

## Theory of Availability – Trace Decay Theory

a) The trace decay theory argues that memories become less available over time as our brains create a path or 'trace' to each memory which, if we don't rehearse it, will fade away and we will no longer be able to remember it anymore. It argues that once the trace has faded, that particular memory is gone forever. To keep memories available we must constantly revisit and rehearse them. This theory explains the reasons why we remember interesting or meaningful information; however, this theory does not really apply to procedural memories, for example riding a bike, swimming, as once we have learned how to do these processes we rarely forget them. Ebbinghaus in 1885 carried out an experiment on himself by making himself learn a list of nonsense syllables and then tested his recall over time intervals. The intervals ranged from 10 minutes up to 30 days, and he found that the longer the duration, the less words he could recall. Ebbinghaus concluded that over time, the trace faded and the list of syllables was lost. However, there are some criticisms of this experiment, one being that he was the only participant so it is hard to make a generalisation from such a small sample. A further criticism of his experiment was using himself as a participant which could lead to experimenter bias. He knew what his aims and results were, so there was a possibility of demand characteristics. Overall, the criticisms of the trace decay theory are that we cannot physically see the trace so it is impossible to prove, neither can we test to see whether information has permanently faded away as it might just be that we cannot remember the information at that point in time. Also, this theory can be seen as more of a prediction than a theory as there is not much evidence to support it. And information is not always forgotten despite not being revisited often, which shows that not all memories fade away. Not all forgetting may be caused by decay, it could be more of an accessibility issue than an availability as we have many interfering events to do with learning and recall.

b) According to the trace decay theory, learning something creates an engram in our brain which gradually fades over time. The theory says that as we learn new information, it interferes with previous information, and therefore the engram grows fainter until we cannot recall it anymore. Peterson and Peterson (1959) used the Brown and Peterson technique (where participants were asked to recall trigrams, but after the presentation asked to count backwards in threes) to support the trace decay model. This technique found that the counting caused forgetting, and Peterson and Peterson suggested that this was because the counting prevents rehearsal taking place which is necessary to replenish the engram before it decays completely. However, this could also be explained by displacement; as the

participants were counting backwards, the numbers were being stored in their short term memory and therefore displacing the trigrams.

Procedural memory shows little effect of trace decay, i.e. when you learn to swim you do not forget how even years later.

One problem with testing the trace theory is that you can never see and evidence of an imprint on the brain, so we cannot tell whether it really exists or not. Also, procedural memories are rarely forgotten, so this cannot apply to all forms of remembering.

Bahrick's (et.al) study goes against the trace decay theory. In his experiment, Bahrick tested participant's memory for class mates faces several years after they had graduated from high school. One out of the five pictures was a person that they had graduated with. Bahrick discovered that 90% of participants were identifying their classmates correctly, even those who had graduated more than 40 years previously. So, trace decay did not happen in this case.

c) Craik and Tulving conducted an experiment in which they tested participants by asking them three sets of questions in the categories rhyming, structural and meaningful. They were asked very simple questions such as 'does this word start with a capital letter?' and then the results were recorded. Craik and Lockhart decided that the semantic words they tested the participants on were processed more deeply than the other words as they had meaning to the participants. However, the recall may have been better in some participants as the words may have had a previous significance to them, for example if one of the words was 'garden' and their occupation involved gardening, then the recall may have been better for that word. Also, Craik and Lockhart were trying to prove that there was only one memory store, and this experiment does not prove that, as there may be three stores but each having a different capacity.

A further limitation of Craik and Tulving's experiment is the duration, which is relatively short. It didn't test short term memory over a period of hours or weeks. It is also limited as to whom the results can generalise to. The assumption is that only adults process this way. It doesn't consider all of the senses, just sight, nor the individual learning style of each participant. Even the deep condition is not really meaningful, so will the information really stay in the long term memory?