

AS Psychology Essay – Memory – Forgetting

Human memory, like memory in a computer, allows us to store information for later use. There are 2 main types of store for our memory. Short Term Memory (STM) and Long Term Memory (LTM).

It is usually argued that information enters the STM as a result of applying attention to a stimulus, which has been momentarily held in a visual or auditory sensory register. However, McKay's findings do not fully support this, claiming that unattended information may also enter the STM. For LTM there are generally two schools of thought: Firstly, if information in the STM is rehearsed enough, then it is transferred to the LTM (as shown by Atkinson & Shiffrin, 1968). Secondly, if meaning is applied to the information in STM, this may also lead to the transfer of information.

The capacity and duration of both differ substantially. The capacity for STM is very small, Atkinson & Shiffrin (1968) proposed 7 ± 2 items of information. Miller (1956) claims it is 7 "chunks" however another possibility is that STM doesn't have any storage capacity; it is the processing capacity that is limiting (Gross, 1990). The experiments on STM's duration show it to be up to 30 seconds. Peterson & Peterson (1959) found it to be 6-12 seconds, whilst Atkinson & Shiffrin (1968) and Hebb (1949) state it is 30 seconds. LTM capacity has no known limit as Barnyard & Grayson (1996) pose the question, "Can you imagine your long term memory being full?" and its capacity can be minutes to potentially a lifetime.

In both STM and LTM there are 3 main theories for each as to why we forget things. For STM the theories are:

Displacement - existing information is replaced by newly received information when the storage capacity is full (Waugh and Norman, 1965)

Decay - information decays over time.

Interference - other information in storage at the same time distorts the original information (Keppel and Underwood, 1962).

The LTM theories are:

Decay - as above, stored information decays over time

Interference - as discussed previously, knowledge already held is distorted by other information, altering the validity of the initial memory (Anderson, 1983).

Retrieval Failure - as opposed to the other two theories, information is not presumed lost, but there is an inadequacy of effective cues to prompt recall (Tulving, 1968).

Displacement Theory:

If the STM is a limited capacity system then forgetting might occur via displacement. When the system is full the oldest material in it would get displaced or 'pushed out' by the incoming new material. Waugh & Norman (1965) explored this possibility by a serial probe task. Their experiment was to present participants with 16 digits at the rate of 1 or four per second. One of the digits (the 'probe') was then repeated and participants had to say which digit followed the probe. So presumably if the probe were a digit at the beginning the chances of recalling it would be small, as later digits would have displaced the earlier ones. And if the probe digit were given towards the end of the list then the chances of recalling it would be higher as it would not yet have been displaced.

Decay Theory:

Decay theory or trace decay tries to explain why forgetting increases over time. As we learn, decay theory presumes that a structural change to the brain takes place (the engram). So according to decay theory metabolic processes occur over time, which break down and degrade the engram, unless it's maintained via repetition and rehearsal. This results in the memory contained within it becoming unavailable. Hebb (1949) argued that the engram, when formed whilst learning, is very delicate and liable to disruption (the active trace). So as we learn it grows stronger until a permanent engram is formed (the structural trace) through neuro-chemical and neuroanatomical changes. So STM forgetting is due to the disruption of the active trace, and decay through disuse explains LTM forgetting. However Jenkins & Dallenbach's (1924) experiment concluded that interference is more important than the mere passage of time. Their experiment was to have participants learn ten nonsense syllables. Some then went to sleep immediately (the 'do nothing' state) while the others went about

their normal activities. They found that the participants could recall more syllables after sleep than those who tried to recall the syllables after going about their normal activities.

Interference Theory

According to this theory forgetting is influenced more by what we do before or after learning than by the mere passage of time. There are 2 types of interference, retroactive (RI) and proactive (PI). RI is when later learning interferes with the recall of earlier learning and PI is when earlier learning interferes with the recall of later learning. The strongest support for interference theory comes from laboratory studies, however these studies lack ecological validity because learning in such studies does not occur in the same way it does in the real world, the studies also tend to use nonsense syllables as the stimulus material. When meaningful material is used interference is more difficult to demonstrate (Solso, 1995) although in support of interference theory, it is generally agreed that if students have to study more than one subject in the same time frame they should be as dissimilar as possible.

