Lesson 5

Explanations of Forgetting: The Interference and Context Explanations

Why do we forget things? There is no single answer to this question. Most likely we forget different things for different reasons. In this lesson we look at two of several suggestions made by psychologists, the interference and the context explanations.

The Interference Explanation of Forgetting

This explanation has two models: proactive interference and retroactive interference.

Proactive interference: things you have remembered in the past interfere with something you are trying to remember now.

For example, if you learned French at school, you learn that the French for tree is ***arbre***. So you now associate the English word tree with the French word ***arbre***. But perhaps you want to learn German as well? The German for tree is ***baum***. Now you want to associate the English word tree with the German word ***baum*** too. According to the interference explanation of forgetting, the first association, between the English and French, interferes with the attempt to associate English and German. So you are less likely to remember ***baum***.

This is proactive interference – an old memory interferes with a new one.

Retroactive interference: things you are remembering now will interfere with things you remembered in the past.

Taking the same example, learning the German for tree now interferes with your memory of the French for tree, which you learned previously. So you may forget the French for tree because you have just learned the German for tree.

This is retroactive interference – a new memory interferes with an old one.

Trigrams are sometimes used in the study of memory: these are combinations of three letters that do not form "real" words such as ati, est, han. They are also known as "nonsense syllables".

The study of interference as an explanation of forgetting goes back a long way. For example, in 1924 Jenkins and Dallenbach asked participants to learn a list of nonsense syllables. They asked participants to recall the list after one, two, four or eight hours. Some of the participants slept during these periods and some stayed awake. Those who slept had better recall of the nonsense syllables than those who stayed awake. One explanation of this finding was that the mental activities of those who were awake interfered with their ability to recall the lists of nonsense syllables.

Jot down answers: does that 1924 study illustrate proactive or retroactive interference? Check the answer under "Feedback", at the end of the lesson.

However, another explanation of that result could be that sleep itself actively "consolidates" the memories. Perhaps during sleep the brain processes the information to make it firmer. So instead of protecting the participants from interference, sleep had actively encouraged improvement in memory.

The "Classic" Way to Study Interference: the A-B, A-C paradigm

The First Group

One group of participants is given a list of word-pairs to learn. The list is usually around 8 to 12 pairs long. This list is called the A-B list: the first word is the A and the word that accompanies it is the B. A pair might be Age-Not, for example. There are different ways this can be done. For example, the researcher may show the participant a pair of words on a screen for 2 seconds then move on to the second pair and so on until 12 pairs have been shown. Then the experimenter could show the A word alone (Age) and ask the participant to recall the B word that went with it (Not). This is repeated until the participant always gives the correct B word when shown an A word.

In the next phase the procedure is repeated and the same A words are given but now a different word accompanies each one. This different word is the C word. For example, the A word might be Age, as before and the C word might be Him. The procedure is carried out until the participant gives the correct C word for each A word. The researcher records the number of trials it takes for the participant to get the A-C list right. After 24 hours participants are tested to see how many A-C pairs they can recall.

The Second Group

A second group is given only the A-C list to learn. They also are tested on it 24 hours after they have learned it. The researcher notes the number of trials the participant took to learn the list and the number of pairs recalled after 24 hours.

The Outcome

If interference has taken place, learning A-B should have interfered with learning A-C so:

- The first group should take longer to learn A-C than the second group, because the second group had no interference from learning A-B;
- We would expect the first group to recall fewer A-C pairs after 24 hours because interference from the A-B list would affect their recall of the A-C list.

A study in 2009 used the A-B, A-C paradigm and demonstrated that interference has an effect on memory.

Studies of Forgetting: The Interference Explanation of Forgetting

Key Study: Ellenbogen et al., 2009, The Sleeping Brain's Influence on Verbal Memory[1]

***Reason why the study was conducted*:** to see if memory for a list of word-pairs (A-B) would be affected by learning a new list of word pairs (A-C)

Method:

- The researchers asked participants to learn a list of word pairs, which they called the A-B list. They tested them for recall on this list after 12 hours.
- 10 minutes after the test, the researchers asked the participants to learn a second list of word pairs, which they called the A-C list. The first word (A) was the same as in the A-B list but the second word of the pair (C) was different.
- 10 minutes after learning the A-C list they tested the participants on A-B again.

