

Memory Techniques

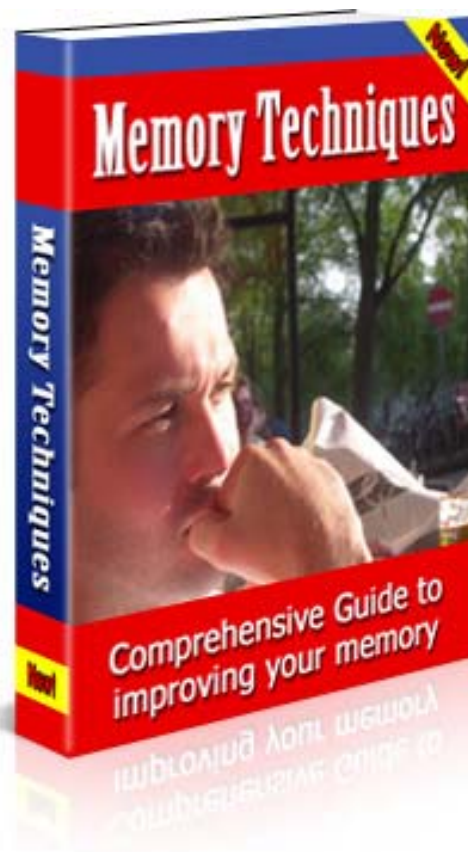


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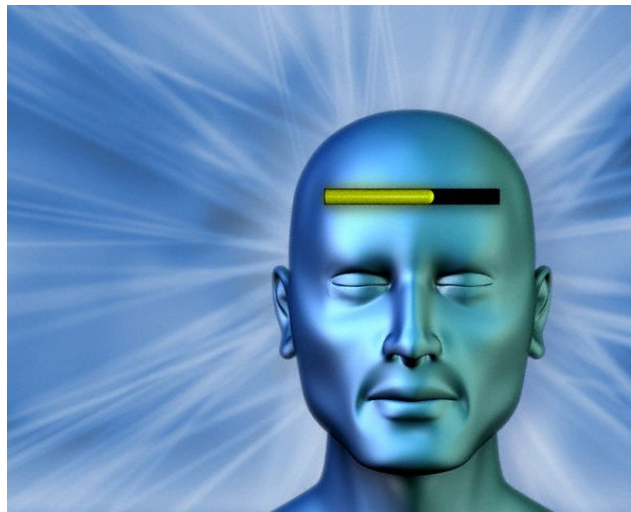
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Human Memory [An Introduction]

**" Memory is the cabinet of imagination, the treasury of reason,
the registry of conscience and council chamber of thought "**

I keep in mind my mother's vegetable backyard when I was a kid, callus plants tall like skyscrapers. I remember whilst I knocked down of a tree and everybody from the neighbor's grill hurried over to observe if I'd wrecked a bone. memorize, memorize... the verb itself is elegiac. The idea of reminiscence is so exciting that we've approach with additional descriptions for it than for any other cerebral experience.



Early hypothesis envisage a memory "engram," a truthful manuscript written by the body to explain long-ago experiences. Freud popularized descriptions of reserved memoirs, experiences actually obscured in the pits of the intuitive. Contemporary descriptions are conquered by correlation to computers, in which the individual mind is a hard disk that stores practice in electronic archives and folders. Distinctive of biology, the fact is at formerly more intricate and extra stunning than any of these metaphors.

How does the brain stock up information? What type of reminiscence do people have? How simple is it for you to memorize certain things? It's thought that humans have two main sort of memory: short-term and long-term.

Scientists do not yet recognize numerous stuff about human memory and many of the thoughts and hypothesis regarding it are still fairly contentious. The subsequent argument stresses a few of the more extensively decided upon thoughts. For instance, most scientists agree that it is very useful to describe human memory as a set of STORES which are "places" to put information, plus a set of PROCESSES that that act on the stores.

A very simple representation may include 3 different stores:

- The Sensory Information Store (SIS)
- The Short-Term Store (STS)
- The Long-Term Store (LTS)

and 3 processes

- Encoding (putting information into a store)
- Maintenance (keeping it "alive")
- Retrieval (finding encoded information)

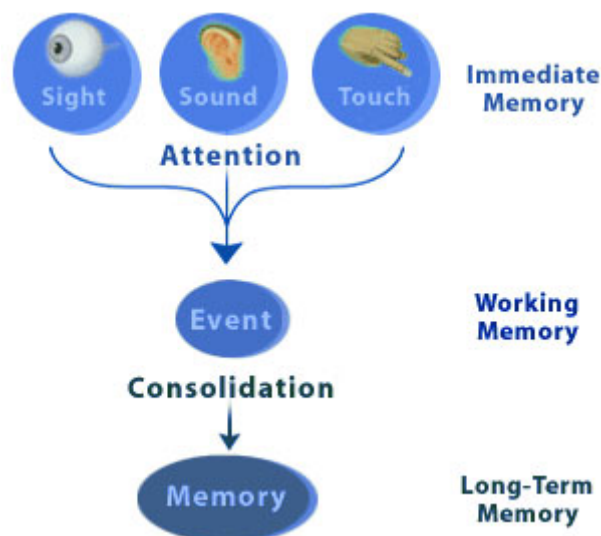
A hypothesis of human memory ought not only identify a set of procedures and stores, but also be able to help out answer questions such as how long it will take to recover reachable information and when information will be forgotten. To do this, the hypothesis must identify specifications of the processes and stores.

--- in other words, a highest amount of information that it can clutch at a certain point in time. If we recognize a store's capability and what occurs when that facility is surpassed, we will be capable to envisage that certain information will be forgotten at specific times.

How Memories are Made

The majority people consider that their memories get inferior as they get older. This is true only for people who do not use their memories properly. Memory is similar to a muscle, the further it is used, the healthier it gets. The more it is abandoned, the poorer it gets.

Memory works by creating links among information, fitting details into psychological compositions and frameworks. The more you are vigorously remembering, the more facts and frameworks you hold, the more extra facts and ideas will slot easily into long term memory.



Whilst in learning, the majority public have to utilize their reminiscences intensively - just to keep in mind details and pass exams. Whilst public leave full time education, they lean to end to utilize their memory as vigorously, and so it begins to get flabby.

Modern computers program memory as a enormous range of self-governing, digital bits of information that are "randomly reachable." Functionally, this means that your computer can carry up your best friend's phone number without accessing any information regarding what your best friend seem like or how you convene. The human brain stores memory in a very different way; recalling your best friend's phone number may very well bring to mind your friend's face, a pleasant conversation that you had, and the title of the movie that the two of you are going to see. While computer memories are discrete and informationally simple, human memories are tangled together and informationally complex.

Our memories are rich because they are formed through associations. When we experience an event, our brains tie the sights, smells, sounds, and our own impressions together into a relationship. That relationship itself is the memory of the event. Unlike computer memories, a human memory is not a discrete thing that exists at a particular location; instead, it is an abstract relationship amongst thoughts that arises out of neural activity spread over the whole brain.

But how is the memory relationship actually made? The process from both a biological and a behavioral perspective is critically dependent on reinforcement. Reinforcement can come in the form of repetition or practice; we remember that two plus two equals four because we've heard it so many times. Reinforcement can also occur through emotional arousal; most people remember where they were when they heard that John F. Kennedy was shot because of the highly emotional content of that event. Arousal is also a product of attention, so memories can be reinforced independent of context by paying careful attention and consciously attempting to remember.

Remembering a New Face

Reinforcement is important in forming memories because it moves the memory relationship from short-lived categories to longer-lasting ones. For example, if you met a man called John Byrd at a party, you'd see his face, hear his name, and you'd be aware of the social context of the event. At first this information is loosely held in immediate memory, just long enough for the event to play itself out. Immediate memories are held in various modality-specific regions of the brain, meaning that immediate visual memory is probably held in visual parts of the brain, immediate auditory memory in auditory parts of the brain, and so on.

