Stage Theory of Memory

The **stage theory of memory** has been a very influential theory in cognitive psychology, and will likely appear on the GRE Psychology Test. This theory holds that there are several different memory systems and that each system has a different function. Furthermore, the theory suggests that memories enter the various systems in a specific order. These three memory systems are called **sensory memory**, **short-term memory**, and **long-term memory** (incidentally, many psychologists today prefer to use the phrase *working memory* instead of short-term memory).

Sensory Memory

Sensory memory contains fleeting impressions of sensory stimuli. **Visual memory** is sometimes called **iconic memory**, and auditory memory is sometimes called **echoic memory**. Information does not last long in this memory; at most, for a few seconds.

To find out how much information could be retained in sensory memory, early researchers used a method called the **whole-report procedure**. In this method, subjects looked for a fraction of a second at a visual display of nine items such as the one shown in Figure 2. They were then asked to recall as many of the items as they could. On average, subjects could remember only about four of the nine items. Researchers interpreted this as evidence that the capacity of sensory memory was only four items. However, a young researcher by the name of **George Sperling** suspected that this might not be an accurate indication of the capacity of sensory memory.

<div align="center">

B   X   O

R   T   P

W   Q   L

</div>

Figure 2. A Sample 3-by-3 Array Used to Study Sensory Memory

Sperling devised a method called the **partial-report procedure**. Like the earlier researchers, he used a 3×3 matrix of letters and flashed the array for a fraction of a second. However, unlike earlier researchers, he asked the subjects to report only one row of the array. Immediately after the presentation of the array of letters, a high, medium, or low tone was presented, indicating to the subjects which row to recall. Notice that the subjects didn't know beforehand what row they had to recall. Therefore, the subjects couldn't focus on just one row. It turned out that, regardless of which row Sperling asked for, the subjects' recall was nearly perfect, thus suggesting that the capacity of sensory memory was about nine items. Other experiments with larger arrays confirmed the nine-item limit. So, in the whole report method, as the subjects were reporting what they saw, their sensory memory of the array was decaying. By the time the subjects reported about four of the stimuli, the memory had already decayed. Sterling's procedure, however, avoided this problem.

Short-Term Memory

In real life, we are bombarded with sensations at any given moment. What happens to all of this input? Well, most of the information just leaves your sensory memory within a few seconds. However, information that you attend to goes from your sensory memory into your **short-term memory**. Short-term memory can be thought of as the link between our rapidly changing sensory memory and the more lasting long-term memory.

How long information remains in short-term memory depends on what is done with it. If nothing is done with the information, it will remain in short-term memory for only about 20 seconds. However, if the information is rehearsed, it can stay in short-term memory for a relatively long time, as long as you keep rehearsing the information (as when you repeat a phone number you want to remember). This is called **maintenance rehearsal**.

There is a limit to the amount of information that can be kept in short-term memory. George Miller found that seven (plus or minus two) pieces, or chunks, of information can be stored in short-term memory. Chunks are meaningful units of information. To get a sense for how chunking information into seven or fewer units of information can be an effective method for using your short-term memory, imagine trying to remember the following list of numbers: 1 9 7 6 1 8 1 4 1 6 4 3 1 4 7 5 1 2 0 3. You could probably remember about seven of these numbers. If, however, you chunk the numbers, you could probably remember all of them: 1976, 1814, 1643, 1475 and 1203. Breaking the numbers down into five years will make it much easier to remember all of the numbers.

Long-Term Memory

The phenomenon of chunking is an important interaction in behavior and long-term memory. **Long-term memory** can be considered to be the permanent storehouse of your experiences, knowledge, and skills. Items in long-term memory can be brief or can last a lifetime. One of the ways we get information into long-term memory is by using **elaborative rehearsal**, which involves organizing the material and associating it with information you already have in long-term memory.

TYPES OF REHEARSAL		
Type	**Definition**	**Use**
Maintenance	Repeating the information	Keeping the information in short-term memory
Elaborative	Organizing the information and associating it with information already in long-term memory	Getting the information into long-term memory

There are two types of long-term memory: **procedural memory** and **declarative memory**. **Procedural memory** has to do with remembering how things are done. It includes things like how to tie your shoelaces, how to swim, how to ride a bike, etc. **Declarative memory** is where explicit information is stored. Sometimes it is called fact memory. There are two types of declarative memory: **semantic memory** and **episodic memory**. **Semantic memory** has to do with remembering general knowledge, especially the meanings of words and concepts. **Episodic memory** refers to memories for particular events, or episodes, that you have personally experienced.

LONG-TERM MEMORY	
Type	**Concerned With**
Procedural memory	Remembering how to do things
Declarative memory	Remembering explicit information
Semantic memory	Remembering general knowledge
Episodic memory	Remembering particular events you have personally experienced

Encoding

In general, encoding for verbal material in short-term memory differs from that of long-term memory. Encoding for verbal material in short-term memory tends to be phonological or acoustic, rather than visual. For example, when asked to recall letters from short-term memory, confusions tend to occur with letters that sound alike, e.g., D and T, rather than with letters that look alike, e.g., D and O. On the other hand, items in long-term memory are more likely to be encoded on the basis of their meaning. This assertion is supported by studies of **semantic priming**. In the usual semantic priming task, the subject has to decide whether a stimulus is a word or a nonword. In one classic experiment, subjects were presented with pairs of words, some of which were semantically related (e.g., NURSE-DOCTOR) and some of which were not (e.g., NURSE-BUTTER). The subjects' task was to press a Yes button if both words were real words and to press a No button if both words were not real words. The response time was quicker if the two words were semantically related.

ENCODING: SHORT-TERM MEMORY VERSUS LONG-TERM MEMORY	
Memory System	**Encoding of Verbal Material Likely to Be Based On**
Short-term memory	Phonology
Long-term memory	Meaning