

Multi-Store Model of Memory

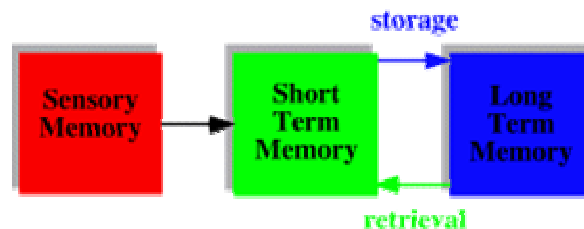
by Richard H. Hall, 1998

“Real World” Memory

Most learning and memory in the "real world" involves something more than simply associating a stimulus with an emotional response, or responding to a single reinforcer. In other words, traditional classical and operant conditioning models are a good starting point, but certainly not the whole picture. Real world memories often involve intricate and elaborate associations among many different factors, and recall of these memories is often holistic, integrated, verbally oriented, and conscious. This is clearly an important and fascinating topic for neuroscientists to tackle. Unfortunately, it is also an area in which it is difficult to use simple animal models. However, experimenters have developed some ingenious animal experiments for the study of complex/contextual memories. As we begin to consider more complex types of learning we begin to approach areas that are more and more unique to our own species, and animals can no longer inform us as to the nature of, for example, verbal memories. For this reason, case studies of humans who have experienced brain injuries are very informative, when one takes into account the neurological nature of their damage, and the impact of the damage on their behavior. This is an area of research in which quasi-experimental research with humans has played a very important role.

Model

We begin our discussion of “complex learning” with a brief description of what has come to be the prominent model of memory in cognitive psychology, which I'll refer to as the "**multi-store model**" (illustrated in Figure 1). This model is based on two fundamental assumptions: 1) memory can be conceived of as a few discrete "structures"; 2) information passes through these structures in a systematic order. Information is originally encountered via the sensory system and is retained for a very short period of time in **sensory memory** (sort of like a "buffer"). As soon as we attend to the information it is transferred to short term memory, which is working memory, conscious awareness. The capacity of **short term memory** is quite small relative to long term memory, and, as a consequence, is sometimes referred to as a "limited capacity structure". Information we are attending to in short term memory either decays quickly (about 20 — 30 seconds) or is stored in long term memory. Information can be held in **long term memory** as long as a lifetime, and its capacity is virtually limitless. Of course, many things we become aware of do not come directly from sensory experience; rather they are the result of us recalling information already in long term memory for one reason or another. The process of transferring information from long term memory into short term memory is called retrieval. It's very useful to keep this basic model in mind to better understand the way memory works when reviewing case studies of



brain damaged patients. It's especially helpful to keep in mind the process of transfer of information from short term to long term memory, that is, memory storage.

Figure 1. Multi-store Model of Memory