If you paid attention during the introduction, the relationship between sight, sound, and awareness is brought together into working memory, somewhere in the prefrontal lobe of the brain. When the event moves from immediate memory to working memory, certain features will be lost. You probably won't remember background conversations from the party, and you may not remember the color of the Mr. Byrd's shoes. The loss of distracting information is an important feature of human memory, and is critical for efficient storage and recollection of experiences.

At this point you might rehearse the event by saying the name to yourself, or by making up a mnemonic (John Byrd, who has a big hook nose like a bird). The

mnemonic and the rehearsal cause the memory to move from working memory into long-term memory, a change that starts in the brain's hippocampus. The process of converting working memory into long-term memory is called consolidation, and again, it is characterized by the loss of distracting information. Several days after meeting Mr. Byrd you may not be able to remember what color his tie was or whether he wore a wristwatch, but you will still remember his face, his name, and the person who introduced you to him. The consolidation phase of memory formation is sensitive to interruption; if you are distracted just after meeting Mr. Byrd, you may have trouble remembering his name later.

So to recap, the event of meeting John Byrd started out in immediate memory, spread out in various modality-specific regions of the brain. Reinforcement through attention caused the relationship between sight, sound, and context to consolidate into working memory in the prefrontal lobe. Further reinforcement through practice caused more consolidation, and the most critical relationships in the event (the name, the face, and the context) were tied together in the hippocampus. From there, the memory relationship is probably stored diffusely across the cerebral cortex, but research on the actual location of memory relationships is still inconclusive.

Why Memory Doesn't Work!

Another reason for memory getting apparently worse is that outside academia information tends not to be as clearly structured as it is in education. The clear presentation and organization of a good lesson or training course provides a structure that is almost a mnemonic in its own right. Where information drifts in as isolated facts, it will normally be forgotten simply because it is not actively fitted into a mnemonic.



Again, as people grow up they are trained out of spontaneous, imaginative behavior: most peoples' jobs depend on them being predictable and reliable far more than on them being imaginative. An important feature of memory, though, is the imagination that allows you to construct the strong mnemonic links between things to be remembered and the cues for their recall. Of course be reliable, but keep your imagination fresh at the same time!

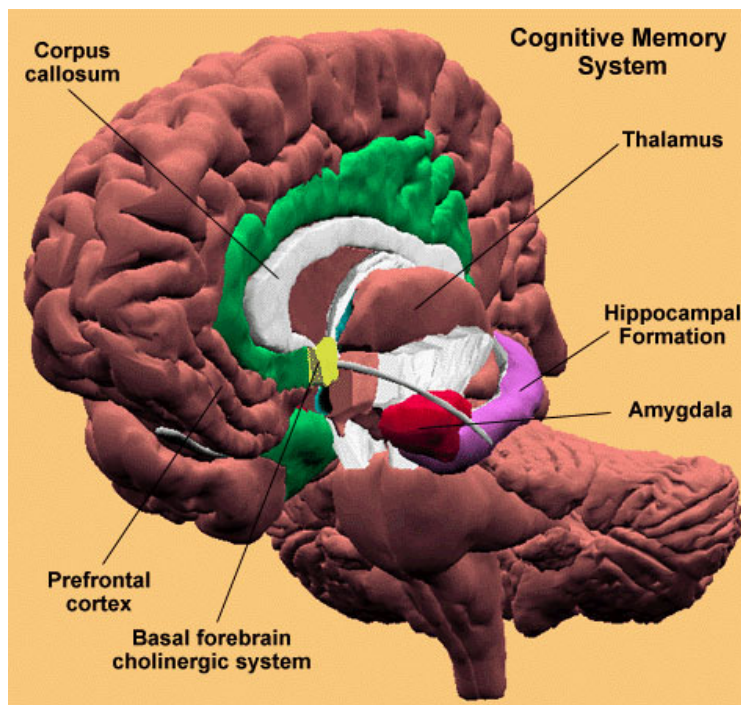
So memory in most people does get worse with age, but only because it is allowed to. By continuing your education throughout your life, by cultivating your mind and keeping it open to new experience, by actively fitting facts into clear and flexible frameworks, and by keeping your imagination working, your memory can get better and better as you get older.

Doing this not only gives you a better memory: think how many times you have heard this message in connection with other self-improvement methods! An important thing to realize is that different people learn in different ways. The way in which people learn is often a factor determining the subjects they choose to study, instructors they relate to, and careers chosen in life.

Memory Stores

Sensory Information Store (SIS)

In the relatively simple model of memory presented here, sensory information (from eyes, ears, etc..) enters the Sensory Information Store (SIS) and is either ignored or paid attention to. Ignored information doesn't last very long. New perceptual information quickly writes over (masks) the old, a process sometimes described as "interference." Attended information is not only protected from interference, it is processed by higher-level mechanisms that figure out what it means. For instance, information in the SIS might indicate a bright red object somewhere ahead. Attending to this information might reveal that there it is a stop-sign. Once information is processed in this way, it can be encoded into the short-term store (STS).



Short Term Store (STS)

Usually, the STS is described as having a limited storage capacity (seven, plus or minus two items) that "decay" and become inaccessible after a relatively brief interval (estimates range from 12 to 30 seconds). In addition to decay, loss of information from the STS can occur by interference when new information displaces older information. Interference does not always cause information to be lost, but may instead produce memory retrieval errors in which one recalls information that is similar to but not identical with that which is needed.

Short-term memory is housed in the hippocampus. This organ, extending from the midbrain hypothalamus like a horseshoe, is considered the temporary storage unit for short-term memory and a vehicle for long-term memory.

While Ebbinghaus studied retention over long intervals, later experiments studied memory loss over periods of seconds to minutes. Short term memory was postulated to explain temporary retention of information as distinct from long term retention of information. Short term memory acts to also store current sensory information and to rehearse new information from sensory buffers. It has limited capacity (Miller's 7 plus or minus 2). The probability of encoding in Long term memory has been directly related to time in short term memory.

It is now believed that the loss of information stored in short term memory has the same characteristics as loss of information stored in long term memory. It happens quicker because it involves information that is not learned as well. What we call the learning process is transferring information from short term to long term memory and is a physiological process.

Information can be maintained in STM for relatively long periods using maintenance rehearsal (MR), a term describing the act of mentally (sub vocally) repeating the information to be maintained. In many cases, the reason one wishes to maintain information in the STS is to allow time for it to be encoded into the long-term store (LTS), and thus become more permanently available. However, maintenance rehearsal does not appear to be very efficient way to get the memory into long-term memory. Another memory maintenance technique, elaboration rehearsal (ER) seems to work better.

Long Term Store (LTS)

Long-term memory can store a very large quantity of information and can maintain that information for very long periods of time. It holds many different kinds of information including: facts, events, motor and perceptual skills, knowledge of physical laws, spatial models of familiar environments, attitudes and beliefs about ourselves and others, etc. Many different factors seem to affect the difficulty of accessing a memory in the LTS. These factors include: the similarity between current conditions and those that existed when the memory was stored, how recently the memory was last used, its degree of inter-relatedness to other knowledge, its uniqueness relative to other LTS information, and so on. Much scientific research remains to be done to specify the effects of these factors in detail and to determine the mechanisms by which they produce their effects.

Along with the amygdala, the hippocampus also passes on certain memories to the cerebral cortex for long term storage. The amygdala appears to play a large role in the memory of emotional experience. Research indicates that long-term memories are not stored in one specific place, but are stored throughout the brain as associative images. The best research done to date on this has been by Karl Pribram who believes that the brain acts as a holographic instrument able to take bits of information and construct the whole from these fragments of memory.