Results: they found the participants' scores on the first list learned, the A-B list, had fallen.

Conclusions: learning the new list had interfered with participants' memories of the previously learned list.

1. http://www.plosone.org/article/info:doi%2F10.1371%2Fjournal.pone.0004117#pone.0004117-Jenkins1.

Actually, the Ellenbogen et al. study included additional aspects. The participants were divided into two groups. One group stayed awake during the 12-hour period and the other group slept as normal. The group that had slept scored higher than the group that had stayed awake. This was true for both tests of A-B lists – before the interference task and after it (see **Table 5.1**). Ellenbogen and his colleagues used some rather complex statistical analysis[2] to conclude that interference does play a part in forgetting but that sleep also has an active role in consolidating memory.

	Awake Group	Sleep Group
Before Interference	65	80
After Interference	42	70

Table 5.1 Percentage of B Words Recalled Correctly

Practical Application of the Interference Explanation – Stagger Your Studies

This theory tells us that if you have to learn two things that are very similar you should learn them on separate occasions. For example, if you are trying to memorise a list of vocabulary for Spanish, you should not learn it at the same time as you learn a vocabulary list for French. You can apply this idea to all sorts of other subjects like learning maths formulae or science experiments.

Benefit

- You should save time in the long run by employing this application because your Spanish vocabulary memory will not interfere with your French vocabulary memory and this will minimise the time required to learn the lists.

Drawbacks

- It is very difficult with many tasks to say whether or not they are similar enough to interfere with each other. For example, will learning one piano piece interfere with your learning of another one or are there common, transferable "piano" skills that are reinforced by learning both, leading to improved performance in both? Also, what is the definition of "at the same time"? In the same morning? On the same day? In the same week/month?

2. Analysis of Variance (ANOVA) – which is not part of the GCSE syllabus.

Check Your Understanding. Write down your answers. Check them against the suggested answers in the ***Feedback*** section. Record your marks in your **Assessment Record**.

1. Is the following sentence a description of proactive interference or retroactive interference? "A list of words you are learning now affects your ability to recall a list of words you learned earlier." [1 mark]
2. What did Ellenbogen et al. conclude from their 2009 study? [2 marks]

The Context Explanation of Forgetting

Does this ever happen to you?

- You find yourself at the top of the stairs but forget why you have come up.
- You go into a room but forget why you went in there.
- How do you deal with this?

Lots of people do this. If this happens to you, you should find that returning to the place (the context) where you decided to go upstairs or into the room rekindles the memory of why you went.

In a rather unusual study, Godden and Baddeley asked a group of divers to learn a list of words underwater.

Studies of Forgetting: The Context Explanation of Forgetting

Key Study: Godden and Baddeley, 1975, Study of Divers' Memories

***Reason why the study was conducted*:** to see if people remember more if they are asked to recall information in the same context as the one in which it was learned.

Method: the researchers asked a group of divers to learn a list of words underwater. They tested half the group on their memory for the list on the beach and the other half back underwater.

***Results*:** the people who were tested underwater recalled more words than the people tested on the beach.

***Conclusions*:** being put back into the context in which they had learned something helped the divers to recall the list.

Why is this? You will remember the idea of encoding, storage and retrieval of information in memory. These are the important processes psychologists see in memory. Psychologists think that when we encode something – a list of words for example – we also encode the things around us as part of that thing. So the sights, sounds, smells, textures and even tastes of the moment are also part of the memory. Sometimes elements like smell may not be important – for example, you may not be able to smell anything at all at the moment. But at other times smell may be important. For example, the smell of the facemask to the divers in Godden and Baddeley's study could be important – and of course this is missing if they are not wearing it on the beach.

Each encoded memory is, then, associated with different elements of the context. When we are put back in the context those associations are recreated and they stimulate different elements of the memory.

