

# Amnesia

# Memory

Memory is the ability to acquire, store and retrieve information.

The main function of memory is to provide human beings a knowledge base that allows us to understand the events which we live. Human memory retains and reworks our memories according to the present and update our ideas, plans and skills in a changing world.

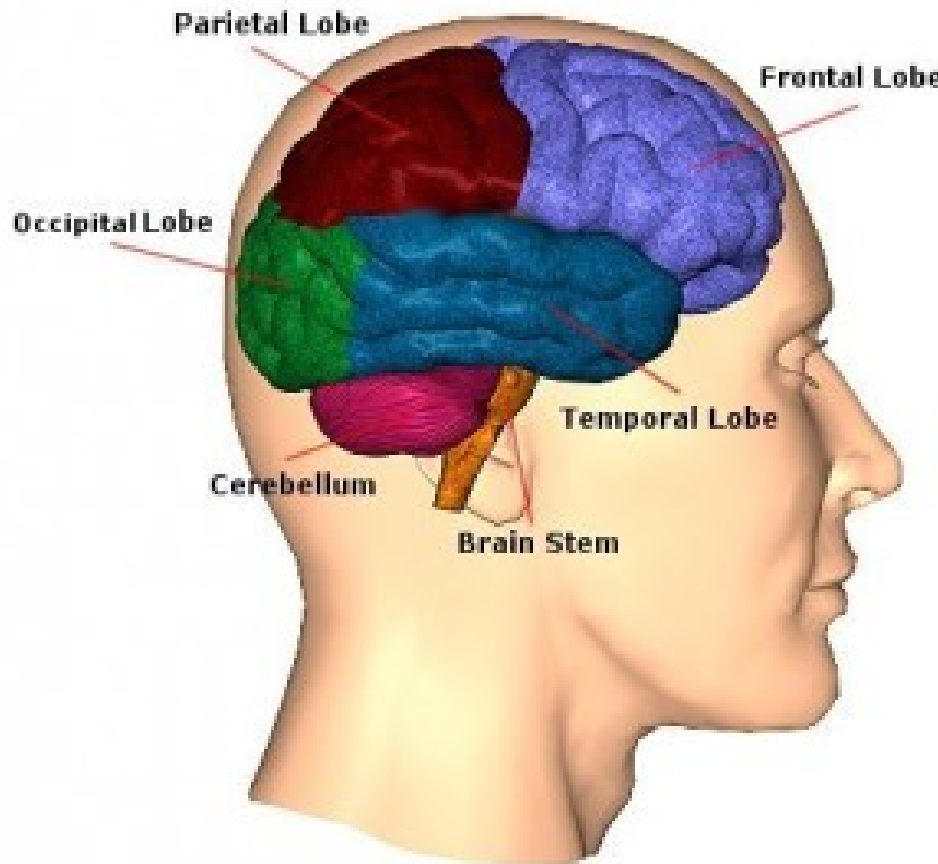
Memory is not a unitary reality, but consists of several interconnected systems with different purposes and memory lapses can occur at different levels.

These systems allow us to acquire, retain and retrieve information that comes from the environment.

These different memory systems, each with its own functions and operating modes, operating in a coordinated and simultaneous manner; so we have the subjective impression that learn and remember depend on the functioning of a single mental mechanism.

The main problem is that memory does not always behave as we would like and sometimes follows its own program: it stores information that we need and, as if to annoy, it forgets things we would like to remember.

# The neuropsychology of memory gives us new knowledge:



The mechanism that triggers memory is the frontal cortex, but there are many circuits connecting this area with the sensory system.

# The memory of faces, facts, events or knowledge comprises:

- Coding: the transformation of stimuli is a mental representation. In this phase, the focus is very important for the direction and intensity of the stimuli are processed.
- Storage is you retain data in memory for later use. The organization of information is done through schemes structured knowledge units together concepts, categories and relationships.
- Recovery: is the way people access information stored in its memory.

