

# Memory

**Memory:** the persistence of learning over time through the storage and retrieval of information.

**Flashbulb memory:** a clear memory of an emotionally significant moment or event. The memory is as clear as looking at a picture. Ex. Being in the Twin Towers on 9/11, you remember every detail: sights, sounds, smells, etc.

**Semantic memory:** fact based Jeopardy-like information.

**Procedural memory:** how-to memory.

**Episodic memory:** memories of certain episodes/events. Ex. vacations, birthdays, holidays, prom, etc. Not every episodic memory is a flashbulb memory, but every flashbulb memory is an episodic memory.

**Eidetic memory:** photographic memory, very rare.

**Prospective memory:** remembering not to forget to do something. Ex. I can't forget to call my boss later today.

**The Three Stage of Memory (They MUST go in this order!!!):**

1. **Encoding:** the processing of information into the memory system.
2. **Storage:** the retention of encoded information over time.
3. **Retrieval:** the process of getting information out of memory storage.

**Parallel processing:** the processing of many aspects of a problem simultaneously; the brain's natural mode of information processing for many functions. We take in a lot of information at the same time, not like a computer in which you can only input one piece of information at a time.

**Automatic processing:** unconscious encoding of incidental information such as space, time, and frequency, and of well-learned information, such as the meanings of words.

**Shallow processing:** encoding the shapes, looks, or surface structure of things, especially words, not the meanings. It is difficult to remember things if it is only shallowly processed. **\*Remember: the "what would you need on an island activity" – does the word have the letter E in it?**

**Deep processing:** encoding something according to its semantics.

**Semantic encoding:** the encoding of meaning, including the meaning of words.

**Self-referent processing:** encoding something based on how it relates to you. This is a type of deep processing.

**Effortful processing:** encoding that requires attention and conscious effort.

**Rehearsal:** the conscious repetition of information, either to maintain it in consciousness or to encode it for storage.

**Spacing effect:** the tendency for distributed study or practice to yield better long-term retention than is achieved through massed study or practice.

**Next-in-line effect:** a person in a group has diminished recall for the words of others who spoke immediately before or after the person.

**Serial position effect:** our tendency to recall best the last and first items in a list.

1. **Primacy effect:** information at the beginning of a list is remembered better than material in the middle.
2. **Recency effect:** information at the end of a list is remembered better than the material in the middle.

**Overlearning:** the additional rehearsal of information even after learning material that increases retention.

**Visual encoding:** the encoding of pictures/images.

**Acoustic encoding:** the encoding of sound, especially the sound of words.

**Imagery:** mental pictures, a powerful aid to effortful processing, especially when combined with semantic encoding.

**Rosy retrospection:** recalling the high points of an event while forgetting the mundane ones.

**Mnemonics:** memory aids, especially those techniques that use vivid imagery and organizational devices.

**Method of Loci:** a mnemonic that helps people remember things by placing them in a familiar place, such as in your house, on a baseball field, etc.

**Link method:** forming a mental image of items remembered in a way that links them together. Ex. making a story out of items.

**Peg-word system:** remembering a peg-word jingle (one is a bun, two is a shoe, etc) and visually associating the peg-words with the to-be-remembered words.