A simple observation: We often need to recall information that we learned long ago. How quickly and reliably we recall it depends on:

Activation: How long since we last used the information.

Strength: How well we have practiced it.

Experimental Evidence: (Anderson 1976) - Subjects learn some sentences. Some sentences are studied twice as long as others. Subjects must discriminate sentences they learned from distracters. They are tested for each sentence more than once, with varying intervening sentences. Results: Both amount of study and how recently the information was accessed affect speed of response. However amount of study matters only if the information was not recently accessed (an interaction effect).

Delay (number of intervening items)	Less Study	Degree of Study More Study
Short (0-2)	1.11 seconds	1.10 seconds
Long (3 or more)	1.53 seconds	1.38 seconds

Memory Processes

Encoding

Encoding is an active process. It requires selective attention to the material to be encoded. One question is at what point in the process is the distracting material screened out:

early: Broadbent (1958) binaural v dichotic listening

- **Binaural** (2 messages but heard with both ears)...difficult to recall
- **Dichotic** (2 messages, one heard by one ear, other by other ear)...much easier to recall one message and ignore the other

However, cocktail party phenomenon suggests a late filtering. All messages are registered but only the ones with meaning are actually put into memory. Another possibility is that where the filter occurs depends upon the task. The more attention capacity that is available at any one time, the more one can use meaning and then the later input filter (selection) (Shiffrin, 1988).

Memories may then be affected by the amount or type of attention devoted to the task of encoding the material. There may be different levels of processing which occur and that some are deeper than others, but there is no definition for what is meant by "deeper" structural encoding (emphasis on the physical structural characteristics of the stimulus) is a shallow level.

Phonemic Encoding (emphasis on the sounds of the words) is an intermediate level
Semantic encoding (emphasis on the meaning) is considered deep processing

Some other aspects of encoding are as followed:

Elaboration=associating with other information

Visual Imagery can be used to add richness to the material to be remembered (also adds more sensory modalities)

Maintenance

Do we forget because the information is gone, or do we forget because we can't access information that is still there? It is difficult to distinguish the two. However, there is evidence that we retain more than we can retrieve.

Experiment: (Nelson 1971) - Learn paired associates (numbers to nouns). Tested 2 weeks later to see which were remembered. Then given new material to learn that had some of the forgotten numbers, both with and without their original nouns.

Results: Subjects relearned the original associations faster (in spite of the fact that they could not recall them). Subjects relearned the original associations faster (in spite of the fact that they could not recall them). This suggests that some associative information was retained. One possible interpretation: strength of memories decay gradually. If these strengths fall below a certain threshold, we can't recall the information, but the remaining memory trace is still there to facilitate relearning.

Is forgetting due to decay of unused information, or to interference of new information with old information? Different kinds of evidence are offered for each position.

A survey of forgetting research concluded that the rate at which we forget information usually conforms to a power law: we forget a lot at first, but over time the rate of forgetting diminishes.

Decrease in long-term potentiation follows a similar power law. These facts are interpreted by some as evidence for a physiologically determined decay rate.

Interference Experiments Typical Experiment (A-D C-D paradigm):

Subjects all learn A-B association (between items on list A and items on list B). Experimental subjects learn A-D associations (which use the same stimuli items as the A-B associations), while control subjects learn C-D association. Everyone is tested on A-B associations.

Typical Results: Experimental subjects take longer to learn their second set of associations than controls, and make more errors on the A-B test. Experimental subjects take longer to learn their second set of associations than controls, and make more errors on the A-B test. These results are interpreted as evidence that learning new associations to stimuli causes forgetting of old associations. However, interference does not happen with factual material when the additional facts are redundant with (e.g., causally related to) the original facts.

Fan Effect (a model) - Interference effects can be modeled as weakening of spreading activation over multiple links in a propositional network.

Stimulus activates concept nodes.- Fixed (limited) amount of activation spreads from activated nodes over associative links, divided equally between links. (Hence the more links, the less activation per link.) Activation converges at propositional nodes (candidate responses) until one emerges as the answer. Time to identify the response is inversely related to level of activation.

Decay or Interference? Some claim that interference can produce the appearance of decay although it appears, both mechanisms are involved in forgetting or memory loss.

Retrieval

It is well established that people make inferences during retrieval, and believe that they saw or heard things that they in fact did not. People are more likely to erroneously think they read a sentence if it is an implication of something they read.

Effect of Prior Knowledge - People add other knowledge they have about the material studied.

Effect of Question Wording - Subjects shown film of automobile accident. Subjects asked: Did you see a broken headlight? or Did you see the broken headlight? (There was actually none.)

Results: Subjects more likely to respond yes to the broken headlight. Implications for courtroom testimony!

Canadian neurosurgeon, Wilder Penfield, was probing the temporal lobes of patients plagued by epileptic seizures when he discovered that touching certain parts of the brain caused the patient to remember vividly previous experiences.

In Penfield's words the memories he discovered as he probed the patient's brain were, "They were electrical activation's of the sequential record of consciousness, a record that had been laid down during the patient's earlier experience. The patient "re-lived" all that he had been aware of in that earlier period of time as in a moving-picture 'flashback'." Because I am blessed with an eidetic memory, this is exactly what I experience when I choose to remember something perfectly. I simply allow myself to return to the original experience and it comes back completely refreshed. Penfield also concluded with his experiments that the brain stores everything its owner has ever experienced in its original form. Sigmund Freud also believed that, "in mental life nothing which has once been formed can perish." Everything you've ever experienced is there in the subconscious.

Another Way to Categorize Memory

Another way to categorize memory is to divide memories about what something is from memories about how something is done. Skills like catching a baseball or riding a bicycle are called **non-declarative memories** because we perform those activities automatically, with no conscious recollection of how we learned the skills.

Declarative memories, on the other hand, are memories of facts and events that we can consciously recall and describe verbally.

Categorizing memory temporally and functionally makes sense from the clinical and biological perspective; patients with various amnesias may have difficulty with one particular type of memory and not with others. Moreover, scientists have discovered that different brain structures are specialized to process each category of memory, suggesting that these categories are not merely convenient for discussion, but are based in the biology of how we remember. Understanding how memories are formed in each category and how some memories move amongst categories can help to focus strategies for improving memory and learning.

Creativity and Memory

Creative thought could not exist without memory. Though creativity is usually thought of as a spontaneous original response, the ability to remember one's past experience and use it as a springboard for new potentials is necessary. Without a clear understanding of what is already known, how could you know that you'd discovered something unknown? This is especially the case in problem solving. Creative artistic inspiration draws more on aesthetic considerations. Yet both are dependent upon the remembrance of known experience as a platform for new creations.



You realize that if you can learn to be consciously present in each moment, you will be able to recall anything you chose by simply returning to that moment in thought. Perhaps it is the retrieval process we need to focus on not how to retain certain

memories. If you consider how much information is impinging your brain at any one moment it is staggering. We must select from the continual onslaught of information and impression bombardment what we chose to integrate with our conscious thought. This is why I feel that focused intent is the key to memory retention and retrieval. Though a good sound and healthy brain is necessary for this to function properly.

What this has to do with creativity is that a truly creative person is never handicapped by losing the wisdom of prior experience. What the truly creative mind does is access that certain idea which has already been offered to consciousness. Then become relaxed, open and free to allow anything new that memory has yet to resolve. All problems are solvable if you are patient and know that the solution lies in your intent to find it and your willingness to be open to it.

In summary, three very important things are necessary to enhancing creative thought utilizing previous experience as stored memory. One is that you need a healthy energized brain; two is that you need to be present with interest for anything you chose to remember later, or use for future creative experience and three, a relaxed state of mind is the greatest vehicle for creative thought. A relaxed mind is simultaneous with a light heart. Both conditions will foster spontaneous creativity and make life a joy in the process.