# Types of memory

- **Sensory memory (SM).** Scans the physical characteristics of the stimulus and records sensations. Record for a very short time, but long enough for this information is transmitted to the STM.
- **Short-term memory.** Information more durable than stored in sensory memory, but is limited if not reviewed. Functions include withholding information, support in learning new knowledge, understanding the environment in a given time, the formulation of immediate goals and problem solving.
- **Long term memories.** Contains our knowledge of the physical, social and cultural reality, our autobiographical memories, as well as the language and the meanings of concepts. LTM information is semantics.

What is amnesia?



# Definition of amnesia

**Amnesia** is the general term for a condition in which memory (either stored memories or the process of committing something to memory) is disturbed or lost, to a greater extent than simple everyday forgetting or absent-mindedness. Amnesia may result either from **organic** or **neurological** causes (damage to the brain through physical injury, neurological disease or the use of certain drugs), or from **functional** or **psychogenic** causes (psychological factors, such as mental disorder, post-traumatic stress or psychological defence mechanisms).

How many types of amnesia do you know?

## There are two main types of amnesia:

- **Anterograde amnesia:** where the ability to memorize **new** things is impaired or lost because data does not transfer successfully from the conscious short-term memory into permanent long-term memory. It is the more common of the two.
- **Retrograde amnesia:** where a person's **pre-existing** memories are lost to conscious recollection, beyond an ordinary degree of forgetfulness, even though they may be able to memorize new things that occur after the onset of amnesia.

# Other types...

- **Transient Global Amnesia.** This is a severe case of anterograde amnesia, where patients aren't able to recollect new memories at all, where past memories are somewhat remembered, but not completely. Although rare, this is a very possible case among people. It is a combination of retrograde and anterograde amnesia.
- **Childhood / Infantile Amnesia.** This form of memory loss takes place among those who have no strong memories of their childhood. This may be due to the cause of incomplete maturity of the brain during one's younger days.

# Other types...

- ***Hysterical / Fugue Amnesia.*** When one is put through a traumatic event in his/her life, where the brain cannot handle the devastating effects of this. The person then wakes up one day and has no clue as to who he/she is, including what their name is, and has no idea what they look like, since their reflections look alien to them. Sometimes it comes back out of the blue in a couple of days, but in some cases this is permanent. The event that caused such a traumatic effect on the brain is not remembered in its entirety.
- ***Traumatic Amnesia.*** This comes about when one has been through a car accident, or experienced a hard blow to the head. Memory can come back depending on how severe the brain damage is. In some cases, people can slip into comas and lose their consciousness.

# Other types...

- ***Blackout Phenomenon.*** This takes place when one has drunk way too much than the body can handle. There is no recollection whatsoever of the previous day's events, and he/she has no idea what took place in previous events before they went on the binge.
- ***Wernike-Korsakoff's Psychosis.*** This kind of amnesia is also linked to malnutrition, where the former reason is drinking on a regular basis in heavy doses. This condition gets worse as time lapses, where one ultimately goes numb in his/her toes and fingers, with a lack of coordination as a result of neurological problems.

# Amnesia: Tests and diagnosis

To diagnose amnesia, a doctor will do a comprehensive evaluation to rule out other possible causes of memory loss, such as Alzheimer's disease, other forms of dementia, depression or brain tumor.

# Medical history

The evaluation starts with a detailed medical history. A family member, friend or another caregiver generally takes part in the interview as well.

The doctor will ask many questions to understand the memory loss. Issues that might be addressed include:

- Type of memory loss — recent or long term
- When the memory problems started and how they progressed
- Triggering factors, such as head injury, stroke or surgery
- Family history, especially of neurological disease
- Drug and alcohol use
- Other signs and symptoms, such as confusion, language problems, personality changes or impaired ability to care for self
- History of seizures, headaches, depression or cancer



# Physical exam

The physical examination may include a neurological exam to check reflexes, sensory function, balance, and other physiological aspects of the brain and nervous system.

# Cognitive tests

The doctor will test the person's thinking, judgment, and recent and long-term memory. He or she will check the person's knowledge of general information as well as personal information and past events.

The memory evaluation can help determine the extent of memory loss and provide insights about what kind of help the person may need.