Retrieval-failure Theory

According to this theory memories cannot be recalled because the correct retrieval cues are missing or cannot be used. This is demonstrated in the tip-of-the-tongue phenomenon, in which we know that we know something but cannot retrieve it at that particular moment in time. Brown & McNeill's (1966) 'tip-of-the-tongue' experiment gave participants dictionary definitions of unfamiliar words and asked them to provide the words themselves. Most participants either knew the word or knew they did not know it. However some were sure they knew it but could not recall it, they were only able to give the first letter, the number of syllables or words which sounded similar etc.

The above theories are the main ways we seem to forget things; there is however other means in which we fail to remember things.

Emotional factors can have a major part in forgetting; memory of past events can be affected by their emotional significance (Groome *et al.*, 1999) to the person. According to Freud's (1901) Motivated-forgetting theory, forgetting is a motivated process rather than a failure of learning or other processes. Repression refers to an unconscious process that renders certain memories inaccessible. Things that are likely to induce guilt, embarrassment, shame or anxiety are likely to be repressed as a defense mechanism. This is shown in Freud's report of a man who continually forgot the line that followed 'with a white sheet'; even though he was familiar with the poem it came from. Freud found that it was because the man associated 'white sheet' with the linen sheet that is placed over a corpse. For Freud, the apparently innocent forgetting of the poetry involved the repression of the unconscious conflicts over the fear of death.

Freud's repression hypothesis is backed up by Levinger & Clark's (1961) test in which they looked at the retention of associations to negatively charged words (like 'hate', 'fear', 'angry') compared with those for neutral words (like 'window', 'cow', 'tree'). The results showed that it took the participants longer to respond via free association to the emotional words than it did the neutral words and the amount of galvanic skin responses (GSR) was higher (GSR is a measure of emotional arousal). They also asked immediately after the test if the participant could recall their associations, they had particular trouble recalling the words they'd associated with the emotionally charged words. This is exactly what Freud's repression hypothesis predicted. However there are other studies, which show that whilst highly arousing words tend to be poorly recalled when tested immediately the effect reverses after a delay (Eysenck & Wilson, 1973). If the words are being repressed this should not happen, suggesting that arousal was the cause of reversal.

Traumatic experiences can undoubtedly produce memory disturbances, but there is great doubt as to whether Freud's explanation is the best one (Anderson, 1995). Psychogenic Amnesia is a form of amnesia that does not have a physiological cause; it commonly takes the form of memory loss for events occurring over some specific time frame (event-specific amnesia). It may last hours or years but it can disappear as suddenly as it appeared. This is difficult for motivated-forgetting theory to explain.

Amnesia refers to a partial loss of memory. It generally means temporary or permanent impairment of some part of the memory system. It's basically caused by anything that damages the brain, which tends to slow down the rate of acquiring new information and the

speed of renewing existing knowledge. Areas in brain which if damaged can produce amnesia, tend to involve a circuit linking the temporal lobes of brain with frontal lobes and the limbic system comprising of hippocampus and the maxillary bodies. There are many different types of amnesia: Anterograde, Retrograde, Pure, Traumatic, Post-Traumatic, Infantile/Childhood and Hysterical Amnesia. The functional characteristics of amnesia are:

- 1) STM in amnesic patients is typically normal; the working memory can be quite intact.
- 2) Semantic memory may also be well preserved – impairment only becomes obvious when amnesic subjects try to add new material to semantic memory, e.g. updating knowledge of current affairs.
- 3) Non-declarative knowledge or implicit learning is typically preserved in amnesic patients, especially for skills, priming, classical conditioning and non-associative learning.
- 4) Procedural learning - although amnesic patients may not remember acquiring a new skill, their capacity to learn and perform new skills may be unimpaired by deficits in other areas of memory.
- 5) LTM - pure amnesic patients have difficulty in new episodic learning.

So whilst cases of psychogenic amnesia are consistent with Freud's theory, a strictly Freudian interpretation may not be necessary, and experimental support for the repression hypothesis is inconclusive.

It seems that as much as we remember, we forget even more. Forgetting isn't really all that bad, and is in actuality, a pretty natural phenomenon. Imagine if you remembered every minute detail of every minute or every hour, of every day during your entire life, no matter how good, bad, or insignificant. Now imagine trying to sift through it all for the important stuff like where you left your keys.