

Discuss the role of  
the hippocampus in  
memory



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In everyday life, we use this term amnesia to refer to “ loss of memory”. This implies that amnesia is a kind of forgetting or apparent loss, and indeed some forms of memory disorder do result from a loss of what has already been stored or an inability to retrieve stored information. But amnesia in more general is a “ disease of memory”. The term is also used for cases in which encoding and storage are impaired so that new memories cannot be formed while leaving language and perception intact. Thus amnesia is a profound memory deficit due either to the loss of that has been stored or to the inability to form new memories . some amnesias have a biological basis; the memory machine-the brain, is disturbed in some way. These may be biological amnesias. Other amnesias may be called psychological amnesia. Without any known malfunction, these amnesias result from major disturbances in the processes of information encoding, storage and retrieval. The distinction between these two general kinds amnesia biological and psychological is however, often blurred. On the other hand, encoding, storage, and retrieval processes are impaired in the biological amnesias; and on the other hand, some psychological amnesia may turn out to have biological basis. When we think of amnesia, we often have in mind the person who forgets almost everything, including his or her identity. But in a sense, everyone is an amnesia victim; we remember very little of our early childhoods and our dreams.

Childhood amnesia- Both common studies and common experience agree on the poverty of early memory. Why is our early childhood memory so poor? Freud (1938) used the “ repression” concept to account for childhood amnesia he said that we are unable to retrieve childhood memories because

they are associated with the forbidden, guilt-arousing sexual and aggressive urges he thought characterised early childhood. These urges and their associations are repressed and cannot be retrieved they are “ forgotten” because being aware of them would result in strong feelings of guilt or anxiety.

Another interpretation of childhood amnesia (Schacter, 1959) stresses differences in the ways young children and older people encode and store information. As adults, much of our memory is encoded verbally and tied into networks, or schemata, that are based on language; it is probably no accident that language development and the richness of memory go hand in hand. But when we were very young and without language, we encoded memories in a nonverbal form perhaps storing information as images or feelings. Early childhood memories are thus set to be stored in forms no longer available to us as verbal adults; our language dominated memories do not have retrieval cues appropriate for gaining access to the image-and feeling memories of early childhood`

The interpretation of childhood amnesia is that it may not be very psychological at all. The brain is maturing and growing in the first few years of birth. Perhaps the memory machine is just not able to store long term memories until its maturation is essentially finished. Language ability and memory develop together, according to this interpretation, because both depend on brain maturation.

Dream amnesia -We dream several times each night, but we remember very few of these experiences. Freud's (1990/1953) interpretation of dreams was

based, as was his interpretation of childhood amnesia, on the repression. He considered dreams to be expressions of forbidden sexual or aggressive urges. These urges can produce strong guilt or anxiety if we become aware of them in ourselves so their expression in dreams is hidden behind the disguise-the actual content of the dream. But even the disguised urges - dreams -have the capacity to generate some guilt or anxiety feelings hence they are forgotten.

Other interpretations stress the differences in the symbol system used in dreaming and waking (Hall, 1953), a situation similar to that in one of the interpretations of childhood amnesia DESCRIBED ABOVE if the memory-symbol networks of waking life are different from those of dreaming, we may have difficulty retrieving dreams in the waking state.

And just as with childhood amnesia, dream amnesia may actually have a biological basis. The dreaming brain seems to be in a special state different from that of the waking brain. Thus dream amnesia may be just another example of state-dependent memory. Amnesia can be categorized in a number of different ways, but it is common to distinguish between retrograde and anterograde. Different types of amnesia's are given below.

### **Retrograde amnesia**

It is a form of amnesia which results from brain injuries in that the individual loses memories for the time period just earlier to the injury. The time period can expand from few minutes to several years, and naturally it is worse for even which occurred before the injury. Very rare cases have been reported in which a person sustains full retrograde amnesia as a result of physical brain

injury more often, retrograde amnesia occurs in a person who also has anterograde amnesia. In this case the person will have nearly total loss of memory for the events which occur after the injury and some loss of memory for the events which occurred before the injury. Retrograde amnesia initially targets your most recent memories. The more severe the case the farther back in time the memory loss extends. This arrangement of destroying newer memories before older ones is called Ribot's law. It generally happens because the neural trails of newer memory are not as strong as older ones that have been strengthened by years of retrieval. Retrograde amnesia usually follows damage to areas of the brain beside the hippocampus because the long term memories are stored in the synapses of different brain regions. For example, damage to Broca's area, which is the house for language information would likely to cause language related memory loss. With both anterograde and retrograde amnesia, it is very important to know that people's understandable, or episodic, memory is normally lost. Amnesia patients retain their personality and identity, along with their implicit, or procedural, memory. That's because the motor skills and instinctive physical memories like riding a bike are stored separately from your episodic memories. The hippocampus firstly processes both types, but episodic memories move to the cortex, while procedural ones go to the cerebellum. Defensive amnesia

This is the well-publicized, but relatively rare, type of psychological amnesia that has captured the popular imagination. People with this form of amnesia may forget their names, where they have come from, who their spouses are, and many other important details of their past lives. It is called defensive

because this type of amnesia is usually considered to be a way of protecting oneself from the guilt or anxiety that can result from intense, intolerable life situations and conflicts. We often wish we could forget a nagging problem. The defensive amnesiac does what we might wish to do and, because the problem has so many complications in his life, forgets much more than the specific problem itself. Defensive amnesia is thus an extreme form of repression.

