Putting Your Memory to Work

Memory is one of the most remarkable and powerful features of human beings. Try to imagine what our everyday world would be like without memory. We would not be able to recognize people, places or things. And without memory we would not be able to develop or even employ language. Most people would like to have better memories. And this is also true of students -- especially at test time.

OBJECTIVES:

The materials below will:

1. give you a basic understanding of the three operations necessary to remember;
2. provide a working model of the three memory systems; and,
3. offer some basic techniques for improving your memory.

I. THE PHASES OR OPERATIONS OF MEMORY

We must begin by distinguishing among three operations implied by any act of remembering. These three distinct operations must have occurred in order to remember anything. The first operation of memory is acquisition. To remember, one must first have experienced a particular object or encountered a specific piece of information. In terms of study habits, this means paying close attention to materials presented in lectures or encountered while reading your textbooks or other supplemental materials.

The second operation of memory is retention. This is the phase during which information is stored away for later use. As we shall soon see, this is the critical phase of memory .T o be retained for any length. of time information must be carefully organized. For the classroom student, retention requires intense concentration and efficient study habits which assist you in organizing material in a way which permits you to grasp the relationships between discrete facts.

The final operation of memory is retrieval, the phase during which one attempts to remember, or recall, some specific piece of information. As a student, you must develop study habits which enable you to acquire information in the first place, store it away for later use, and retrieve it upon demand. Most "memory lapses" --failures to recall what the textbook or professor said -- are actually retrieval problems. Retrieval problems usually result from the haphazard or disorganized storing of information. The memory simply doesn't know where to search for it.

II. THE THREE MEMORY SYSTEMS

Cognitive psychologists generally agree that there are three memory systems: these systems include (1) the sensory registers, (2) the short-term and (3) the long-term memory. These three memory systems are actually very interdependent rather than separate and independent systems.

We are constantly surrounded by sensory stimuli. We seldom notice many of these stimuli --the temperature in the room, the bird chirping outside the window, the car passing on the street. Memory, in the form of the sensory registers, actually comes into playas soon as we begin to focus our attention on any specific sensory stimulus. But the sensory registers hold sensory information for mere fractions of a second. Information from these sensory registers either must be transmitted immediately into the short-term memory or be lost forever.

The short-term and long-term memory systems differ from one another in terms of (a) their relation to our lived experience, (b) their storage capacity, and (c) the form in which information is stored. The short-term memory system deals with experiences in the very recent past. It can only hold material for about a minute or so. And it is limited to a capacity of about seven items. Try to remember, for example, a random set of seven to ten numbers. Finally the short-term memory can hold material in a disorganized or chaotic form.

The long-term memory system deals with experiences in the remote past which are viewed as gone and done with. The long-term memory, in contrast to the short-term, has an enormous capacity. It can store material for much longer periods, perhaps even for a lifetime. It holds material in a processed or organized form.

Comparision of the Short-term and Long-term Memory

characteristic	**short-term memory**	**long-term memory**
lived experience	recent past	remote past
capacity	limited to seven items	virtually unlimited
storage form	may be disorganized or chaotic	must be processed or organized

A very useful analogy by which to understand these three memory systems is to think of a truck delivering items to a warehouse. The truck represents the sensory data coming toward us from the outside world. The warehouse represents our long-term memory where packages of information may be stored for long time periods. Outside the warehouse is the loading dock and the dock foreman. The dock foreman represents the sensory registers. The foreman decides which items are unloaded from the truck and placed on the loading dock. And the loading dock, of course, represents the short-term memory where packages of information are temporarily stored.

III. MEMORY IMPROVING TECHNIQUES

One way to improve your memory is by the use of external aids, such as reference books, calendars, address books, a well-marked (or 'educated') textbook, class notes, course outlines, summaries, charts, or study guides. Anything we learn to write down to locate at a later time is

a thing we need not commit to memory. External aids are any physical devices that helps us remember.

The important thing is to transfer information from the fleeting sensory registers (where it 'is being seen') or the temporary short-term memory (where it has 'just been seen') into the more permanent long-term memory .The trick is to organize the material so it can be stored and recalled when needed. Several memory techniques can assist you in organizing information for memory transference.

One of the oldest transfer techniques is repetition, especially in the form of flash or note-cards. Many students have used flashcards to learn arithmetic tables, or vocabulary cards for foreign language. You can develop a similar system for learning important definitions or lists of things. Simply put the word to be learned or the title of a list on one side of the card and the definition or the list on the other side.