**Hierarchies:** a few broad concepts divided and subdivided into narrower concepts and facts.

**Chunking:** organizing items into familiar, manageable units.

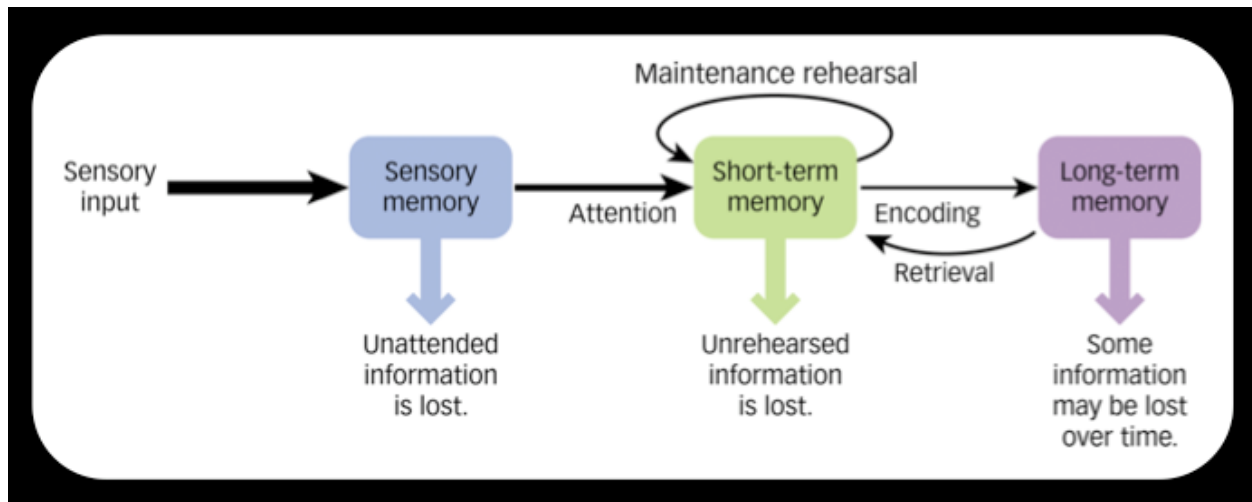
**Acronym:** a type of chunking in which a word is made out of the first letters of the to-be-remembered items. Ex. HOMES (the 5 Great Lakes: Huron, Ontario, Michigan, Erie, Superior)

**Richard Atkinson and Richard Shrifin Three Stage Memory Model:**

1. **Sensory memory:** a quick, fleeting memory that is activated by the five senses.

2. **Short-term/working memory:** activated memory that holds a few items (on the average 7) for a brief time (usually 30 seconds) before the information is stored or forgotten. Located in the frontal lobe.
3. **Long-term memory:** the relatively permanent and limitless storehouse of the memory system that includes knowledge, skills and experiences.

**Working memory:** a newer understanding of Atkinson and Shiffrin's second stage of short-term memory that focuses on conscious, active processing of incoming auditory and visual-spatial information, and of information retrieved from long-term memory.



**Iconic memory:** a momentary sensory memory of visual stimuli; a photographic or picture-image memory lasting no more than a few tenths of a second. **\*Remember: an icon is a picture on your computer, iconic means visual.**

**Echoic memory:** a momentary sensory memory of auditory stimuli; if attention is elsewhere, sounds and words can still be recalled within 3 or 4 seconds **\*Remember: an echo is a sound.**

**Explicit memory:** memories of facts and experiences that one can consciously know and "declare", such as telling about a vacation or giving directions. **Also called declarative memory.** Goes through the **hippocampus** (the part of the limbic system responsible for explicit memories of names, images, and events).

**Implicit memory:** procedural, how-to memory that you don't have to think about, it's independent of conscious recollection. **Also called nondeclarative or procedural memory.** Goes through the **cerebellum** (the part of the brain that plays an important role in forming and storing implicit memories).

**Long-term potentiation (LTP):** an increase in a synapse's firing potential after brief, rapid stimulation. Believed to be the neural basis for learning and memory.

**Memory trace:** proof of memory, the neuron physically changes when memories are made. **CREB:** the protein that forms memories by reshaping synapses. The less CREB, the less memory making ability.

**Recall:** a measure of memory in which the person must retrieve information learned earlier, as on a fill-in-the-blank test.

**Recognition:** a measure of memory in which the person need only identify items previously learned, as on a multiple-choice test.

**Relearning:** a measure of memory that assesses the amount of time saved when learning material for a second time.

**Priming:** the activation, often unconsciously, of particular associations in memory.

**Retrieval cues:** anchor points used to access the information you want to remember later.

**Déjà vu:** the eerie sense that “I’ve experienced this before.” Cues from the current situation may subconsciously trigger retrieval of an earlier experience.

**Mood-congruent memory:** the tendency to recall experiences that are consistent with one’s current good or bad mood.

**State-dependent memory:** what we learn in one state may be more easily recalled when we are again in that state, such as being happy or sad.

