A GUIDE TO MEMORY

ACADEMIC SUPPORT CENTER

BREMER HALL, ROOM 116

HAWKEYE COMMUNITY COLLEGE

MEMORY

"Memory: the power or process of reproducing or recalling what has been learned and retained;…a particular act of recall or recollection." --Webster's Ninth Collegiate Dictionary

"Memory is the mother of imagination, reason and skill…This is the companion, this is the tutor, the port, the library with which you travel." --Mark Van Doren

"The true art of memory is the art of attention." --Samuel Johnson

All of these definitions of memory have some truth to them. Your ability to remember relies on your storing and recalling previous experience. Yet it is enhanced by attention to the present moment.

The power of the human ability to remember is seldom noticed. We tend to be more aware of defects and limitations in remembering. Using the natural strengths of your adult brain, you will become aware of methods of learning and remembering that you thought you had forgotten.

One amazing memory skill that you constantly use is "chunking". Our brains spontaneously group items of information that we remember as a single item. For example, a word is a chunk of letters, but it carries far more information than the sum of the individual letters. Yet we remember this "chunk" as easily as we recall the single unit.

Our memories also serve us well when they allow us to recall meaning more naturally than verbatim words. If you hear or read a sentence, you will

probably forget the precise wording or specific details after a few seconds. But you will remember the content or meaning of the communication.

A final example to demonstrate the strength of your memory at this moment has to do with the power of visualization.

Imagine a tiny bee off in the distance.
Does it have a dark head or a light head?
Did you notice that you mentally "zoomed in".

We tend to store images as if they were on film or tape. We projected the images when needed, then inspect them as if they had become actual pictures.

The three memory forces described here—"chunking", meaningfulness, and visualization—will be discussed later. They are a few of the memory techniques that research supports as being profitable. Hopefully, it will put you at ease to know that most, if not all, of the strategies for remembering are ones that you have frequently used. The trick is to apply the techniques to your technical coursework.

Assignment #1

Personal Memory Inventory

Complete all parts of this exercise to gain insights into the workings of your own memory.

Part I: Write Down

1. Your phone number:
2. Your area code:
3. Your social security number:
4. Your zip code:
5. Your mother's maiden name:
6. The name of your first grade teacher:
7. The name of the football coach in the high school you attended:
8. The number of students in your high school homeroom:
9. The name of the first boy or girl you ever went out with.
10. The name of your seventh grade English teacher:

Part II: Indicate why you think you remember each piece of specific information you were able to recall.

1.

2.

3.

4.

5.

6.

7.

8.

9.

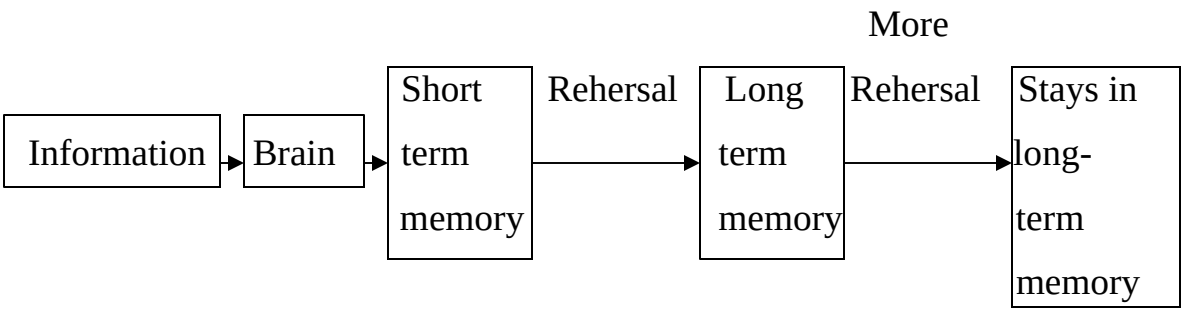
10.

Part III: What patterns do you see?

Part IV: Discuss instances in which you regularly say things like "My memory's shot." "I must be brain dead." "I've lost too many brain cells". Tell how the examples you have cited are related to each other. Try to identify specific types of memory tasks that give you the most trouble.