Another transfer technique is known as chunking. Chunking is a technique for grouping several items of information into one piece that is as easy to remember as a single item. It is easier to remember a seven digit phone number, such as 354-2783, when it is grouped as three chunks of information, such as "three fifty four, twenty seven, eighty three." It is easier to remember "the three primary causes of cancer" than just "causes of cancer." Identifying the number of items to be remembered seems to place boundaries around the material, rendering it into a "chunk" of information.

A third transfer technique is the use of mnemonics (ne-mon'-iks), which are deliberately created associations. In general terms, mnemonics are mental techniques which provide organization in terms of which we can more easily remember information that has little rhyme or reason for us. The simplest mnemonics are the use of catchwords or catch phrases. A catchword is a word that is made up of the first letters of several words you want to remember. You may have heard of the great advice to explain things with a "KISS," (Keep It Simple Stupid). Some catchwords become recognized as acronyms such as WAC (Women's Army Corp) or TASP (Texas Academic Skills Program).

A catch phrase or sentence, on the other hand, is one which the first letters of each word in the phrase correspond to the first letter of an item to be remembered. The order of the planets from the sun, for example, can be remembered by the catch phrase "Mary Visits Every Monday and Just Stays Until Noon Period" (Mercury, Venus, Earth, Mars, etc). Young music students are taught to remember the lines of the treble clef by means of the catch sentence "Every Good Boy Does Fine" and the spaces by the catchword " FACE." Mnemonics rely on deliberately created, even contrived, associations. Many lists of things can be so transformed into catchy mnemonics with a little effort.

Mnemonics are highly effective in memorizing limited amounts of information; but alas, they do not enable us to deal with the vast amounts of wide-ranging materials we learn and need in daily life or in difficult courses. What does help us to remember large amounts of material is hierarchical organization. Hierarchical organization requires active learning. It may be likened to the development of a structural framework in which the more important or general information is listed and then less important or specific information is listed below in order of decreasing generality.

A good example is the classification system utilized in biology. All living organisms are divided into broad kingdoms (e.g., plants and animals), each kingdom is divided into phyla (e.g., animals are broken down into protozoa, mollusks, anthropods, vertebrates, etc.), each phylum is divided into classes (e.g vertebrates are divided into fish, amphibians, reptiles, mammals, etc.), and each class is further divided into orders, orders into families, families into genus, and genus into species.

The hierarchical organization or arrangement of information is one of the most basic and strongest techniques for developing the long-term memory because it involves weaving information into a web. And this weaving of information forces you to become an active learner, looking for your own organizational patterns. New information can not only be inserted into the web, but becomes caught and held like a fly in a spider's web. The hierarchical organization of information furnishes the mind with a multitude of associations or retrieval clues. If you pull on any strand of the web, the rest of the information on that strand follows.

An example will illustrate both the nature and the value of hierarchical classification or organization. I once gave half the members of a class three minutes to memorize the following list of items:

Frenchhorn	Carnation	Birch	Trumpet	Tree
Mum	Pine	Piano	Brass	Tuba
String	Saxophone	Clarinet	Maple	Rose
Tulip	Flower	Trombone	Violin	Ash
Plant	Oak		Daisy	Reed
Harp			Instrument	

After the three minutes this group was able to write only an average of 16 words on the list. The other half of the class was given the same three minutes to memorize the same list of items, only they were organized in the following manner:

Instrument			Plant	
String	Brass	Reed	Flower	Tree
Harp	Frenchhorn	Clarinet	Mum	Pine
Piano	Trombone	Saxophone	Tulip	Oak
Violin	Trumpet		Carnation	Birch
	Tuba		Daisy	Maple
			Rose	Ash

After three minutes the members of this second group were able to write an average of 22 words on the list. And, more importantly, the members of this second group were able to recall an average of 19 words on the list a week later, whereas the first group was able to recall an average of only 7 words a week later. Apparently nothing is as productive of the effective and long term retrieval of information as its hierarchical arrangement.

IV. ADDITIONAL READING MATERIALS

1. Ellis, David B. Becoming a Master Student. 6th Ed. Rapid City: College Survival Inc., 1991, pp. 74-95.
2. Gleitman, Henry. Basic Psychology. New York: W. W. Norton & Co., 1983. Chap 7, pp. 169-195. A much expanded version of this material is available in Geitman's larger text, Psychology .
3. Hunt, Morton. The Universe Within. Simon & Schuster, 1982. Chapter 3, pp. 84 - 120.

Developed by Dr. Richard Oliver
Student Learning Assistance Center (SLAC)
San Antonio College, 1995.