



How We Make Memories

The way in which the information that we see, hear and learn each moment is stored in our brains and then made available to be recalled is a complex process. While new theories are still being proposed, the most widely held model proposes that memories are formed in three stages:

Stage 1: Memory Acquisition. Learning new information activates neurons (nerve cells) in the brain. Communication among these nerve cells encodes the information, creating a temporary neuronal pathway that holds the information as a **short-term memory**.

If you perceive something visual or spatial, such as a picture, the pathway is created in the right parietal lobe; if you're reading, the pathway forms in the area of the brain that processes language, the left temporal lobe. Focusing attention on new information promotes the encoding process, which then helps it solidify from short- to long-term memory during consolidation. **That means that if you have a problem remembering something, maybe you weren't concentrating on it too hard in the first place.**

Stage 2: Memory Consolidation. For information to be retained long term, the neural pathway formed during memory acquisition must be strengthened. The replaying of events in the brain strengthens the pattern of neuronal activity, as more elaborate connections (or synapses) are formed among the neurons.

- The brain region known as the hippocampus plays a key role in consolidating **declarative memories** (those related to names, dates, faces, facts and specific events) and is more vulnerable to decline during aging and Alzheimer's disease.
- **Procedural memories**, which deal with skills you acquire (like riding a bicycle), are consolidated throughout the frontal lobes, cerebellum, and basal ganglia. These memories hold up better over time and can survive even into dementia.

Stage 3: Memory retrieval. In order to recall something, the brain must reactivate the nerve pathways where the specific memory is stored. Frequently retrieved memories are usually easier to recall, whereas infrequently retrieved information often takes longer to emerge and may require a prompt of some kind, such as a related piece of information.

What happens as we age. With the onset of middle age, many people become more distractible and less able to fully concentrate on new information. This deficit weakens the memory acquisition process. The brain also becomes less efficient in consolidating new memories. Some researchers suspect that it may also take longer to "reassemble" a memory during the retrieval process.