Some Beliefs About Human Memory

There have been many belief systems suggested, to account for the operation of human memory:

Mind is like a video tape

The mind records in very complete detail every event during a person's lifetime, much like a video tape. Retrieving a memory is similar to searching for a scene in a video tape: one selects the correct cartridge, fast-forwards to the episode of interest, and observes the scene. It does not matter how a memory from the past is accessed, whether through direct memory, or with the aid of hypnosis, "truth serum", guided imagery, etc. By whatever method it is accessed, it is exact and reliable.

One example of this belief system occurred during the police interrogation of Paul R. Ingram of Olympia WA. He was charged with multiple cases of Satanic Ritual Abuse. As he was describing one of the abuse scenes, an interrogator asked him what time the rape took place. In his mind, he "zeroed in" on one of the perpetrator's arms and read the time off of his watch dial. Both Ingram and his interrogator appear to have believed in the video camera theory of memory.

This belief system reinforced the recovered memory therapy (RMT) movement, which regards many adult emotional problems as being caused by repressed memories of childhood sexual abuse. Many RMT therapists believe that certain childhood memories are stored precisely and in complete detail in an area of the brain that is normally inaccessible; the memories are repressed. This is sometimes believed to be limited to only sexual abuse memories. However, hypnosis, guided imagery and similar therapies are believed to be able to unlock these memories and recall them in pristine detail as they actually happened.

Mind is reconstructive

Events are imperfectly remembered. Many events are not remembered at all. Some events are remembered initially but later gradually forgotten. A trigger (e.g. an article in a newspaper, a photograph of a friend etc) might bring back a recently forgotten memory. However, most events eventually become permanently lost and can never be retrieved.

It is impossible for the brain to store complete details of every event. It simply does not have the storage capacity to hold that amount of data. Rather, only a minimal amount of information is actually stored in the brain. When we recall a memory, our mind will automatically "flesh out" the recollection by inventing details of the event, based on previous similar experiences. This process is largely unconscious; we are not generally aware of it happening.

One interesting phenomenon can occur when the memory is being recalled as a result of questions by a therapist or interrogator. Their suggestive questions can distort this "fleshing out" process. The mind can add new components to the memory that are unrelated to the original event. Even more interestingly, these distortions will later re-enter the client's memory, and will probably emerge during subsequent recalls.

Mind is distributed through the body

The human mind is not all confined to the brain. It is rather distributed around the body. For example, the foot has an elementary brain that will automatically operate the accelerator of a car in order to keep the car moving at a constant speed without any conscious involvement of the brain. A woman who has experienced severe trauma will store memories of that event in those cells in her body which were involved in the attack. When she suffers a flashback, these "body memories" reconstruct the violence as if it is currently happening to her. This belief system is promoted by some feminists.

Mind is very selective in what it remembers

Jennifer Freyd, a professor at the University of Oregon has formed an interesting theory of the psychological processes involved in human memory. She believes that a repression/dissociation mechanism exists whereby memories of some specific types of abuse are repressed and can only be recovered later through recovered memory therapy. She believes that seriously distressing events will often be remembered continuously into adulthood. So will instances of sexual molestation and abuse. But memories of sexual abuse by parents or other caregivers are often repressed. She believes that the factor that causes the mind to treat these two types of sexual abuse differently is a sense of betrayal in the mind of the child. 2 The rationale is that a child abused by a parent is continually in the presence of the abuser. Each time that they see the abuser, they try to forget the abuse. Eventually, the memory is repressed, and can only be recovered through hypnosis and other similar techniques. Her theories have gained widespread support among adults who believe that they have recovered long-repressed memories of sexual abuse by their parents. They do not seem to have been widely accepted by the therapeutic community and other memory researchers.

History of Beliefs About the Mind

In the early years of the 20th century, Sir Frederick Bartlett, a British psychologist from Cambridge, concluded that human memory was far more reconstructive than was previously thought. He became convinced that memory is not an accurate record of the past. Rather, the mind reconstructs a memory based on minimal stored information. It adds additional material - something like a paint-by-numbers canvas. The latter was "shown to be affected by cognitive biases, short-cuts in reasoning strategies, social and contextual processes, and even personality factors." 1

The pendulum swung towards the video camera theory by the middle of the 20th century. Dr. Wilder Penfield, a Canadian neurosurgeon from Montreal, performed a series of experiments in which vivid memories were recalled by injecting a small electrical current into the temporal lobes of the patient's brain. It appeared as if every event that a person experienced during their lifetime was recorded in minute detail in the brain and thus might be recalled at any time. This theory was later criticized on logical grounds. The amount of data storage for even one year of memories would vastly exceed any possible ability of the brain to hold.

Recent work by Elizabeth Loftus, an American psychologist from the University of Washington, and others, has largely confirmed the conclusions of Bartlett, and shown that the video tape theory is without validity.

Other Recent Findings About Memory

Ancient Belief: Consciousness is not a function of the brain

Karl Pribram hunted for years for the particular engrams or physical spaces in the brain where memories are housed. What he discovered is that memory is non-local. Working with Karl Lashley they discovered working with rats that no matter how much of the rat's brain was removed the animal could still perform a variety of tasks. Therefore, long term memory was not stored in specific locations in the brain after all. Another scientist who is documenting his own research in this area is Dr. Paul Pietsch. Again, science is beginning to agree with the ancient wisdom teachings that consciousness is not a function of the brain, but something that is processed through the brain, yet exists in a domain beyond the material world.

Pribram, along with Rupert Sheldrake tapped into the understanding that though the brain is the hardware necessary for processing consciousness that manifests as mind, this elusive mind can exist in a non-local presence around the human body. Memory can be electrochemical, but it can also be that etheric substance that science is just gleaning as a very subtle frequency that surrounds the human body and brain. From all his research Pribram came up with his theory of the holographic brain. The best book available that explains all the research in this area in laymen's terms is Michael Talbot's The Holographic Universe.

Hypnosis Researches

"Hypnosis researchers such as Ernest Hilgard, Martin Orne, Nicholas Spanos, and Robert Baker have shown numerous times how easy it is to produce pseudo memories in experimental subjects who will state with great conviction that the suggested events actually occurred."

Researchers at Northwestern University found that people confuse objects that they have actually seen and objects about which they have only imagined. They asked people to look at real objects and then to vividly visualize other objects. Over time, they got confused over which was which. The authors of the study wrote: "We think parts of the brain used to actually perceive an object and to visually imagine an object overlap. A vividly imagined event can leave a memory trace in the brain that is very similar to that of an experienced event."

A typical adult is unable to remember events which occurred prior to 42 months of age. Memories from events that happened during infancy (0 to 24 months) are unknown.

There appears to be no evidence for the existence of distributed memory throughout the body. No structures external to the brain have ever been found that could remember and recall events.

The study of the human mind is currently in its infancy. It is an exciting area of study that will lead to greater understanding in the future.

Other Facts about Memory

Organization of Material

Retrieval of information is better if the information is organized in some manner supporting systematic search, such as in hierarchies.

Method of Loci

The ancients remembered things by imagining taking a familiar walk, and placing the things to be remembered at locations along the way. This method works because it organizes the material to be remembered and it encourages elaborative processing and memorable imagery.

