**Memory Consolidation**

Consolidation is a neurological process that involves gradually converting information from short-term memory into long-term memory.

Remember, [short-term memories](http://psychology.about.com/od/memory/f/short-term-memory.htm) are only stored for about 20 to 30 seconds. In order to be retained so that the information can be retrieved and used later, the contents of short-term memory must be moved into [long-term memory](http://psychology.about.com/od/memory/f/long-term-memory.htm).

**The Consolidation Process**

1. Long-term potentiation is a process in which synapses become stronger the more frequently signals are passed between two neurons. This mechanism is believed to play a major role in the learning and memory processes. When two neurons fire at the same time repeatedly, they become more likely to fire together in the future. Eventually, these two neurons will become sensitized to one another.

1. As we acquire new experiences, information, and memories, our brains create more and more of these connections. Essentially, the brain is able to rearrange itself, establishing new connections while weeding out old ones.

1. By rehearsing or recalling information over and over again, these neural networks become strengthened. For example, if you study the same material regularly over a long period of time, the pathways involved in remembering that information become stronger and more familiar. The repeated firing of the same neurons over and over again makes it more likely that those same neurons will be able to repeat that firing again in the future. As a result, you will be able to remember the information later with greater ease and accuracy. Think of these synaptic pathways as being similar to a path in the woods. The more often you walk the path, the more familiar it becomes and the easier it is to traverse.

The consolidation process begins on the synaptic level as the brain begins to form new pathways to the information it encounters. This process can occur over a period of days, weeks, months, or even years. While we often think of the brain as being like a filing cabinet or a computer, carefully storing away specific memories in individual files, memories are actually spread out across the entire brain. Through the consolidation process, the brain is able to access this information by creating a sort of neural map, allowing memories to be retrieved when they are needed.

Experts suggest that sleep can play an important role in the consolidation process. For example, research has found that sleep enhances the consolidation of episodic emotional memories into long-term memory. One of the major [theories of sleep](http://psychology.about.com/od/statesofconsciousness/p/TheoriesofSleep.htm) suggests that sleep exists as a way to process and consolidate information that we have acquired during our waking lives.

People often think of memories as permanent, but just because a memory has been consolidated does not mean that cannot be lost. In fact, researchers have found that memories often need to be reconsolidated once they have been recalled. The process of recalling and reconsolidating a memory can help maintain and strengthen information in long-term memory.

It is also possible to speed up the consolidation process when learning new information. Rehearsal and memorization strategies are just a few techniques that can lead to faster memory consolidation. One of the best ways to ensure that information is consolidated into long-term memory is to repeatedly rehearse it over several spaced intervals. Going over your class notes once a week for several weeks will lead to greater memory retention than cramming the night before an exam.

**Problems with Memory Consolidation**

One well-known example of how consolidation can impact memory is the case of the patient known as H.M. In 1953, H.M. had surgery to treat his severe epilepsy. The surgery involved removing parts of his medial [temporal lobe](http://psychology.about.com/od/tindex/f/temporal-lobe.htm). While the surgery did alleviate the symptoms of his epilepsy, it left him with severe memory issues. While H.M. could recall old memories from before the surgery, he was unable to remember new information or recall information from the two years prior to the surgery. The effects of the surgery led researchers to conclude that the medial temporal lobe plays an important role in the process of memory consolidation.