HOW PEOPLE LEARN AND REMEMBER

Study the following diagram for a few moments:



(Integrating College Study Skills. Wadsworth, 1984. p. 238)

As shown by this diagram, all information enters the brain. We are constantly receiving stimuli from the environment—an instructor's words, what is being written on the chalkboard, every noise going on in the classroom, expressions on the faces of other students, the clock, the carpet, the walls…An infinite list could be made for all the data inputted into our minds at any given moment.

All this information fails to overwhelm us, however, because it lingers in our minds briefly. Our brains automatically sort out important signals from unimportant ones. Information sorted as "important" is kept in the brain for a few seconds. It then fades or decays and is replaced by new incoming stimuli.

The function of sensory storage to memory is that it allows us to retain information long enough to selectively attend to it and transfer it to short-term memory.

Short-Term Memory

Short-term memory holds information acquired from sensory storage for a few seconds—just long enough to dial a phone number or record a lecturer's words in your notes. This level of memory is limited both in time span (less that 20 seconds) and in capacity (5-9 bits, or chunks, of information at a time). While in short-term memory, the mind assesses the value of the information. Data that is judged to be of little or no value is quickly forgotten. Information that is judged as being significant is rehearsed. At this point, you may form the illusion that you permanently possess the information in your memory. This is because your attention is

temporarily focused on it, and you can easily recall it at that moment. You may actually even recite the information, which makes you even more confident in your assumption. We deceive ourselves in this because as much as 90% of the data held in short-term memory is lost after a brief time.

Long-Term Memory

The transfer of information from short-term to long-term memory is a crucial step in learning. Long-term memory is your permanent stockpile of information. Some researchers say that data may be retained here until the brain expires. This storage is nearly unlimited in both span (time) and capacity, unlike short-term memory.

Occasionally this transfer from short to long-term memory takes place with no effort, especially when a strange experience or powerful emotion is involved.

More often in academic learning situations, though, you will need to make a conscious effort to store information in such a way that it will be retrievable when you need it. The manner in which data is stored affects its availability to you.

HOW TO GET INFORMATION INTO LONG-TERM MEMORY

There are many principles of learning that relate to this vital step—transferring information into long-term memory. Underlying these techniques is a basic fact: you will remember only what you intend to remember. Your interest in the material becomes vitally important. You cannot store something over the long haul unless you have identified it as something worth remembering. So your first step is to connect to the material being delivered—to want to remember it. Secondly, the material must be meaningful to you. If you don't understand it, you won't remember.

Once you have decided to remember something that makes sense to you, you will need to rehearse it to store it in long-term memory (refer to diagram on page 6). Following are strategies that will work well for you:

1. **Association.** This learning principle allows you to connect new with previously learned or familiar information. This is one of the basic ways humans learn—relating the known to the unknown. We first learned to build concepts in this way, and we continue to learn this way as adults. For example, in college you learn that a department head is like a principal, a word processor is like a typewriter, a communications skills course is like an English class, etc. With experience, you begin to see the differences, but it is the initial connection that allowed you to store the information. Finding these connections will open your mind toward receiving new data.
2. **Categorization ("chunking").** This principle relates to restructuring material into meaningful groupings. By reorganizing the information it becomes easier to recall. This is why students often make a separate study sheet for terminology presented in the chapter. By forming a

"vocabulary" category, you can efficiently complete that kind of study task before going on to another.

In the same way, try grouping concepts. One way you can do this is to classify your lecture and textbook notes by category. This is called synthesizing information and refers to separating topics in each source. This process organizes your mind toward remembering. Rather that getting "mind spray" by reading each source through repetitively, you will be able to focus entirely on each topic in isolation. When each category is fully meaningful and stored in memory, you can begin to see interrelationships among topics.

3. **Visualization.** The left hemisphere of the brain is generally believed to control your logical and verbal processes. The right hemisphere controls your visualization. Reading and writing are primarily left brain processes. If you can engage your right brain as well as your left in learning, you will expand the channels to memory.

