

FACT SHEET: ***MAKING MEMORIES AND THE IMPACT OF TRAUMA***

Memories make us who we are and are the chain that connects our past to our present. They are what we have learnt over time.

Different kinds of memory are stored in different types of the brain. For example, remembering how to speak English, is stored in a different place to knowing how to sing. Some people who suffer strokes in the part of the brain responsible for language, can be taught to sing before relearning how to speak. That's because language is a left-brain function¹, but singing is a right brain function. Many children who experience trauma have difficulty speaking because trauma can affect the part of the brain responsible for language².

Another example of how different parts of the brain are responsible for different memories is Clive Wearing. Clive was an accomplished London musician but in 1985 he contracted a rare Herpes Encephalitis virus that affected his central nervous system. After this, he was unable to remember any of his past or make new memories. He couldn't recognise anyone but his wife. He could however remember how to walk, talk, fry an egg and play the piano. These are known as "procedural memories". The parts of Clive Wearing's brain responsible for recognising faces and storing short term memories were affected, however his procedural memories were left virtually intact.

It is not only illness however, but that also affects our memories. They can also be affected by trauma.

Making memories

To remember something, we must:

- Sense it (e.g., by feel, sight, sound, touch, or taste).
- Encode it into the brain and store it (consolidate it) for future use. This can be broken into short term and long-term memory.
 - Sometimes we store memory consciously. This is called **explicit memory**.

¹ There are two main areas of the brain associated with language: Broca's area (in the frontal lobe) which is associated with producing language, and Wernicke's area (in the temporal lobe), which is associated with comprehending language.

- Some we store memory without conscious awareness. We call **this implicit memory**. An example is classically conditioned associations. Perhaps you get sweaty and nervous at the dentist because you had a root canal last year.
- Retrieve the memory from storage (e.g., be able to recall, revive or recognise it into consciousness). Sometimes this can also happen without active concentrating. For example, you don't need to consciously retrieve your mental file about going to the dentist to think "Oral surgery – don't love it!". These implicit processes happen automatically.

Much of the information we encode depends on both the time it took to learn and how it was personally relevant to you.

Different types of memory include:

- **Semantic memories** – memories of general facts or knowledge like:
 - Paris is the capital of France.
 - $1+1 = 2$; or
 - Oysters are a good source of Zinc.
- **Episodic memories** – these are memories tied to specific episodes of your life. You might remember your first kiss or your school graduation. You might recall witnessing a car accident going to work. You may recall you really don't like the taste of oysters.

Making semantic and episodic memories takes conscious awareness. These types of memories are called explicit memories.

- **Procedural memories** – this is how we remember to do things like riding a bike or speaking English. It takes effort at first but eventually you do it without thinking much about it
- **Emotional memories** – these are the emotions experienced during an event. A war veteran may hear a helicopter and have an immediate sense of fear because it brings back memories of being in Vietnam. Think of the song by Redgum "I was only 19" and the lyrics "*why the channel 7 chopper chills me to my feet....*". Of course, emotional memories can also be positive such as when you smell roast turkey, and you immediately think of happy times at Christmas.

Trauma can affect our memories by blocking explicit processing and heightening implicit processing. Conscious recall is inhibited whilst sensory recall is heightened. Current research appears to show that increased cortisol in the hippocampus disrupts the consolidation of explicit memory and activities in the amygdala leading to release of adrenaline which intensifies implicit memory.

Whilst traumatised people often can't talk about their experiences, they may be compelled to re-enact them (van der Kolk 2015) without understanding the meaning of their behaviour.

Therefore, trauma is largely remembered as physical sensations, automatic responses and involuntary movements. It may also be very difficult for those experiencing trauma to communicate what they are experiencing to others.