Context-dependent forgetting, then, is the idea that we have forgotten something because we are trying to recall it outside the context in which we learned it.

Jot down an answer. According to the context explanation of forgetting, what is the best place for students to take their exams?

Students will recall most if they are back in the place in which they learned the material for the exam. Of course, it won't be easy to convince the exam board that you should be allowed to sit the exam in your bedroom but you might like to quote the Godden and Baddeley study as an argument!

At the beginning of this lesson we said there are other explanations apart from these two (interference and context). These other explanations cover ideas like:

- We forget things because we subconsciously want to forget them (e.g. we forget a dental appointment because we are scared of going to see the dentist);
- We forget things because our memory only has so much space and new memories displace ones already there.

Practical Applications of the Context Explanation of Forgetting: Recreating the Context (Police Reconstructions)

21-year-old Rachel Moran was last seen at about 2:15 a.m. on New Year's Day 2003 near a bus stop in Hull. She was feared dead as police divers had found her passport, mobile phone and handbag in water near her home.

On 16 January that year the police staged a reconstruction. A volunteer dressed in clothes similar to the ones worn by Rachel on the night she had disappeared. The volunteer stood at the same bus stop at the same time in the hope that the sight of her would jog someone's memory and they would come forward with more information to help the police find out what had happened to Rachel. This type of reconstruction is common when police have a last sighting of a victim but no further leads. Rachel's body was found in a nearby flat four weeks after her disappearance and her murderer was finally sentenced to life imprisonment ten years after her murder.

What's the Link with Psychology Studies of Memory?

In this lesson you have learned about the context explanation of forgetting. When we encode an item into our memory we encode the context too. By this we mean the surrounding sights and sounds and even our feelings. If we are put back into the context we can use all the other things from the context as "cues" to help us recall the item. In the case of this reconstruction, the police are hoping that someone who was passing when Rachel was standing at the bus stop will remember seeing her because all the other cues are there – the bus stop, the time of the morning, the feeling of being out at such a time and so on. Of course, there would be more context cues if the police were able to carry out the reconstruction on the next New Year's Day – but they could not wait that long.

Evaluation of the Reconstruction Application

Benefit

- This can be a very effective way to recall items from your memory. Certainly the police find it useful and often use it under the right circumstances. But we can use it in everyday situations too. Walking round the supermarket you realise you need a particular item and carry on choosing your goods for a few minutes. Then your recall that a few minutes ago you realised you needed a particular item but you cannot remember what it was. Return to the place you were in when you realised you needed the item and the chances are very high that you will recall what it was.

Drawback

- It is not always possible to go back to the original context or to recreate the situation you were in when you committed the items to memory.

Check Your Understanding Continued

3. What is context-dependent forgetting? [2 marks]
4. Why did the divers in Godden and Baddeley's study recall more underwater than on the beach? Explain fully. [3 marks]
5. Outline one practical application of psychological knowledge based on theories of forgetting. [2 marks]

Feedback

Suggested Answers to ***Check Your Understanding***

1. Retroactive interference. [1 mark]
2. They concluded that learning the second list had interfered with participants' memory for the first list. [1 mark] They said this was an example of retroactive interference. [1 further mark] [Total 2 marks]
3. Forgetting something because you are trying to recall it outside the context in which you learned it [1 mark] and don't have the associations created by the context in which you learned it. [1 further mark] [Total 2 marks]
4. Because they learned the list underwater and encoded the context when they encoded the list. [1 mark] When asked to recall the list underwater they were able to recall the parts of the memory associated with the context. [1 further mark] However, when asked to recall the list on the beach, they had no context associations to stimulate those parts of the memory. [1 further mark] [Total 3 marks]
5. (e.g.) Police reconstructions. [1 mark] In this application, the police recreate the scene of a crime and ask passers-by if they had been there at the time and what they could recall about the situation.[1 further mark] [Total 2 marks]

Integrating Methods Lessons

If you have decided to integrate your study of research methods with your study of the other topics in the course we suggest you work through Lesson 20 (Experimental Designs) at this point. After completing Lesson 20, return to Lesson 6.