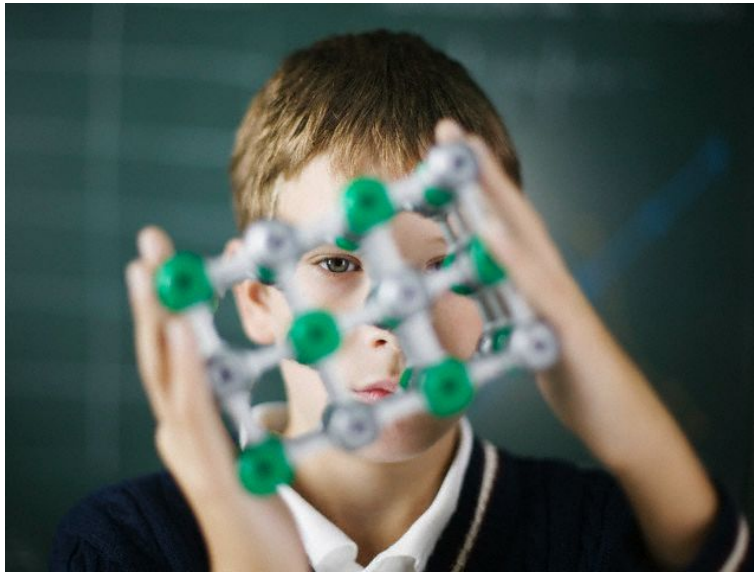
Context-Dependent Learning

Physical and emotional context may be inadvertently coded as retrieval cues, along with the intended cues.

Consistent with this idea, various studies show that recall is better when tested in the same context (physical or emotional) as in which learning took place. Some benefit has been found studying for important exams in the same room as they will be taken. However these results are variable.

Working with Mnemonics

'Mnemonic' is another word for memory tool. Mnemonics are methods for remembering information that is otherwise quite difficult to recall. A very simple example is the '30 days hath September' rhyme. The basic principle of mnemonics is to use as many of the best functions of your brain as possible to store information.



Our brains evolved to code and interpret complex stimuli such as images, colors, structures, sounds, smells, tastes, touch, positions, emotions and language. We use these to make sophisticated models of the world we live in. Our memories store all of these very effectively. Unfortunately information we have to remember is almost always presented in only one way - as words printed on a page. While language is one of the most important aspects of human evolution, it is only one of the many skills and resources available to our minds.

Mnemonic techniques are more specific memory aids. Many are based on the general memory strategies that were presented earlier. Although it can be easiest to remember those things that you understand well, sometimes you must rely on rote memory. The following techniques can be used to facilitate such memorization.

ACRONYMS

You form acronyms by using each first letter from a group of words to form a new word. This is particularly useful when remembering words in a specified order. Acronyms are very common in ordinary language and in many fields. Some examples of common acronyms include NBA (National Basketball Associations), SCUBA (Self Contained Underwater Breathing Apparatus), BTUs (British Thermal Units), and LASER (Light Amplification by Stimulated Emission of Radiation). What other common acronyms can you think of? The memory techniques in this section, for example, can be rearranged to form the acronym "SCRAM" (Sentences/acrostics, Chunking, Rhymes & songs, Acronyms, and Method of loci).

Let us suppose that you have to memorize the names of four kinds of fossils for your geology class: 1) actual remains, 2) Petrified, 3) Imprint, and 4) Molds or casts. Take the first letter of each item you are trying to remember: APIM. Then, arrange the letters so that the acronym resembles a word you are familiar with: PAIM or IMAP.

Although acronyms can be very useful memory aids, they do have some disadvantages. First, they are useful for rote memory, but do not aid comprehension. Be sure to differentiate between comprehension and memory, keeping in mind that understanding is often the best way to remember. Some people assume that if they can remember something, that they must "know" it; but memorization does not necessarily imply understanding. A second problem with acronyms is that they can be difficult to form; not all lists of words will lend themselves equally well to this technique. Finally, acronyms, like everything else, can be forgotten if not committed to memory.

SENTENCES/ACROSTICS

Like acronyms, you use the first letter of each word you are trying to remember. Instead of making a new word, though, you use the letters to make a sentence. Here are some examples:

My Dear Aunt Sally (mathematical order of operations: Multiply and Divide before you Add and Subtract)

Kings Phil Came Over for the Genes Special (Kingdom, Phylum, Class, Order, Genus, Species)

Can you think of other examples? Like acronyms, acrostics can be very simple to remember and are particularly helpful when you need to remember a list in a specific order. One advantage over acronyms is that they are less limiting. If your words don't form easy-to-remember acronyms, using acrostics may be preferable. On the other hand, they can take more thought to create and require remembering a whole new sentence rather than just one word (as is the case with acronyms). Otherwise, they present the same problem as acronyms in that they aid memorization but not comprehension.

EXERCISE: PRACTICE USING ACROSTICS

1. Try making up a sentence (acrostic) to remember the five mnemonic techniques discussed in this section.
2. Now come up with acrostics for several of the main sections of a chapter from one or your textbooks.

RHYMES & SONGS

Rhythm, repetition, melody, and rhyme can all aid memory. Are you familiar with Homer's *Odyssey*? If you are familiar with the book, then you know that it is quite long. That is why it is so remarkable to realize that this, along with many ancient Greek stories, was told by storytellers who would rely solely on their memories. The use of rhyme, rhythm, and repetition helped the storytellers remember them.

You can use the same techniques to better remember information from courses. For example, even the simple addition of familiar rhythm and melody can help. Do you remember learning the alphabet? Many children learn the letters of the alphabet to the tune of "Twinkle, Twinkle, Little Star." In fact, a student demonstrated how she memorized the quadratic formula (notorious among algebra students for being long and difficult to remember) by singing it to a familiar tune!

Using these techniques can be fun, particularly for people who like to create. Rhymes and songs draw on your auditory memory and may be particularly useful for those who can learn tunes, songs, or poems easily. Like the other techniques in this section, however, they emphasize rote memory, not understanding. Also, when devising rhymes and songs, don't spend too much time creating them. Use these techniques judiciously and don't let them interfere with your studying.

METHOD OF LOCI

This technique was used by ancient orators to remember speeches, and it combines the use of organization, visual memory, and association. Before using the technique, you must identify a common path that you walk. This can be the walk from your dorm to class, a walk around your house, whatever is familiar. What is essential is that you have a vivid visual memory of the path and objects along it. Once you have determined your path, imagine yourself walking along it, and identify specific landmarks that you will pass. For example, the first landmark on your walk to campus could be your dorm room, next may be the front of the residence hall, next a familiar statue you pass, etc. The number of landmarks you choose will depend on the number of things you want to remember.

Once you have determined your path and visualized the landmarks, you are ready to use the path to remember your material. This is done by mentally associating each piece of information that you need to remember with one of these landmarks. For example, if you are trying to remember a list of mnemonics, you might remember the first--acronyms--by picturing SCUBA gear in your dorm room (SCUBA is an acronym).

You do not have to limit this to a path. You can use the same type of technique with just about any visual image that you can divide into specific sections. The most important thing is that you use something with which you are very familiar.

EXERCISE: METHOD OF LOCI

1. If someone reads a list of unrelated words to you, just once, how many do you think you could remember? Give it a try. Have someone read a list of 10 words to you at a slow but steady pace (about 1 word per second). Rather than using any of the memory techniques presented here, simply try to concentrate on the words and remember them. How many words did you remember?

2. Now take a few minutes to identify a path or object that you can use in the method of loci. Familiarize yourself with each of sections of your path or object. Mentally go through each of the loci (locations) and visualize them as best you can. Remember, it is important to be able to visualize and recall each location readily. Once you have done this, have your friend read you a different list of words. This time, try to create visual images of the words associated with one of the locations.

This may not come easy at first, but with practice you should be able to create these visual images more readily. If you find that you are having difficulty coming up with the images quickly, practice on some more lists until you have improved. Chances are, when you become familiar with using this technique, you will be able to remember many more words (maybe all 10 items).