**Context-dependent memory:** putting yourself back in the context where you experienced something can prime your memory retrieval.

**Amnesia:** the loss of memory.

**Infantile amnesia:** the inability to remember anything before the age of 3.

**Retrograde amnesia:** the inability to remember anything after specific brain surgery or an accident. Can’t remember old memories.

**Anterograde amnesia:** the inability to form new memories after specific brain surgery or an accident.

**Dementia:** a loss of brain function that occurs with certain diseases. It affects memory, thinking, language, judgment, and behavior.

**Delirium:** sudden severe confusion and rapid changes in brain function that occur with physical or mental illness.

**Alzheimer’s disease:** is one form of dementia that gradually gets worse over time. It affects memory, thinking, and behavior. Usually the body “forgets” to work and eventually shuts down.

**Dissociative Disorder:** Dis-association of memory, sudden unawareness of some aspect of identity or history.

**Cortisol:** “the stress hormone” that is secreted during times of stress.

**Tulving's Encoding Specificity Hypothesis:** memory of information is improved if the cues are present during learning are also present at the time of retrieval because those cues can be used to facilitate retrieval. Ex. learning a list underwater and being tested on land.

**Distributed practice:** working to retain information over time, not cramming it all in during one session, that produces better long-term recall.

**Massed practice:** cramming that can produce speedy short-term learning and feelings of confidence.

**Tip-of-the-tongue Phenomenon:** knowing the answer but not being able to retrieve it.

**Proactive interference:** the disruptive effect prior learning on the recall of new information; forward-acting. Ex. can't remember your new locker combination because you keep remembering your old one.

**Retroactive interference:** the disruptive effect of new learning on the recall of old information; backward-acting. Ex. can't remember your old locker combination because you keep remembering your new one.

**Positive transfer:** when old information can facilitate our learning of new information, such as knowing Latin to help learn French.

**Schacter's 7 Sins of Forgetting:** the causes of forgetting.

**1. Three sins of forgetting:**

- a. **Absent-mindedness:** inattention to details leads to encoding failure (not paying attention to where you put down your keys)
- b. **Transience:** storage decay over time (forgetting the names of former classmates)
- c. **Blocking:** inaccessibility of stored information (tip of the tongue phenomenon)

**2. Three sins of distortion:**

- a. **Misattribution:** confusing the source of information (putting words into someone else's mouth or remembering a dream as an actual happening.)
- b. **Suggestibility:** the lingering effects of misinformation (a leading question on the stand in court)
- c. **Bias:** belief-colored recollections (current feelings toward a friend may color our recalled initial feelings)

**3. One sin of intrusion:**

- a. **Persistence:** unwanted memories (being haunted by images of a car accident)

**Motivated forgetting:** when people unknowingly revise their memories.

**Repression:** a defense mechanism that banishes anxiety-arousing thoughts, feelings, and memories from consciousness.

**Misinformation effect:** incorporating misleading information into one's memory of an event.

**Source amnesia:** attributing to the wrong source an event we have experienced, heard about, read about, or imagined; also known as source misattribution. Source amnesia, along with the misinformation effect, is at the heart of many false memories.

**Confabulation:** the spontaneous narrative report of events that never happened. It consists of the creation of false memories, perceptions, or beliefs about the self or the environment.

## **Memory Key People:**

**Donald Broadbent:** developed the encoding **Filter Theory** that states unimportant information is dropped and relevant information is encoded.

**Hermann Ebbinghaus:** discovered the more time we spend learning novel information, the more we retain it. (The Ebbinghaus retention curve)

**Karl Lashley:** lesioned rats' brains after running a maze to discover where memory is stored. He concluded that it is all over the cortex.

**Eric Kandel & James Schwartz:** discovered the neural basis of learning, long-term potentiation, by observing changes in the sending neurons of a simple animal, the California sea slug, *Aplysia*.

**Daniel Schacter:** specified seven ways in which our memories fail us (three sins of forgetting, three sins of distortion, one sin of intrusion).

**Elizabeth Loftus:** memory researcher who showed that if false memories, such as being lost in a mall or drowning in a lake, are implanted in individuals, they construct (fabricate) their memories.