# Diagnostic tests

Imaging tests may be ordered to look for damage or abnormalities in the brain. Blood tests can check for infection, nutritional deficiencies or other issues. An electroencephalogram may be ordered to look for the presence of seizure activity.

# Anterograde amnesia

**Anterograde amnesia** is the loss of the ability to create **new memories**, leading to a partial or complete inability to recall the recent past, even though long-term memories from before the event which caused the amnesia remain intact. Sufferers may therefore repeat comments or questions several times, for example, or fail to recognize people they met just minutes before.

<https://www.youtube.com/watch?v=ehtk3NfnX>

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# Causes

- These memory loss causes can take form as a result of many underlying factors, or severe ones, which subject the person to memory loss in varying degrees – either mild or severe in nature.
- Tumor formation in the brain.
- Result of strokes.
- Lack of oxygen supply to the brain.
- Some people with celiac disease, experience amnesia-like symptoms.
- Inflammation in the brain (encephalitis).

- Electroshock therapy.
- Regular alcohol abuse, leading to thiamin deficiency.
- Bleeding that takes place within the skull and brain (subarachnoid hemorrhage).
- Alzheimer disease.
- Head injuries cause by traumatic accident.
- Dementia
- Seizure disorders.

# Causes

- Anterograde amnesia may be **drug-induced** (several benzodiazepines and alcohol intoxication have powerful amnesic effects) or it may follow a traumatic brain injury or surgery in which there is damage to the **hippocampus** or **medial temporal lobe**, or an acute event such as a concussion, heart attack, oxygen deprivation or epileptic attack. Less commonly, by **shock** or an emotional disorder.
- It results from a failure of memory encoding and storage. New information is processed normally, but almost immediately forgotten.
- It can result from damage to the **hypothalamus** and **thalamus** and the surrounding cortical structures, so that encoded memories are never stored since connections between **hippocampus** and **cortex** are disrupted.



- Anterograde amnesia patients often lose only the episodic part of their declarative memory (relates to autobiographical information with a temporal and/or spatial context), and not the semantic part (factual information, such as language, history, geography, with autobiographical association).
- When there is damage to just one side of the medial temporal lobe, the **neuroplasticity** of the brain (its ability to re-map its neural connections when necessary) can often allow the opportunity for normal, or near-normal, functioning for memories with time.

# Symptoms

The memory loss symptoms that take place, can occur suddenly and without warning among those who experience the onset of amnesia, or can occur when one regains consciousness after an accident.

- Loss of memory is partial.
- Memories aren't remembered on specific dates.
- Not easy remembering faces of close family/friends.
- Feeling confused and out of sorts.
- Difficulty retaining new information.
- Places that one has frequented to, are not familiar anymore.
- Memory loss of the past is absolute.
- Movement is haphazard, sometimes bringing on tremors.

What kind of treatment can we use  
for retrograde amnesia?

Is it necessary to use drugs?

# Treatment

- ***Using Reminders***

People who've suffered from anterograde amnesia, will have recalled how to use a phone, and how the different applications function. He/she can make a record of events that they need to remember, and keep reminders that can beep in stored data on the event date. Tasks that need to be recorded, medications that one needs to take can be kept on alert using these devices as a helping source. Use of post-its and event book logs to keep track of events, meetings, and important dates.

# Treatment

- ***Medication***

There are no medications that deal with severe cases of anterograde amnesia, but a diet that is rich with brain food (almonds, sage, cumin, apples) can help. Cutting out alcohol consumption completely would help patients drastically.

# Treatment

- ***Therapy***

Amnesiacs can seek help from occupational therapists, who can help with how to retain new information, and how to connect the old, in order to remember and associate it with the new. Memory training is a great way to help patients learn how to train their minds to remember information that is currently being received.

Anterograde amnesia is not something that is easy to live with every single day, but with help and support from family and friends, it can be helpful in the long run. Patients should make use of the treatment methods mentioned, and should they find medication that can be of any help, then it would serve them well.

# Retrograde amnesia

**Retrograde amnesia** is memory loss of events that occurred in the recent past before the onset of amnesia. Research shows that people who experience retrograde amnesia are more likely to lose memories closer to the occurrence of the amnesia.

For example, if John is diagnosed with retrograde amnesia in the year 2013, he is more likely to lose memories from 2012 and 2011 than he is to lose memories from 1980. It's possible that he loses those memories too, but more likely that he loses memories closer to 2013.

Luckily, those with retrograde amnesia can still form new memories.

Retrograde amnesia usually follows damage to areas of the brain other than the **hippocampus** (the part of the brain involved in encoding new memories), because already existing long-term memories are stored in the neurons and synapses of various different brain regions.

For example, damage to Broca's or Wernicke's areas of the brain, which are specifically linked to speech production and language information, would probably cause language-related memory loss



<https://www.youtube.com/watch?v=uVehPXyeU>

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# Causes

It usually results from damage to the brain regions most closely associated with declarative (and particularly episodic) memory, such as the **temporal lobe** and **prefrontal cortex**. The damage may result from:

- **Cranial trauma** (a blow to the head),
- **Cerebrovascular accident** or stroke (a burst artery in the brain).
- **Tumour** (if it presses against part of the brain).
- **Hypoxia** (lack of oxygen in the brain).
- Certain kinds of **encephalitis**.
- Chronic alcoholism, etc.

# Symptoms

- Symptoms of retrograde amnesia are false memories, confusion, or brain and coordination problems (similar to other types of amnesia).
- The only specific symptom of retrograde amnesia is forgetting past events as opposed to new ones.
- Episodic memory is more severely affected than semantic memory; the patient may remember words and general knowledge (their country's leader, how everyday objects work, colours) but not specific events in their lives.
- Procedural memory (memory of skills, habits and how to perform everyday functions) are not affected at all.

What kind of treatment can we use  
for retrograde amnesia?

Is it necessary to use drugs?

# Treatment

Treatment for RA will be individualized for each patient depending upon the specific underlying cause and the individual's situation.

- Diuretics, anti-seizure drugs and surgical resection are the options available for minimizing additional damage to the brain tissues in patients with traumatic injuries. In emergency cases, adequate oxygen and blood supply is a must to restore breathing and circulation.
- Antibiotics, steroids and anticonvulsants can control the spread of bacterial infection in the brain. Special antiviral drugs are used to treat brain infections caused by herpes strains.

- Alcoholic patients must be counseled and educated about the negative effects of heavy drinking.
- Replacement or supplementation of thiamine by intravenous or intramuscular injection, together with proper nutrition and hydration can hasten recovery.
- Psychotherapeutic techniques such as hypnotherapy conducted by experienced practitioners can be beneficial. Spontaneous recovery utilizes a method called classical conditioning, a form of learning in which a biologically significant stimulus elicits a response from the patient. The appearance and sudden extinction of the response may accelerate the activity of the brain and helps restore the autobiographical information.

# Amnesia: coping and support

People with more-severe forms of amnesia may require direct assistance from family, friends or professional caregivers.

It can be helpful to talk with others who understand what you're going through, and who may be able to provide advice or tips on living with amnesia..

If an underlying cause for the amnesia is identified, there are national organizations that can provide additional information or support for the individual and their families.

- The Alzheimer's Association
- The Brain Injury Association of America

How could we help to prevent  
amnesia?



# Amnesia:prevention

Because damage to the brain can be a root cause of amnesia, it's important to take steps to minimize your chance of a brain injury. For example:

- Avoid excessive alcohol use.
- Wear a helmet when bicycling and a seat belt when driving.
- Treat any infection quickly so that it doesn't have a chance to spread to the brain.
- Seek immediate medical treatment if you have any symptoms that suggest a stroke or brain aneurysm, such as a severe headache or one-sided numbness or paralysis.

Thank you for your attention!

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# Resources

- <http://www.mayoclinic.org/diseases-conditions/amnesia/basics/definition/con-20033182>
- <http://www.brainbehappy.com/brain-injury/complications-after-brain-injury/memory-loss/anterograde-amnesia/>
- <http://www.human-memory.net/disorders anterograde.html>