3. Practice the technique to sharpen your skills.

CHUNKING

This is a technique generally used when remembering numbers, although the idea can be used for remembering other things as well. It is based on the idea that short-term memory is limited in the number of things that can be contained. A common rule is that a person can remember 7 (plus or minus 2) "items" in short-term memory. In other words, people can remember between 5 and 9 things at one time. You may notice that local telephone numbers have 7 digits. This is convenient because it is the average amount of numbers that a person can keep in his or her mind at one time.

When you use "chunking" to remember, you decrease the number of items you are holding in memory by increasing the size of each item. In remembering the number string 64831996, you could try to remember each number individually, or you could try thinking about the string as 64 83 19 96 (creating "chunks" of numbers). This breaks the group into a smaller number of "chunks." Instead of remembering 8 individual numbers, you are remembering four larger numbers. This is particularly helpful when you form "chunks" that are meaningful or familiar to you (in this case, the last four numbers in the series are "1996," which can easily be remembered as one chunk of information).

PRACTICE MAKES PERFECT

Okay, it may not be a mnemonic, but repeating is still a great memory aid. Remember the children's game "I'm going on a picnic and I'm bringing...." As each new object is added, the old objects are repeated. People can often remember a large number of objects this way. When remembering a list of things, you might try a similar concept. Once you are able to remember 5 items on your list without looking, add a 6th, repeat the whole list from the start, add a 7th, and so on. It can be quite intimidating to see long lists, passages, or equations that you are expected to commit to memory. Break up the information into small bits that you can learn, one step at a time, and you may be surprised at how easy it can be. You might even utilize grouping techniques, like those discussed earlier, to form meaningful groups that you can learn one at a time.

Utilizing Complete Mind to Remember

By coding language and numbers in striking images, you can reliably code both information and the structure of information. You can then easily recall these later.

You can do the following things to make your mnemonics more memorable:

- Use positive, pleasant images. The brain often blocks out unpleasant ones

- Use vivid, colorful, sense-laden images - these are easier to remember than drab ones
- Use all your senses to code information or dress up an image. Remember that your mnemonic can contain sounds, smells, tastes, touch, movements and feelings as well as pictures.
- Give your image three dimensions, movement and space to make it more vivid. You can use movement either to maintain the flow of association, or to help you to remember actions.
- Exaggerate the size of important parts of the image
- Use humor! Funny or peculiar things are easier to remember than normal ones.
- Similarly rude rhymes are very difficult to forget!
- Symbols (red traffic lights, pointing fingers, road signs, etc.) can code quite complex messages quickly and effectively

Designing Your Mnemonics

The three fundamental principles underlying the use of mnemonics are imagination, association and location. Working together, you can use these principles to generate powerful mnemonic systems.

- Association
- Imagination
- Location

Working together, these principles can be used to generate powerful mnemonic systems. Hopefully once you have absorbed and applied these techniques you will understand how to design and apply these principles to your field to design your own powerful, sophisticated recall systems.

These principles are explained below:

Association

Association is the method by which you link a thing to be remembered to a method of remembering it. Although we can and will suggest associations to you, your own associations are much better as they reflect the way in which your mind works.

Things can be associated by:

- Being placed on top of the associated object
- Crashing or penetrating into each other
- Merging together
- Wrapping around each other
- Rotating around each other or dancing together
- Being the same color, smell, shape, or feeling

Whatever can be used to link the thing being remembered with the image used to recall it is the association image.

As an example: Linking the number 1 with a goldfish might be done by visualizing a 1-shaped spear being used to spear a goldfish to feed a starving family.

Imagination

Imagination is used to create the links and associations needed to create effective memory techniques - put simple, imagination is the way in which you use your mind to create the links that have the most meaning for you. Images that I create will have less power and impact for you, because they reflect the way in which we think.

The more strongly you imagine and visualize a situation, the more effectively it will stick in your mind for later recall. Mnemonic imagination can be as violent, vivid, or sensual as you like, as long as it helps you to remember what needs to be remembered.

Location

Location provides you with two things: a coherent context into which information can be placed so that it hangs together, and a way of separating one mnemonic from another: e.g. by setting one mnemonic in one village, I can separate it from a similar mnemonic located in another place.

Location provides context and texture to your mnemonics, and prevents them from being confused with similar mnemonics. For example, by setting one mnemonic with visualizations in the town of Horsham in the UK and another similar mnemonic with images of Manhattan allows us to separate them with no danger of confusion.

So using the three fundamentals of Association, Imagination and Location you can design images that strongly link things with the links between themselves and other things, in a context that allows you to recall those images in a way that does not conflict with other images and associations.

Learning Styles Affects the Use of Mnemonics

The way in which people learn affects the sort of mnemonics they should consider using to store information.

The three main learning styles are:

- Visual
- Auditory
- Kinaesthetic

No-one uses one of the styles exclusively, and there is usually significant overlap in learning styles. To discover your learning style, [click here](#) (links to psychometric test)

Visual Learners

Visual learners relate most effectively to written information, notes, diagrams and pictures. Typically they will be unhappy with a presentation where they are unable to take detailed notes - to an extent information does not exist for a visual learner unless it has been seen written down. This is why some visual learners will take notes even when they have printed course notes on the desk in front of them. Visual learners will tend to be most effective in written communication, symbol manipulation etc.

Visual learners make up around 65% of the population.

Auditory Learners

Auditory learners relate most effectively to the spoken word. They will tend to listen to a lecture, and then take notes afterwards, or rely on printed notes. Often information written down will have little meaning until it has been heard - it may help auditory learners to read written information out loud. Auditory learners may be sophisticated speakers, and may specialize effectively in subjects like law or politics.

Auditory learners make up about 30% of the population.

Kinaesthetic Learners

Kinaesthetic Learners learn effectively through touch and movement and space, and learn skills by imitation and practice. Predominantly Kinaesthetic learners can appear slow, in that information is normally not presented in a style that suits their learning methods. Kinaesthetic learners make up around 5% of the population.

Memory Implications of Learning Styles

Most literature on mnemonics assumes the visual approach to learning styles - mnemonics are recommended to be as visually appealing and memorable as possible. If you are an auditory or Kinaesthetic learner you may find that this emphasis on imagery leads to ineffective recall. In this case, try adjusting the mnemonics to suit your learning style: if you are an auditory learner, use auditory cues to create your mnemonics. If you are a Kinaesthetic learner, imagine performing actions or using tools as the basis of memory techniques.

If you are an auditory or Kinaesthetic learner, adjust these techniques appropriately to suit your personal approach to learning.

Using Mnemonics to Learn More Effectively

When you are creating a mnemonic, e.g. an image or story to remember a telephone number, the following things can be used to make the mnemonic more memorable:

- Use positive, pleasant images. The brain often blocks out unpleasant ones
- Exaggerate the size of important parts of the image
- Use humor (perhaps linked with point 2)! Funny or peculiar things are easier to remember than normal ones.
- Similarly rude or sexual rhymes are very difficult to forget!
- Symbols (e.g. red traffic lights, pointing fingers, etc.) can be used in mnemonics
- Vivid, colorful images are easier to remember than drab ones
- Use all the senses to code information or dress up an image. Remember that your mnemonic can contain sounds, smells, tastes, touch, movements and feelings as well as pictures
- Bringing three dimensions and movement to an image makes it more vivid. Movement can be used either to maintain the flow of association, or can help to remember actions
- Locate similar mnemonics in different places with backgrounds of those places. This will help to keep similar images distinct and unconfused

- The important thing is that the mnemonic should clearly relate to the thing being remembered, and that it should be vivid enough to be clearly remembered whenever you think about it

Hints On Memory Techniques

This section covers a few general hints on the use of memory systems:

One-Way or Two-Way links

Bear in mind that in some cases you may want the link to work both ways - for example if you are using a peg system (e.g. number/rhyme) to link 2 to Henry VIII, you may not want to always link Henry VIII with the number 2 (i.e. the opposite way across the link).