### **Anterograde amnesia**

Anterograde amnesia is a condition in which an individual is unable to form new memories. The short term memory is still there in the brain but it's difficult to store new memories to long term memories. It is generally said to be the result of some form of brain injury or trauma. The severity of anterograde amnesia vary from person to person but it always include forgetfulness it leads to a complete or partial inability to recall the past.

Alcohol intoxication can be one of the reasons for anterograde amnesia. The phenomenon is generally called blackouts, studies show the sudden rise in blood of alcohol concentration over a short period of time , severally impairs and in some people it completely blocks the brain's ability to transfer short term memories which are created at the time of taking alcohol rapid increase in blood, alcohol concentration are caused by drinking large amount of alcohol in short period of time, particularly empty stomach can lead to anterograde amnesia but apart from alcohol consumption, drug can also be the major agent which favours and can lead to anterograde amnesia drugs like benzodiazepines, lorazepan, triazolam etc. these drugs have very power full amnesiac effects and can lead to anterograde amnesia.

Transient global amnesia- this is a profound memory problem with no loss to consciousness. It comes on suddenly without any obvious cause and it typically lasts only for few hours or days before memory becomes normal again. Fortunately, most people who experience such amnesia have it only once. This type of amnesia is called global and it's because so much of what has already been stored in memory is forgotten and because, even though the victim is conscious and can go about the routine business of daily life =, no new memories are formed while the attack is in the progress. In other words, both retrograde amnesia (forgetting events one was exposed to in the past) and anterograde amnesia (the inability to encode and store new information) characterize transient global amnesia. The cause of transient global amnesia is due to temporary alterations in the normal pattern of blood flow to the brain. Marijuana, Alcohol and Amnesia

Marijuana appears to have a limited short lived effect on the encoding, storage, and retrieval of information (loftus, 1980), but can hardly be said to result in amnesia. Even when marijuana is taken in relatively high dose, its, memory effects fall far short of those of the most popular mind -altering drug -ethyl alcohol. Heavy drinking over a period of years, however, can result, through vitamin-b deficits and other chemical imbalances, in irreversible brain damage and a pattern of symptoms known as the korsakoff syndrome. Anterograde amnesia (the inability to form new memories) is one of the prominent symptoms of this syndrome. Korsakoff patients also have some loss of what are called remote memories - remembrances of events that occurred in their early lives (squire & cohen, 1982) and memory is not the only information-processing problem of korsakoff patients; they have

difficulties with attention and perception that may impair their performance on some remote memory test.

### **The major difference between anterograde and retrograde amnesia.**

The major difference between both anterograde and retrograde amnesia is that anterograde amnesia happens when a person is unable to remember the events which happened right after the amnesia (diseases or traumatic events) the person is not able to create new memories. It can happen because of strokes, brain injuries and too much amount of alcohol consumption. Whereas in retrograde amnesia the person is unable to remember events before the amnesia but different from anterograde amnesia patients they can still able to create new memories. And retrograde amnesia is loss of more long term memories.

### **The role of hippocampus in memory**

The hippocampus is said to be the major components of the brain of humans, it is the part of limbic system and plays an important role in the merging of information from short term memory to long term memory and it is a collection of structures located just behind the amygdala, and plays an important role in memory. It's like many structures of the brain and not fully mature until a child is 2-3 years old and that most of structures fully develop as the result many cognitive activities; the hippocampus receives information from all association areas of the brain and sends information back to them. The hippocampus has way connections with many regions in the interior of the cerebral hemispheres. The hippocampus formation is in a position to know and to influence what is going on in the rest of the brain. It



uses this information to influence the establishment of explicit long term memories. The structure appears to be very important for the navigating or exploring out way around a spatial environment or in forming representations of the locations of objects. Spatial memory, the ability to encode and retrieve information about locations and routes is memory itself Kassel et al.(2001)our brain structure and functioning known to be the most complex processes of forming , sorting and storing memories. Different studies have put light on the influence of hippocampus to memory studies have shown that the hippocampus is critical to learning and remembering relationship that characterise spatial layouts. People who suffer from anterograde amnesia have damaged hippocampus by this they cannot remember their past and cannot form new memories but can learn new skills and hippocampus is very essential in various skills like contextual learning. Damage to the hippocampus does not affect some types of memory like the ability to learn new cognitive skills like solving puzzle or playing any musical instrument. Hippocampus is considered the most important part of the brain because if it is damaged them it can lead to memory loss and it is very difficult to live a life like that.