

Memory and Retrieval of Information

Have you ever spent hours studying only to have difficulty remembering information during the exam? This is a common occurrence among students, and it is caused by study habits that fail to transfer information into long-term memory. The Information Processing Model shows that remembering is hard work, with work being the key word. In order to be able to

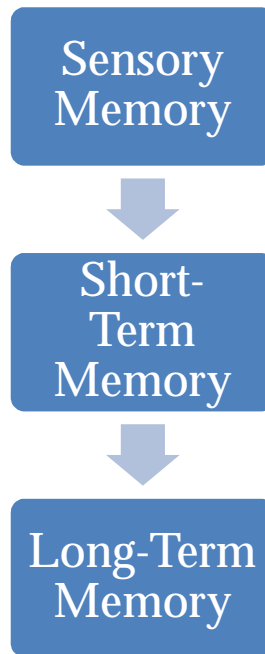
remember what you are studying you must use strategies that help you actively “work on” the material, e.g. organizing, repeating information, and quizzing yourself. This is the most efficient way to transfer information into your long-term memory in an organized way so that it can be retrieved during an exam.

Steps to Forming Memories

Sensory Memory

Your senses are always busy – numerous stimuli are constantly bombarding the sensory receptors in your eyes, nose, ears, tongue, and skin. However, you are not aware of all of this activity because the unimportant stimuli are quickly forgotten. What is the advantage of quickly forgetting this multitude of information? Research has shown that humans can only pay attention to one cognitively demanding task at a time. Imagine if your brain gave full attention to every smell or sound detected by a receptor. You would never be able to concentrate!

When you decide that you want to remember information, it must be moved into the Short-Term memory for processing. However, in order to make this transfer, you must encode the information, i.e. you must make it meaningful.



Long-Term Memory (LTM)

After being processed in the Working Memory, information is transferred to the Long-Term Memory.

The degree to which you work on the information in your WM also affects how it is stored in your LTM. Information that you work on and study a lot will be well “filed” in your LTM. It will be easy for you to locate this “file” during an exam, for example. Information that is only worked a little will not be “filed” well in the LTM, and you will have difficulty retrieving the information.

This underscores the importance of developing and using active memory strategies when studying. These strategies help you organize the material in your working memory so that it can be effectively stored in the LTM.

Short-Term Memory (STM)

The STM is divided into the Immediate Memory (IM) and the Working Memory (WM). Once encoded, information is transferred into your IM where the information that you are currently thinking about is stored. You can remember only a limited amount of information in the IM, and you can remember it for only about 20 to 30 seconds without continual rehearsal. For instance, if you need to remember a phone number as you walk across a room to find a piece of paper and pencil, you usually will repeat the number over and over, i.e. continually rehearse it. If you did not do this, you most likely would not remember the number once you reached the other side of the room.

In order to transfer information into your long-term memory (LTM), you must first move it from the IM into the WM. This part of your STM is appropriately named because you must actively work on the material in order to transfer it into LTM. The harder you work on the material by means of active study strategies, the more likely it will make it to your LTM. If you have ever studied for a test by just reading over the material a few times, you have realized that this is not a very effective study strategy. Just reading the material is not enough to get it into your LTM because when you read, much of that information never makes it past the IM into the WM.

General Memory Strategies

What steps should you take if you are having trouble moving information from your working memory to your long-term memory? As the name implies, you must “work on” the information in your working memory in order to transfer it into the long-term memory. Featured below are some simple strategies that, if practiced, will help you retain information and, ultimately, do well on exams.

Spaced Practice

- Spaced practice is the opposite of cramming.
- It involves spacing your study time over a long period of time. Instead of studying the night before an exam for eight hours, study for two hours a day beginning four days before the exam.
- This allows the information to consolidate in your long-term memory.
- Spaced practice also leads to the information being better organized in your long-term memory.

Break Tasks Down

- Breaking tasks down complements Spaced Practice.
- Instead of cramming by studying all material during one long study session, study only one or two chapters during shorter, spaced study periods.
- This practice will help you stay focused because you do not feel rushed to learn all of the material at one time.

Overlearning

- Overlearning involves exactly what the name implies – continuing to work on the material even after you have learned it.
- This practice improves your memory of the information. As you review the learned material in other ways, you form new associations that can help you when recalling the information.
- If you suffer from test anxiety, overlearning is something that you should do for every test. Anxiety interferes with your ability to recall information. However, overlearned information is so firmly embedded in your long-term memory that it not as susceptible to anxiety.