If, however, you are linking the word the French word 'chien' with the English word 'dog', you will want to ensure that the link runs in the opposite direction - i.e. that the English word 'dog' links with the French word 'chien'.

Remember to use location to separate similar mnemonics

By setting an application of a memory system in one location and clearly using that location as a background, you can easily separate it from a different application of the same memory system set in a different place.

Why mnemonics might fail

Typically you may forget things that you have coded with mnemonics if the images are not vivid enough, or if the images you are using do not have enough meaning or strength for you to feel comfortable with. Try changing the images used to more potent ones, and read the section on using mnemonics more effectively.

Retrieving lost information

You may find that you need to remember information that has either been lost because part of a mnemonic was not properly coded, or that simply was not placed into a mnemonic. To try to recall the information, try the following approaches:

In your mind run through the period when you coded the information, carried out the action, or viewed the thing to be remembered. Reconstructing events like this might trigger associations that help you to retrieve the information.

If the lost information was part of a list, review the other items in the list. These may be linked in some way to the forgotten item, or even if unlinked their positions in the list may offer a different cue to retrieve the information.

If you have any information such as general shape or purpose, try to reconstruct the information from this.

If all the above have failed, take your mind off the subject and concentrate on something else completely. Often the answer will just 'pop into your mind', as your subconscious has worked away on retrieving the information, or something you have been working on sparks an association.

Memory Tricks [Unleashed]

Memory techniques when applied correctly they are so powerful that can improve your memory many times. Don't worry, they have nothing to do with your mind - they are just tricks how to better remember information.

Memory techniques are very simple. The best part - they can be applied in just minutes. Memory techniques go deep in the history - even ancient people used them. They were especially used by ancient orators to remember long speeches.

Think about it. How could someone remember a two hour long speech without memory techniques? I couldn't and I think you couldn't either. But with memory techniques everybody can do that. Doesn't matter how bad you think your memory is - you CAN remember a two hours long speech with memory techniques.

You probably have watched memory experts on TV performing mind blowing memory stunts like memorizing phone numbers or names of 400 people audience. You can do that, too - when using memory techniques. Actually it's very doable.

Memory techniques can improve your life in many ways. You can remember more with them, cut your learning time and never forget things you need to remember. You can also impress your friends with your excellent memory and get a raise in salary at your workplace. There are many ways in life how memory techniques can be applied.

Some of the tricks are discussed as followed

Accelerate your Learning

Have you ever wondered why some people are so much quicker at learning things? How they seem to remember complex things with ease?

Despite popular belief, it is NOT because they are smarter! No, it's because they know (and use) 2 simple learning techniques that help them to learn quicker.

No-one wants to spend extra time studying. Luckily these 2 techniques don't take much time at all. While other's may have to study for hour upon hour, only to get average results, people using these techniques can get outstanding results from just a few minutes a week.

The techniques aren't just for academic study either. They can be used for anything, by anyone. Perhaps you are taking ballroom lessons? Then use these techniques to quickly dance your way to the top of the class! Or maybe you are studying a martial art?

Basically, these techniques will dramatically accelerate how well you learn ANYTHING.

The 2 key techniques to accelerate your learning are reinforcing, and reviewing.

Reinforcing

5 to 10 minutes after you have learnt something (say right after you have had a lesson), you should write down what you just learnt. This reinforces the learning, and improves how well you will recall it later. If you don't do this, the lesson will quickly fade from your memory. You won't forget everything, but you won't remember anywhere near as much as you would by writing down some quick notes.

You DON'T have to write an encyclopedia. Sometimes just a single word will do. No-one understands you better than you do! Which bit of the lesson did you struggle with? Which bit do you think you'll have trouble remembering? Write THAT down!

Don't worry about it being 100% accurate either. If you learnt something new, but you can't exactly remember it, just write it down the best you can. You can always fix it later if you need to. Writing down something wrong is better than not writing down anything at all.

Reviewing

You should skim over your notes periodically. How often is up to you, but I find that once a week works well for me. The better you know the material the less often you have to review it. Things from a year ago may only need reviewing every 3 months, but something hard that you only just learnt may need reviewing every day until you start to really understand it.

It's also worth reviewing right before a lesson. If you are anything like me, you spend the first 5-10 minutes of any lesson trying to remember where you were up to in the previous lesson. By doing a quick review before hand, you can get up to speed before the lesson, and hit the ground running. You won't waste any of your time during the lesson playing catch-up.

Tools for Reinforcing and Reviewing

Stated below are some best tools for reinforcing and reviewing?

Paper-Based

This is the simplest option. Just buy a little notebook, and write into it. Use a page per subject. The biggest disadvantages to this option are that you can't edit, and you can't search. Despite the disadvantages, this is still a good option, and definitely worth considering if you don't have access to a computer.

Word-Processor

This option requires a computer. Just use any standard word-processor(even Microsoft notepad would do), and type your notes into it. You may want to have different subjects in different files, otherwise the file will get very long. This option has advantages over paper, because you can edit what you have written, and you can search. The biggest disadvantage is that it isn't very organized. You either end up with one big file, or lots of files scattered around all over the place.

Don't Forget Your Memory

Remembering Things

I remember a birthday party I went to as a child. There was a contest that involved looking at a table covered in 15 various items. After a few minutes, the things were taken away, and then we each got a piece of paper and a pencil. The object was to write down as many items as we could remember. I struck out after seven or eight, but one little boy got all 15 items, and won the prize.

Only years later did I learn why he was able to do that. His father had taught him a simple technique that none of us other kids knew. All you have to do is tie the items together in an imaginative story. Imagine, for example, that you want to remember a list of the following things: milk, soap, forks, honey, and flowers.

Create a story, and see it vividly in your head: You are in front of the bathroom sink, and you reach for the soap. The soap dish is filled with milk, so you wash your hands with that, then comb honey into your hair with a fork, pick up a bouquet of flowers and smile at yourself in the mirror. Say each item as you review this "movie" in your imagination, and you'll remember all five things, even the next day.

Some Other Memory Tricks

Start telling yourself to remember. If you just learned a person's name, for example, tell yourself, "remember that". This signals the unconscious mind to rank this input higher in importance.

Tell yourself why you want to remember something, and how you will remember it. To remember a person, think about how that person will be important to you in the future, where you'll see them next, and anything you notice about them. Clearly seeing the importance of remembering will help a lot, and the additional associations (where you expect to see the person next, for example) will set the memory more firmly in your brain.

Have you ever forgotten where you set down your car keys? You have probably tried retracing your steps, or at least doing it in your imagination. This works fairly well, but do you ever create the scenario beforehand, so you won't forget? Try it. When you set down the keys on the chair, see yourself walking in and setting the keys on the chair. You'll remember where they are if you do this.

Create Good Memory Habits

Do you know what the biggest problem with memory techniques is? Remembering to use them. No joke. Many popular methods work, but if you don't have the habit of using them, you'll forget to when you need them most. So if you take the time to learn a technique, make a conscious effort to use it until it becomes automatic.

Improve Memory Up To 10 Times

I'm going to give you some hints how to use memory techniques to make things easier to remember. I will only explain each thing in one sentence just to give you general idea. When you use memory techniques you completely eliminate rote memory. No rote memory is needed - only imagination. The best part - remembering things with memory techniques is interesting and you have extra motivation to do so.

Remembering shopping lists or long list of items with memory techniques is a breeze. What you need to do is associate each item with the next one in the list. You need to associate the two items in some unusual way that stays in your mind.

Curse Rule

- The first is Connection method and an extremely strong one. You are creating meaning for an item by connecting it to something you know already. Do you have to remember somebody's address is 1225 Memory Lane? Isn't it easier to think Christmas (12 - 25/ December 25th) than just four separate numbers. Now we have something that has meaning. We can take our story-telling technique and associate it to Memory. It may take some imagination, but that just comes with practice.

Another strong point with the Connection technique is that it allows you to utilize information you already know.

- The second is Repetition. This is a very simple technique and probably the one most used to remember something. However - look closely at what you're really doing when you are repeating something. You are forcing yourself to focus attention on something. That is one of the most important steps in memorization. You forget most things simply because you didn't remember them in the first place.

- Storytelling is another method. The Greeks were great for this - remember the story of Narcissus and Echo. They would take phenomena from everyday life and create a story around it. By creating a story they are forcing your attention (see how important that is) plus they are creating a link mechanism which I just mentioned above. All good memory techniques play off each other and use the brain's natural memory ability. Remember - these are techniques, not tricks!

- Rhyming is another technique. Admittedly it takes some creative energy and a talent for forming rhymes, but if you have that ability it is a very good way to remember things. The rhyme can have a story as well.

- The last method is by Linking - linking one item to something you already know. Remember how memory works. How often a smell can bring back the memory of a certain afternoon a long time ago. Linking or association is a way that was devised to utilize the way memory naturally works. You're not forcing it - it's something you do naturally.

Remembering Numbers

with memory techniques you can remember long digit numbers in minutes. The trick is to convert numbers into words. There is a special phonetic alphabet with 10

sounds - one for each number. No number is too hard to remember when you apply this technique.

Knowing how to remember numbers is a huge advantage. You can remember telephone numbers, style numbers and prices in minutes. No more taking notes, now you can keep telephone numbers in your mind.

Remembering people Names

with memory techniques it's a very doable task. The trick is to associate each persons name with his face. Each time when you see a persons face you will remember his name. To do so you need to find one unusual feature of the persons face and associate it with persons name.

Remembering Everyday Details

Have you sometimes forgot where you left your car keys or in which pocket do you keep money? With memory techniques you can completely eliminate this problem. The trick is to be originally aware - concentrate on what you are doing and you'll never forget a thing.

Memorizing Long Speech

With memory techniques this can be done in minutes. The trick is to give keywords for each paragraph or logical part of the speech and then link the keywords in a list. This way you will always know about what to talk.

Memorizing Foreign Vocabulary

With memory techniques memorizing sophisticated foreign words is very doable. The trick is to substitute the foreign word with a word in your own language that sounds similar. Then associate the meaning of the foreign word to the substitute word. This way you'll be able to remember even the most sophisticated foreign words really fast.

Remembering Weekly Appointments and Meeting Times

The trick is to associate the meeting with the time of the day. This may sound quite confusing when expressed in one sentence but is very doable when you know how to do it.

Remembering Anniversaries and Historical Dates

Again it can be done with memory techniques. The trick is to associate the historical date with the event. It can be done when you know how to remember numbers. Again, it may sound confusing when said in one sentence but is very doable when you know how to do it.

As you understand, memory techniques can make you life much better. With them you don't need to struggle to remember vital information. You can apply memory techniques and remember everything effortlessly and much faster.

Are you Getting the "Memory Full" Message?

Lynn was tapped to head up the project team for a major company restructuring. She began her first team meeting by delegating steps and due dates to the various department heads. That's when she noticed that one member, Bob, wasn't writing anything down. Lynn knew Bob was a competent guy. Yet given the importance of this project his casual approach concerned her.

So, after the meeting she pulled Bob aside. "I don't want to tell you how to do your job," Lynn began, "but I noticed you're weren't writing down any of your assignments." "Oh, don't worry," Bob replied pointing to his head "it's all right up here." Lynn was hardly reassured. "That's great Bob. But what happens if you lose your mind?"

You may not lose your mind, but are you getting the mental "memory full" message a bit more often these days? With a computer there is always the option to add memory or get a bigger hard drive. Even if we could rely on memory, besides not being fool proof, there's the problem of brain clutter, a concern that led Albert Einstein to conclude that one should, "Never bother to memorize anything that is easily accessible." So, what can you do?

Since the closest analogy to the human brain is the computer it makes sense to look to it for solutions to the problem of brain overload. But first it's important to fully understand the problem.

Here are some of the unwelcome things that can happen when a computer's hard drive gets too full. As you can see, when people try handling more information and performing more functions than we're "programmed" to handle similar things can happen:

A too-full computer versus a too-full brain

Computers give you error messages. We make mistakes, forget to do something, things start "slipping through the cracks". Computers run slower. We take longer to process tasks and information, slow down, become mentally or physically sluggish, become uncreative, become unproductive. Computers freeze. We procrastinate, become indecisive. Computers crash. We get stressed out, experience a total mental break down (extreme cases).

The problem of a too full hard drive lends itself to a variety of solutions. These same solutions can apply to the problem of a too full mind. Here are five overwhelming techniques human's can borrow from the computer:

Reboot

If you're getting lots of error messages or your computer is running slow sometimes simply restarting or "rebooting" can help. This same technique works well for people. Sometimes the best thing you can do when you feel overloaded is to take a break. Go for a walk. Find a quieter or just different space to work. If you're experiencing major "brain strain" it may be time for a vacation.

Delete unnecessary files

With a computer you can free up space by sending unnecessary files to the trash. How about all those "junk files" on your mental hard drive? Do you keep reminding yourself to do things that you think you "should do" but don't really need or want to do - like arranging your vacation photos into a photo album, alphabetizing your bookshelf, sending out holiday cards? When you "should on yourself" you're not only piling guilt onto the overload but all this extraneous stuff is taking up valuable mental real estate. Do yourself a favor and delete them.

Call the help desk

When you experience a major computer glitch you can always call some kind of help desk. The same is true with mental overload. Delegate whenever you can. Don't manage anyone at work? If you live with anyone over the age of five, you can almost always delegate more at home.

Download

Many "must keep" files that don't need to reside on your hard drive can be downloaded onto a disk. You may not be able to download your mental To-Do list onto a disk (at least not yet!) but you can achieve the same effect by getting it out of your head and onto paper. The way to keep your mind from getting overloaded in the first place is to immediately download things as they pop up. Or in other words as we say at Time/Design: If you think it, ink it.

If your mental hard drive is exceptionally full you'll want to start with a complete Brain Download. The Brain Download is an exercise in which you fully and completely empty your mind of all the things you need or want to do both in your work and personal life. Big stuff, little stuff. Things you have to do now, things you don't have time to get to right now but are none-the-less taking up precious mind space.

To do a thorough download you should allow at least 30 minutes. At some point in the process you might hit the "overwhelm wall." Seeing how much you have to do can make you want to throw down your pencil in despair. But if you push through this wall and continue writing, ultimately you'll experience the benefits of a well-functioning computer: Faster processing of information, fewer errors, less need to call the help desk, and a greatly diminished risk of that your system will crash.

But here's where humans have a definite edge on computers. Downloading our brain allows us to enjoy additional benefits like less likely to procrastinate, greater creativity, and the peace of mind of knowing that nothing will slip through the cracks.

Defragment

The defragmenting function on a computer rearranges files so your programs run faster. Right now the "files" on your Download list are a jumbled list of To-Dos. You'll want to "Defragment" your list by first organizing them into their proper category, for example, work projects vs. home projects, things you need to do on a certain day verses those that are due by a certain day and so on.

Next, put things into perspective by prioritizing your list. After all, on the same list you probably have things like buy new collar for Fluffy next to develop strategic plan. The simple process of sorting through your list and putting each item into its proper priority "file" can be tremendously freeing.

Finally, just as the defragmenting process on a computer checks the drive for errors, taking the time to organize your activities helps ensure that nothing will slip through the cracks!

In today's world, mental overwhelm is a fact of life. Fortunately, by applying some simple techniques from the computer world, you can avoid some of the costly consequences of a too full brain!