   Approximately 80% of what the brain interprets is visual. It remembers what it sees more easily than what it hears or experiences through other senses. To profit from your strong visual memories, you can create mental images as you study. For many students, these images are far more memorable than words. You can also create diagrams, charts, clusters, and graphic organizers to allow your right brain to assist you. Finally, using the graphic aids provided in your textbooks and by your instructors will help to engage your right brain. You will notice how memorable your shop, lab or clinical experiences are because we tend to mentally visualize what we have experienced physically.

4. **Consolidation.** Our minds make every attempt to organize new information to make it fit with previously stored data. This begins to occur as you hold information in short-term memory to take notes. It also occurs when you have stopped studying and your mind continues to "mull over" what you have learned. This often happens subconsciously as a special service provided by your brain. You begin to incorporate ideas into your memory automatically.
5. **Elaboration.** This principle relates to your thinking about and reacting to the content. Here you expand on the information, evaluate it, or apply the ideas to your own reality. You can do this by asking questions, thinking about the long-range implications of an idea or a process, finding exceptions to rules, and locating similarities and differences.

   For example, a business student may use the principle of elaboration while learning about "discounting" in the following ways:

   a. Think about situations in which I have received these discounts.
   b. Consider the effects of discounts on profit.
   c. Compare types of discounts.
   d. Consider what type(s) of discounts particular businesses may offer.
6. **Mnemonic devices.** These are deliberate tricks you can use to remember information that has no apparent logic or order. A few examples of mnemonics follow:

   a. <u>Rhymes.</u> "30 days hath September, April, June, and November…"
   b. <u>Words.</u> "Roy G. Biv" stands for the colors of the spectrum - red, orange, yellow, green, blue, indigo, violet.

c. Sentences. "King Paul called out for Gus and Sam" represents the identification categories of living things- Kingdom, phylum, class, order, family, genus, and species. And, since words are generally easier to recall than numbers, the sentence "can I remember the reciprocal?" leads you toward recalling the reciprocal of pi(0.318310). Each word in the sentence has the same number of letters as its position in the number list.

d. Gimmicks. There is a "science" to spelling "conscience".

e. Anagrams. The Chicago Police Department once developed an anagram to help officers remember what steps to follow when called to the scene of a crime. The officers' responsibility is to make a preliminary investigation by following the procedures below. Notice the word that is spelled by the first letters of the steps in the procedure.

P - Proceed to the scene

R - Render assistance to the injured

E - Effect the arrest of the perpetrator

L - Locate and identify witnesses

I - Interview complainant and witnesses

M - Maintain the scene and protect evidence

I - Interrogate suspects

N - Note all conditions, events, and remarks

A - Arrange for collection of evidence

R - Report the incident fully and accurately

Y - Yield responsibilities to detectives

(Police Administration, Wilson and McLaren, p. 353.)

7. **Drill and Practice.** This is the "old" way of remembering. Recent research has continued to support it as a method that works toward storing information in long-term memory. Common methods used for drill include flashcards, repetition, recitation, question and answer sessions, and computer-assisted instruction.

Assignment #2: Experiment with…

1. **Sensory storage.**

   What is in your sensory storage right now that you will allow to decay? That you will transfer to short-term memory? To long-term memory?

   Decay:

   Transfer to short-term memory:

   Transfer to long-term memory:

2. **Association**

   List three occasions when you have used this approach to remembering.

   1.

   2.

   3.

3. **Mnemonics**

   Describe three mnemonic devices that you have used.

   1.

   2.

   3.

4. Visualization

Give three examples of mental pictures that have remained in your memory from recent course activities.

1.

2.

3.

5. Active learning

Give three examples of times when you have remembered something because you have actually done it.

1.

2.

3.