Repetition

- When you learned how to ride a bike, or shoot a basketball, or play a musical instrument, did you master the skill after only one practice period? Your answer most likely is no.
- In order to master something you have to practice repeatedly. This is the same for studying.
- If you want to master your material, you must practice it.
- Remember this phrase: write, recite, and think. If you do those things you will find that more of that information makes it into your long-term memory.

Specific Memory Strategies

Rehearsal
Acronyms
Acrostics
Associations

See additional handouts for details

Mnemonic Devices

Mnemonic devices are techniques that allow you to form associations with the material that you are learning. If you use the mnemonic correctly, then you should remember the mnemonic and the associated information. Mnemonics are especially useful for

remembering information that is not well structured. It provides that structure that the information is lacking so that it can be stored in your long term memory in an organized way and be retrieved when needed (like on a test).

1

Acronyms

NASA, FBI, and MBU are acronyms, or words that are made up of the first letters of other words. Acronyms can help you recall lists of information.

For example, the three branches of government are Executive, Legislative, and Judicial. You might want to arrange the words so that your acronym is JEL (Judicial, Executive, Legislative). Thinking about your acronym will help you to remember your list.

2

Acrostics

Acrostics are also called catchphrases. A catchphrase is a sentence made up of words beginning with the first letters of other words.

For example, instead of remembering the National Aeronautics and Space Administration by the acronym NASA, one could remember the catchphrase No Astronaut Stays Around. On the test, you can reference this catchphrase to help you remember that N in "No" stands for National, A in "Astronaut" stands for Aeronautic, S in "Stays" stands for Space, and A in "Around" stands for Administration.

Catchphrases are very useful information that may not form an easily remembered acronym. It is also useful for steps in a process, causes and effects, and key points for essay questions.

3

Associations

Sometimes closely related information (even if it is simple information) can cause more confusion than you would expect. Forming associations between this information and something that is easy to remember can help trigger your memory during an exam.

Think about longitude and latitude. Did you ever have trouble distinguishing between these two concepts? An example association to help you remember might be to relate the letter "n" in longitude to the word north. Thus, when you see the "n" in longitude, you will associate it with north and remember that longitude lines run north to south. Similarly, you might want to remember that "lat" from latitude rhymes with flat, i.e. the lines appear flat or horizontal when viewed on a map.

4

Use mnemonic devices correctly

In order to successfully use a mnemonic device, you must use high level rehearsal strategies to learn the information corresponding to the mnemonic. The mnemonic is only used to retrieve the information once you have learned it. For example, NASA does not have any meaning unless you have used rehearsal strategies to learn that it stands for National Aeronautics and Space Administration.

Rehearsal Strategies

Rehearsal means practicing the material until it is learned. This is a very necessary component of studying. If you do not repeatedly practice the material, it is less likely to transfer into long term memory, and you will have difficulty remembering it during the exam. There are two types of rehearsal strategies: low-level and high-level.

Low-Level Rehearsal

Examples

- Reading over the material a few times
- Repeating the information over and over
- Copying the material several times

Useful for:

- Recalling short lists
- Easy-to-recall information

Misuse Alert

- Low-level rehearsal is not very useful in many college-level courses.
 - The amount of material and the difficulty level necessitate the use of high-level rehearsal strategies.
- If you do not understand the material, low-level rehearsal will not help you remember it.
 - For example, read the following sentence three times, close your eyes, and try to repeat what you read.

El hombre dijo hola a la mujer en la calle.

- If you are not fluent in Spanish, you probably were not able to remember the whole sentence. This is because you did not understand the meaning of what you read.

High-Level Rehearsal

Examples

- Outlining
- Predicting test questions
- Creating:
 - Charts
 - Concept maps
 - Self-tests
 - Study Sheets
- Explaining material in your own words

Useful for:

- Making material meaningful to you
- Remembering difficult or complex material

Why High-Level Rehearsal Works

- When using high-level rehearsal strategies, you are working on the material by:
 - Identifying what you know and what you need to work on
 - Organizing the material in a meaningful way
 - Creating additional cues that can help you locate the material in your long-term memory