Amnesia (from Greek ἀμνησία) is a condition in which memory is disturbed. The causes of amnesia are organic or functional. Organic causes include damage to the brain, through trauma or disease, or use of certain (generally sedative) drugs. Functional causes are psychological factors, such as defense mechanisms. Hysterical post-traumatic amnesia is an example of this. Amnesia may also be spontaneous, in the case of transient global amnesia[1]. This global type of amnesia is more common in middle-aged to elderly people, particularly males, and usually lasts less than 24 hours.

Another effect of amnesia is the inability to imagine the future. A recent study published online in the Proceedings of the National Academy of Sciences shows that amnesiacs with damaged hippocampi cannot imagine the future[1]. This is because when a normal human being imagines the future, they use their past experiences to construct a possible scenario. For example, a person who would try to imagine what would happen at a party that would occur in the near future would use their past experience at parties to help construct the event in the future.

Types of amnesia

- **In anterograde amnesia**, new events contained in the immediate memory are not transferred to the permanent as long-term memory. The sufferer will not be able to remember anything that occurs after the onset of this type of amnesia for more than a brief period following the event.

- **Retrograde amnesia** is the inability to recall some memory or memories of the past, beyond ordinary forgetfulness.

  The terms are used to categorize patterns of symptoms, rather than to indicate a particular cause or etiology. Both categories of amnesia can occur together in the same patient, and commonly result from drug effects or damage to the brain regions most closely associated with episodic/declarative memory: the medial temporal lobes and especially the hippocampus.

  An example of mixed retrograde and anterograde amnesia may be a motorcyclist unable to recall driving his motorbike prior to his head injury (retrograde amnesia), nor can he recall the hospital ward where he is told he had conversations with family over the next two days (anterograde amnesia).

- **Traumatic amnesia** is generally due to a head injury (fall, knock on the head). Traumatic amnesia is often transient, but may be permanent of either anterograde, retrograde, or mixed type. The extent of the period covered by the amnesia is related to the degree of injury and may give an indication of the prognosis for recovery of other functions. Mild trauma, such as a car accident that could result in no more than mild whiplash, might cause the occupant of a car to have no memory of the moments just before the accident due to a brief interruption in the short/long term memory transfer mechanism.

- **Dissociative Amnesia** results from a psychological cause as opposed to direct damage to the brain caused by head injury, physical trauma or disease, which is known as organic amnesia. Dissociative Amnesia can include:
  - Referring to inability to recall information, usually about stressful or traumatic events in persons' lives, such as a violent attack or rape. The memory is stored in long term memory, but access to it is impaired because of psychological defense mechanisms. Persons retain the capacity to learn new information and there may be some later partial or complete recovery of memory. This contrasts with e.g. anterograde amnesia caused by amnesticics such as benzodiazepines or alcohol, where an experience was prevented from being transferred from temporary to permanent memory storage: it will never be recovered, because it was never stored in the first place. Formerly known as "Psychogenic Amnesia"
  - **Dissociative Fugue** (formerly Psychogenic Fugue) is also known as fugue state. It is caused by psychological trauma and is usually temporary, unresolved and therefore may return. The Merck Manual defines it as "one or more episodes of amnesia in which the inability to recall some or all of one's past and either the loss of one's identity or the formation of a new identity occur with sudden, unexpected, purposeful travel away from home"[2]. While popular in fiction, it is extremely rare.
  - **Posthypnotic amnesia** is where events during hypnosis are forgotten, or where past memories are unable to be recalled.
- **Lacunar amnesia** is the loss of memory about one specific event.
- **Childhood amnesia** (also known as infantile amnesia) is the common inability to remember events from one's own childhood. Whilst Sigmund Freud attributed this to sexual repression, others have theorised that this may be due to language development or immature parts of the brain. This is often exploited by the use of false memories in child abuse cases.
- **Transient Global Amnesia** is a well described medical and clinical phenomenon. This form of Long-term alcoholism or malnutrition can cause a type of memory loss known as Korsakoff's syndrome. This is caused by brain damage due to a Vitamin B1 deficiency and will be progressive if alcohol intake and nutrition pattern are not modified. Other neurological problems are likely to be present in combination with this type of Amnesia. Korsakoff's syndrome is also known to be connected with confabulation.