STUDY TECHNIQUES TO INCREASE MEMORY

1. Take notes. This practice requires rehearsal, meaningfulness, and it makes learning physical. This is one of your most valuable memory tools.
2. Overlearn**.** During the early stages of studying, keep going even when you think you have mastered the material. When you think you have memorized something, review it in at least two more study sessions. This will prepare you well for relearning at later reviews. Overlearning, incidentally, is the best way to combat test anxiety.
3. Study for short intervals. Spend about 25-45 minutes at a time on intensive study. Then allow yourself short rest periods. This will ensure concentration and transfer to long-term memory. Your brain will continue rehearsing during study breaks.
4. Study different subjects in succession. We tend to forget information more easily when we are considering two similar bits of material. For this reason, it is wisest to study for two different courses in one lengthy session than two similar courses. For example, studying for Introduction to Business followed by Principles of Management makes less sense than following the former with Accounting I.
5. Review within the first 24 hours. We tend to forget more during this initial time period that at any other time. By scheduling a review soon after learning has occurred, you can minimize this loss. Numerous studies have documented that review immediately following learning increases retention.
6. Review periodically. Return to and quickly review previously learned material on a regular basis. Unless you do this, you are likely to forget

and have to relearn before final examinations. If material is reduced and organized (through highlighting, notes, outlining, mapping, summarizing, categorizing), this step will not be difficult or time consuming.

7. Review before sleep. This will allow your mind to subconsciously assist you in the memory task.
8. Review right before a test. This relates to the fact that new learning will interfere with material recently learned. If you are well-prepared for an exam but have a couple of classes to attend before testing, you run the risk of becoming confused as new data interferes with data you are maintaining at the “tip of your mind”. Spend a few minutes right before the test to do a final review to reinforce material studied in preparation for this event.

WHY FORGETTING OCCURS

Forgetting, or the loss of information stored in memory, is a normal, everyday occurrence. It happens because other information interferes with or prevents you from recalling the desired information. Psychologists have extensively studied the rate at which forgetting takes place. For most, it occurs soon after learning, then levels off over time.

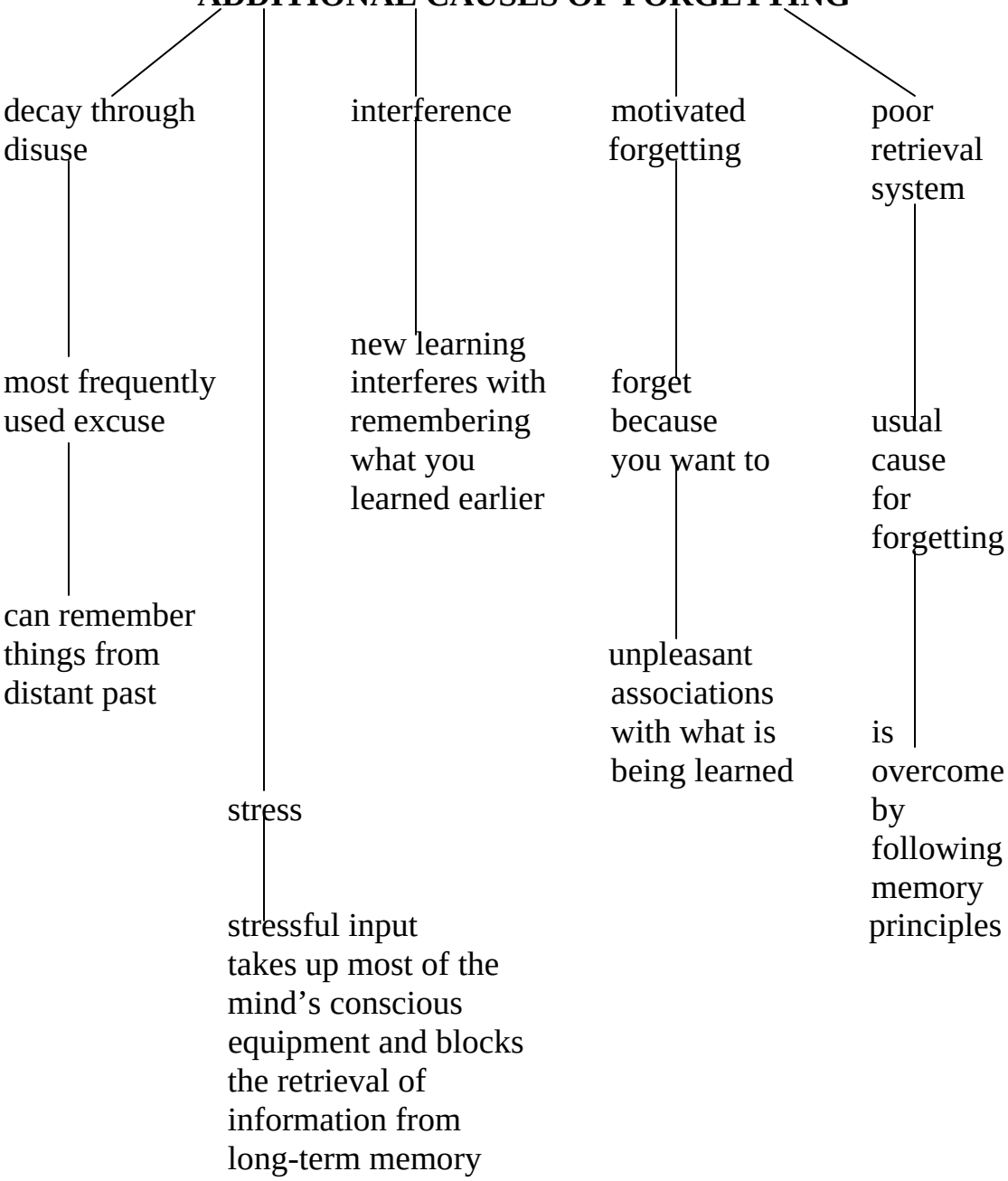
Each reading, study, and memory technique that has been presented is based on learning and memory principles. If followed, they will positively impact your rate of forgetting. To remember what your instructors expect of you (as well as what you expect of yourself), you must impact this curve.

