



One of our greatest fears is loss of memory. Though “mind” has many functions³, memory is one of the most treasured. This is because memory is what connects us not only to our own past, but to our families and cultures. Part of the fear of death is the fear of not being remembered.

“Culture” is the collected memory of a civilization; ritual the enactment of memorized behaviors. Story, another powerful aspect of humanity, conveys memory for cultural thought, emotion and action. Though there is power in the Now, memory enables us to interpret the now and plan for the future. The “Best of...” Homo sapiens—learning, intelligence and wisdom—are all memory-based.

Pre-Conscious Memory

Before the nervous system evolved, the earliest memories were chemically based. Single-celled organisms can receive, encode and transfer information by modulating genes, epigenes⁴ and other molecules. Within our bodies, many of our systems have memory functions (see table). A fetus receives information from numerous sources, past and present, which affects the “set-points” of several systems for the rest of life.

Where Are Memories Stored?

This great mystery is the subject of extensive works by both scientists and philosophers. Evolution of the nervous system enhanced memory, utilizing networks of nerve cells (“neurons”) that communicate with each other. One neuron can receive input from as many as 10,000 other neurons; and humans have billions of neurons. From this perspective, memory is encoded in these connections.

An alternate model postulates that memory exists outside of space and time, in morphic fields⁵. This model describes the brain acts as a receiver (hardware) of memory, like our TV’s which re-constitute audio-visual images by using information encoded by electromagnetic waves that are “received by”, but do not “exist in” the TV.

Both models involve a “holographic” concept, where a specific memory does not exist in a specific location, but is distributed over a network and reconstituted as needed, similar to how a website is constructed by a browser combining multiple sources. Loss of a single part of the network will not erase the memory, but will lose detail.

De-Constructing Memory

Memory is not a single function or a single process, as can be seen in the table. Not only are there different types of memory, it is a series of sub-processes all of which are required to have a fully functioning memory, and can be impaired and repaired somewhat independently. Three key steps are 1) perception (& attention), 2) encoding and 3) recall of the information,

Attention to a stimulus is required in order to remember

it. Conditions such as Attention Deficit Disorder or those that cause distractibility such as anxiety or depression can significantly affect memory. Strong emotions and perceptions, good and bad, such as in PTSD, can lock in memories. For example, a specific smell, sound, sight or action (riding a bicycle after decades) can trigger specific memories. This is called “state-dependent memory”.

Memories from the day require sleep to be encoded “permanently” as long-term memory. Conditions that limit sleep quality or quantity, such as sleep apnea, depression, alcohol and several medications can affect encoding. Dementias such as Alzheimer’s affect the encoding of new memories, with long-term memory preserved until later stages of generalized brain deterioration.

In order to be utilized, a memory must be recalled. The process of recall can be affected by the same factors that affect perception and encoding. Recall is not always conscious—a wave of “déjà vu”, anxiety, or disliking a new face or smell is often associated with a memory that is working at a level below consciousness.

Types of Memory	
Type	Duration
Working	Minutes
Short-Term	Hours
Long-Term	Days to Decades
State-Dependent	Specific State
Chemical/Organ-based (i.e. genes, hormones, fat, muscle, bone, skin)	Days to Decades and Generations
Story	Generations
Morphic Fields ⁵	Across space and time

Diagnosis and Treatment

Conscious memory is relatively easy to test; other memory functions can be measured by special lab tests. Deficiency of critical nutrients such as omega-3 oils, B vitamins, iodine, hormonal imbalances (such as thyroid, estrogen, testosterone and adrenals) and toxins (lead, mercury, pesticides, medications) can affect memory directly and indirectly (by affecting sleep, emotion, as above). Virtually every known factor, including genetics, gender, age and experience can affect memory. By utilizing this information and addressing the modifiable factors discussed above, most of us can preserve and enhance our own memories and other’s memories of us!

IMPORTANT NOTES:

1. **This educational material may not be used to influence medical care without supervision by a licensed practitioner.**
2. These contents are ©2013 by Michael Cheikin MD and may not be reproduced in any form without express written permission.
3. Dr. Cheikin’s website has related articles such as “Neurotransmitter Fix”, “Gut-Brain” “Detoxification” and others.
4. If genes are the hardware, epigenes are their software, and are transmitted across generations.
5. Morphic Fields, proposed by Rupert Sheldrake and proven by experiments, enables information transfer across space and time³.

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