**Amnesia in fiction**

Amnesia is prevalent in many works of fiction. **Global amnesia** is a common motif in fiction despite being extraordinarily rare in reality. **Anterograde amnesia** features in the movies *Memento, Clean Slate, Finding Nemo,* and *50 First Dates,* and **lacunar amnesia** features in the movie *Eternal Sunshine of the Spotless Mind.* In the first season of 24, a prominent character has dissociative amnesia. In the first season of *Lost,* a character is kidnapped and has amnesia upon returning. The TV show *John Doe* is based on an amnesiac who mysteriously appears in the middle of a sea. In *The Bourne Identity,* the main character has retrograde amnesia. In the 1966 motion picture *Mr. Buddwing,* the protagonist enters an amnestic fugue state in response to distress in his marital relationship. In the 2004 film *The Forgotten,* adults struggle with memory loss about the existence of their children, who have been abducted for alien/government experiments. In the Marvel Comics series *X-Men,* Wolverine, one of the main characters, has retrograde amnesia due to brainwashing. In Season 4 of *Smallville,* Clark has his memory wiped by a Summerholt patient.

In Century Fox's animated film, *Anastasia* (1997), Anya suffers from amnesia as a result of having her head hit when trying to climb on train to escape to Paris with her grandmother as a young girl, and cannot recall the first eight years of her life.

In movies and television, particularly **sitcoms,** it is often depicted that a second hit to the head (similar to the first one) cures the amnesia. In reality, however, a second concussion would have catastrophic consequences, a phenomenon known as **Second Impact Syndrome.** Dissociative Amnesia plays a critical role in the novel *Mysterious Skin* and movie of the same name. Author Gene Wolfe addresses amnesia in the series *Soldier of the Mist,* where the main character Latro is injured during battle, causing relatively long term (24 hour) anterograde amnesia.

In Japanese anime, amnesia is a common theme. *The Big O* is largely based on the premise of an entire city having lost their memory forty years prior. In *Noir,* a girl named Kirika Yuumura loses her memory because the memories she had were too traumatic for her. Likewise, in both *Madlax* and *Sukisyo,* the main characters experienced amnesia because their pasts involve betraying someone dear to them. In all three of these cases, the characters went into an advanced state of shock once they gain their memories back; they adapted to their pasts in a homicidal fashion. In *Loveless,* the main character has no memories of the first ten or so years of his life and never regains them. In *Utawarerumono,* the main character has no memory before the series begins. He does not exactly get them back, save for in short bursts, showing several past homicides. These endeavors, with time, become accepted. In *Spirited Away,* the character Haku forgot everything about his life as a river spirit, along with his name, which restricted his freedom. There are countless other examples of this.

**ANTEROGRADE AMNESIA**

**Anterograde amnesia** is a form of amnesia, or memory loss, in which new events are not transferred from short-term memory to long-term memory. This may be a permanent deficit, or it may be temporary, such as is sometimes seen for a period of hours or days after head trauma or for a period of intoxication with an amnestic drug. The deficit makes its sufferers unable to recall an event which occurred only moments earlier when their attention has shifted to something else.
Symptoms

Those who have theoretically pure anterograde amnesia are still able to access memories formed before its onset, but they exist in a transient world where anything beyond their immediate attention span disappears from their consciousness permanently. However, theoretically pure anterograde amnesia rarely surfaces: in reality, long-term cases nearly always occur with some degree of retrograde amnesia.

Anterograde amnesia is often informally, but incorrectly, called "short-term memory loss", conjuring up the idea, as in the movie Memento, that it is a problem of short-term memory. For this reason, formal (correct technical or scientific) usage demands the term anterograde amnesia, since the deficit is not in short-term memory, but rather in encoding into more permanent, long-term memory.

Anterograde amnesiacs suffer differing degrees of impairment to different types of memories. Patients can often learn and remember how to do a new physical skill (e.g., playing the guitar, learning the words to a new song and then singing them, etc.) but not remember when they learned it. Such "how-to", motor skill learning (procedural memory) and its attendant behavioural conditioning and priming are collectively known as non-declarative memory, which appears to be unaffected by anterograde amnesia.

However, the condition tends to impair both episodic memory (the memory of events) and semantic memory (the memory of facts and general knowledge). For the most part, patients are unable to make new semantic or episodic memories. Yet the research at this time conflicts enough that consensus on this point has not been reached: some patients appear able to create new semantic memories, and young children with anterograde amnesia seem to have semantic learning capabilities similar to non-amnesiacs.

Causes

Anterograde amnesia can result from damage to the hippocampus, fornix, or mammillary bodies, thus lending credence to the theory that these structures are primarily responsible for laying down long-term memories. However, the condition can also arise from damage to the basal forebrain (which produces acetylcholine) or a set of brain structures called the diencephalon.

"Traveler's amnesia" is a temporary form of anterograde amnesia in which victims may, for instance, realize they have changed planes during a memory gap or discover that they rent a car. This condition is caused by some medications, notably imidazopyridines and benzodiazepines, especially when they are used as sleep aids. Although medical researchers characterize this side effect as "less common", the benzodiazepine triazolam (Halcion) apparently has the greatest chance of inducing traveler's amnesia, whether taken exactly as directed, varying the dosage (say, when coming off the drug too quickly), drinking alcohol, or not getting enough sleep. However, benzodiazepines alprazolam (Xanax) and nitrazepam (Mogadon) are also more likely to be at fault, the former on its own and the latter when the victim is sleep-deprived or in some way changing the dose.

Criminals may use medications with anterograde amnesic effects for date rape. Unbeknownst to the victim, the perpetrator uses drugs such as flunitrazepam, temazepam, and other common substances, usually in a drink, to cause disorientation; incapacitation; unconsciousness; distortions in vision, time, sense, and identity; and an uninhibited state, the hallmark of which is anterograde amnesia.

Amnesia automatism is usually induced by prescription drugs, frequently but not necessarily in association with moderate alcohol intake. Victims have memory gaps for a period shortly after taking the drug concerned, which causes embarrassment and fear for what might have happened. Disinhibited and uncharacteristic behaviour (sometimes together with carrying out quite complex tasks - e.g. cooking and serving a nice meal, but in the nude) is sometimes witnessed during such episodes, which adds further embarrassment and distress.
Famous cases

The most famous case of anterograde amnesia is that of HM or Henry M. His brain lesions accidentally started the inquiry into the neurobiology of learning and memory.

Another notable patient is Clive Wearing, who was featured in the documentary The Man with the 7 Second Memory. Wearing fell ill with a variety of herpes simplex virus. The virus attacked his brain, doing greatest damage to the hippocampus, which is crucial for handling memory.

Oliver Sacks writes on two men with anterograde amnesia in two chapters of his book The Man Who Mistook His Wife for a Hat. Both suffer from Korsakoff's syndrome, which causes an anterograde amnesia that is irreversible. "The Lost Mariner" chronicles the life of a patient who, since he has forgotten everything that has happened since World War II, lives in complete certainty that it is 1945. Oblivious to his condition, he also believes he is decades younger. In "A Matter of Identity", Sacks profiles the other man, also unaware he suffers from amnesia. Rather than having a consistent false belief about his situation, he deals with his amnesia by constantly re-evaluating and re-explaining his situation. For instance, he greets whoever is with him in the room over and over again, each time with a different name.

Questions: Please answer on a separate sheet of paper

1. What type of people most commonly experience amnesia?

2. Why can’t people who have amnesia “imagine the future”?

3. Which type(s) of amnesia is most typically from a head injury?

4. Which type of amnesia is most typically from drug usage?

5. Which type of amnesia is most typically caused by malnutrition?

6. How long can anterograde amnesia last?

7. How common is anterograde amnesia?

8. Why should the term “short term memory loss” not be used to describe anterograde amnesia?

9. What causes anterograde amnesia?

10. What caused Clive Wearing’s amnesia?