Our memories of events are very personal things. They don't usually remain untouched in our minds. We generally fill in missing details or alter them to fit with questions and suggestions from others. We have no way of retrieving the original memory, and we are not usually even aware that anything has happened to it. We constantly revise our memories or our lives to harmonize with events that continue to happen to us. We become unable to distinguish between what <u>really</u> happened and what we now <u>think</u> happened, since the original memory no longer exists.

Another way that we all experience forgetting relates to our ability to recall names. We file words and names in memory in several ways: by meaning, by initial sound, by mental image, etc. With infrequently used words or names, these cues may not supply enough information to lead us to the word we want when we want it. So we often forget someone's name or "just the right word" because we failed to develop a strong enough cue system to retrieve it.

Forgetting, as it relates to material actively learned also happens for the following reasons:

ADDITIONAL CAUSES OF FORGETTING



MEMORIZING

Memorizing has its place. It is useful to memorize poems and dates. But memorizing has little potential as a strategy to get information into long-term memory. Reciting a list of words or numbers is not the same as knowing the material. It is easy, however, to convince yourself that you know something when you have really only memorized it.

Most material needs to go into long-term memory in a systematic, meaningful way. Forcing data in by incessant drill will often lead to not being able to retrieve it when you need it.

It was formerly believed that memory is a "muscle" that can be strengthened, like any other muscle, with exercise. Today researchers talk about memory cells, which store memories in the brain. To store information in these "cells", data must be transferred to long-term memory through associations, categorization, recording, elaboration, visualization, consolidation, mnemonics, and drill.

Verbatim memorization relies on your ability to learn and recall an author's or speaker's original words with few or no substitutions. This is, for all practical purposes, impossible most of the time. It is useful only for a limited number of very specific memory tasks. If you are faced with lists of unrelated facts and random numbers that have no internal logic or organization, you will need to resort to memorizing.

In-depth remembering makes the author's or speaker's original words less important that the concept those words express. It is a search toward storing substance (meaning) rather than the surface level of language.

Assignment #3

Directions: Summarize what you remember about each of the headings from packet. Make a statement about how you can apply each topic to a course you are currently taking.

Introduction:

Why people learn and remember:

Short-term memory:

Long-term memory:

How to get information into long-term memory:

Association:

Categorization:

Visualization:

Consolidation:

Elaboration:

Mnemonic devices:

Drill and practice:

Study techniques to increase memory:

Why forgetting occurs:

Memorizing: