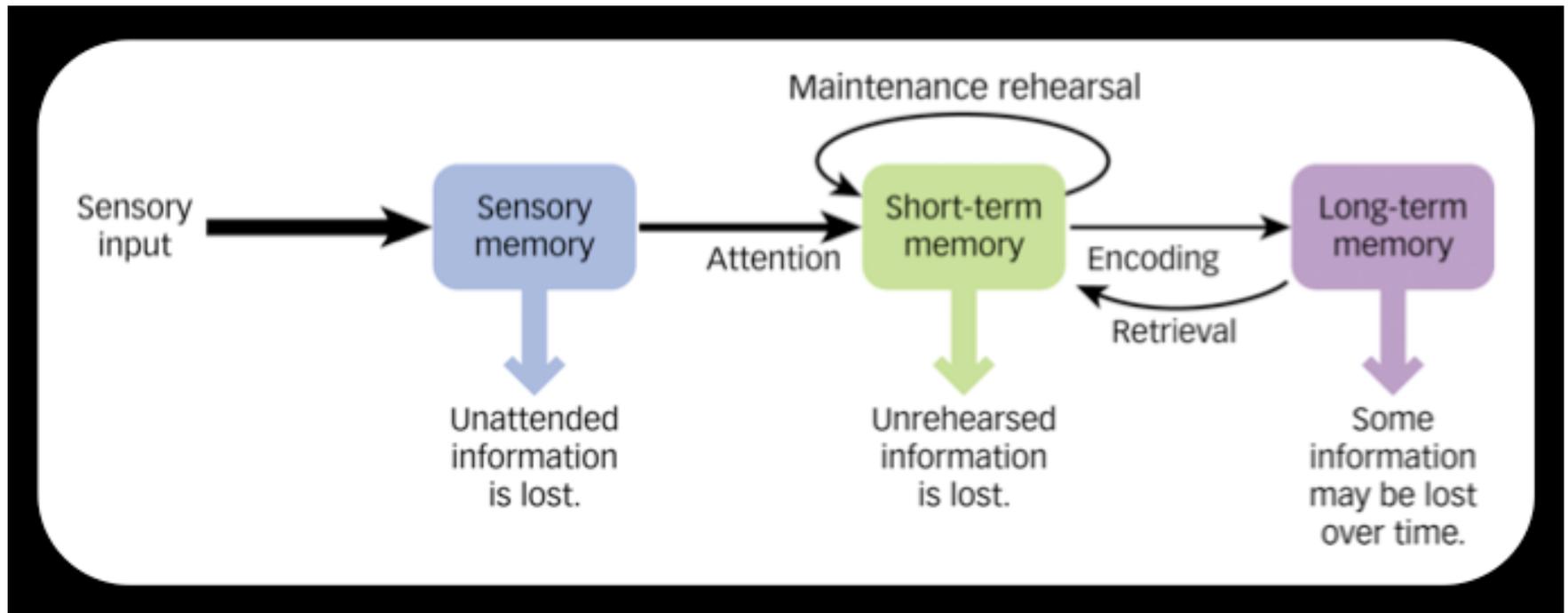
Memory

Memory

- Information-Processing Model
- Levels of Processing Model
- Encoding
- Storage
- Retrieval
- Forgetting
- Memory Construction
- Biological Mechanisms
- Memory Improvement

Information-Processing Model

- **3-Stage Processing Model**
 - created by Atkinson & Shiffrin



Levels of Processing Model

- Shallow Processing: encoding of superficial sensory information
- Deep Processing: attach meaning to information; create associations between new memory and existing memories
- Automatic Processing: unconscious encoding of information that occurs without thought
- Effortful Processing: encoding that requires our attention and conscious effort

Encoding

- Process of getting info into our memory
 - From Sensory Memory to STM (attention)
 - From STM to LTM (encoding)
 - Filter Theory
 - unimportant info is dropped and relevant info is encoded into the next stage

Types of Encoding

- Visual Encoding: encoding of picture images
 - Imagery
 - Mnemonic Devices: memory tricks or strategies to make info easier to remember (some which use imagery)
 - Method of Loci: uses visualization with familiar objects on a path to recall information in a list
 - Peg Word System: uses association of terms to be remembered with a memorized scheme

Types of Encoding

- Acoustic Encoding: encoding of sound, especially the sound of words
- Semantic Encoding: encoding of meaning, including the meaning of words
 - Self-Referent Encoding: relating new info to ourselves to better remember it

Storage

- Retaining information which has been encoded
 - Sensory Memory
 - Short Term Memory (STM)
 - Long Term Memory (LTM)

Storage

- **Sensory Memory**
 - immediate, very brief recording of sensory info. in the memory system
 - Iconic Memory: momentary sensory memory of visual stimuli; photographic or picture-image memory lasting no more than few tenths of second
 - Echoic Memory: momentary sensory memory of auditory stimuli; lasts 3 or 4 seconds

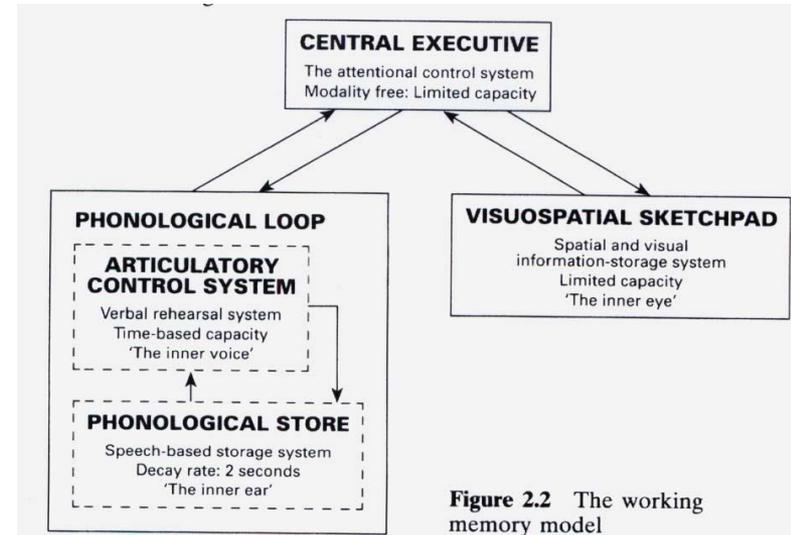
Storage

- **Short-Term Memory**

- activated memory that holds a few items briefly before the info is stored or forgotten

- Working Memory: active 3-part memory system which temporarily holds info, & consists of a phonological loop, visual-spatial working memory, & the central executive (decision-making & cognitive skills)

- Lasts about 30 seconds, holds 7 ± 2 items



Storage

- **Short-Term Memory**
 - Chunking: grouping info into meaningful units, decreases necessary capacity of memory
 - Rehearsal: repetition of info to maintain it in STM or encode it for storage
 - Maintenance Rehearsal: repetition that keeps info in STM about 20 seconds
 - Elaborative Rehearsal: repetition that creates associations between memory & existing memories stored in LTM

Storage

- **Long-Term Memory**

- relatively permanent and limitless storehouse of the memory system
- includes knowledge, skills, and experiences
- Retrospective Memory: memory of things in the past
- Prospective Memory: memory of things in the future

Storage

- **Types of Long Term Memory**
 - Explicit Memory (Declarative Memory)
 - LTM for facts & experiences we consciously know and can verbalize
 - Hippocampus involved in conversion to LTM
 - Semantic Memory: facts & general knowledge
 - Episodic Memory: personally experienced events
 - Flashbulb Memory: vivid memory of emotional event

Storage

- **Types of Long Term Memory**
 - Implicit Memory (Nondeclarative Memory)
 - LTM for skills & procedures whose retention is independent of conscious recollection
 - Cerebellum involved in conversion to LTM and storage
 - Procedural Memory: tasks we perform with and without thinking
 - Conditioning: classical & operant conditioning associations of stimuli

Storage

- **Organizing Long Term Memories**
 - Hierarchies: systems in which concepts are arranged from more general to more specific classes
 - Concepts: mental representations of related things
 - Prototype: most typical example of a concept
 - Semantic Networks: system which links concepts to other concepts

Storage

- **Organizing Long Term Memories**
 - Schemas: preexisting mental frameworks that start as basic operations, then get more complex as we gain additional information
 - Enable us to organize and interpret new information
 - Scripts: schemas for events

Retrieval

- **Getting information out of memory storage**
- Retrieval Tasks
 - Recognition: identification of learned items when they are presented
 - Recall: retrieval of previously learned info without cues
 - Relearning: assesses amount of time saved (method of savings) when learning material for a second time

Retrieval

- **Retrieval Cues**

- stimuli that provide a trigger to get an item out of memory storage
- Priming: activating specific associations in memory either consciously or unconsciously
- Mood-Dependent/Congruent Memory: tendency to recall memories consistent with current mood

Retrieval

- **Retrieval Cues**

- Context-Dependent Memory: when the context in which info was learned can help in retrieval later
- State-Dependent Memory: tendency to recall memories consistent with current internal state

Retrieval

- **Serial Position Effect**

- when recalling a list, it is easiest to remember the first and last items on the list
 - Middle items are the first forgotten, then the last items are forgotten, and memory for the first items lasts in memory the longest
- Primacy Effect: better recall of the *first* items on a list
- Recency Effect: better recall of the *last* items on a list
 - Initially, last items are best recalled (related to STM)

Retrieval

- **Spacing Effect**

- Tendency for distributed study or practice to yield better long-term retention than is achieved through massed study or practice
- Distributed Practice: spreading out memorization of info or skills over several sessions; typically produces better retrieval than massed practice
- Massed Practice: cramming memorization into one session

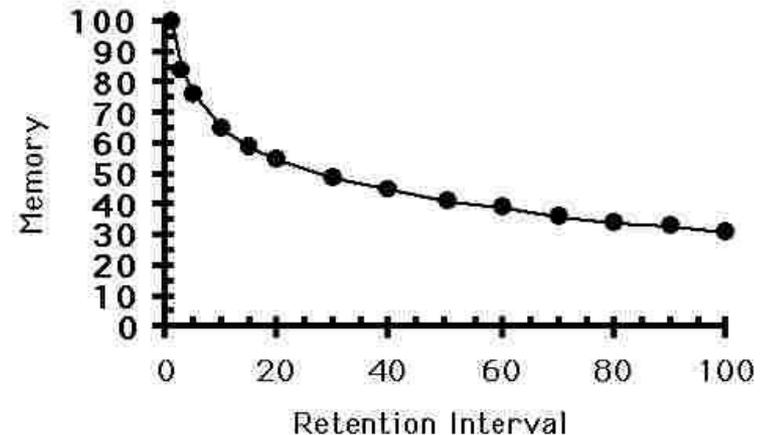
Forgetting

- **Amnesia**

- Infantile Amnesia: inability to recall *explicit* memory before the age of 2 or 3
- Retrograde Amnesia: inability to recall information *before a physical trauma*; problems with retrieving LTM
- Anterograde Amnesia: inability to recall information *after a physical trauma*; problems converting info from STM to LTM
- Dissociative Amnesia: inability to remember due to *emotional trauma*; no physical cause

Forgetting

- Encoding Failure (Absent-mindedness)
 - Information is never properly encoded, so it never becomes part of LTM
- Storage Failure (Transience)
 - Storage decay over time; unused memories fade
 - Forgetting Curve
 - much of what we learn we quickly forget
 - Research done by Hermann Ebbinghaus



Forgetting

- **Retrieval Failure**

- Inability to draw out of memory previously encoded and stored items
- Tip-of-the-Tongue Phenomenon: inability to access info., even though it is in LTM
- Proactive Interference: disruptive effect of prior learning on the recall of newer information
- Retroactive Interference: disruptive effect of new learning on the recall of older information

Forgetting

- **Motivated Forgetting**
 - Repression: banishes from consciousness anxiety-arousing thoughts, feelings, and memories

Memory Construction

- Memory does not work like a recorder; memories are subjective and can be influenced by many things, including our current state of mind and opinions
 - Misinformation Effect: incorporation of misleading information into memories of a given event
 - Source Amnesia/Misattribution Error: attributing to wrong source an event we have experienced, heard, read about, or imagined

Memory Construction

- Confabulation: filling in gaps in memory with information made up or from other sources (“honest lying”)
- Rosy Retrospection: tendency to rate past events more positively than when the event occurred
- Elizabeth Loftus & Eyewitness Testimony

Biological Mechanisms

- **Parts of the Brain Involved**

- Thalamus

- helps encode info from sensory memory into STM

- Hippocampus

- involved in converting info from STM to LTM
 - processes *explicit* memories

- Cerebellum

- processes and stores *implicit* memories

- Amygdala

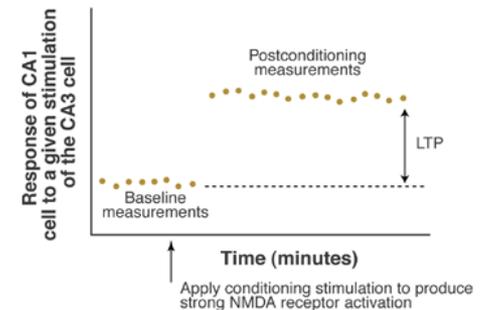
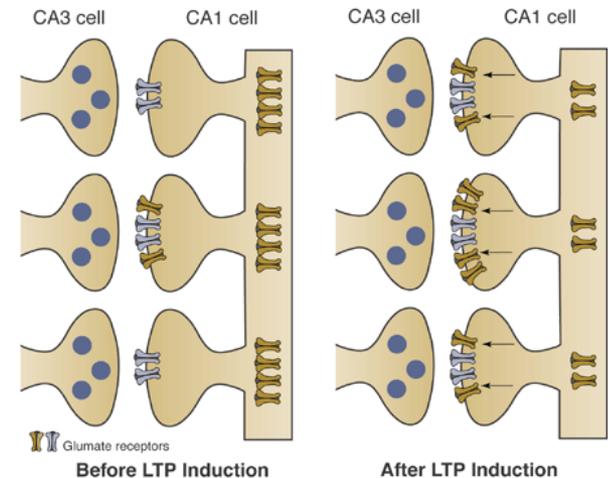
- involved in storage of *emotional* memories

Biological Mechanisms

- **Connectionism**

- memory is stored throughout the brain in connections between neurons, many of which work together for a single memory

- Long-Term Potentiation: increase in efficiency with which signals sent across synapses within neural networks of LTM



Biological Mechanisms

- Hormones & Memory
 - Strength of emotion is correlated with the strength of a memory (due to release of stress hormones)
 - Release of stress hormones can also block retrieval of older memories
- Neurotransmitters
 - Neurotransmitter release triggers a memory; fewer neurotransmitters are needed to trigger a memory once LTP has occurred

Memory Improvement

- **Strategies to Improve Memory**
 - Study repeatedly (distributed practice)
 - Make the information meaningful (semantic encoding)
 - Activate retrieval cues
 - Use mnemonic devices
 - Minimize interference
 - Get more sleep
 - Test yourself repeatedly, it'll reinforce what you already know and show you what you don't