

Lancashire Traumatic Stress Service**HOW TRAUMA AFFECTS THE WAY
IN WHICH WE ENCODE AND STORE MEMORIES**

In everyday life we take in information through our senses – sounds sights smells touches and tastes. This information is processed through various parts of the brain and at least some of this information is stored.

This is a complex process but for it is helpful to consider how two parts of the brain contribute to the steps involved in processing and storing information

So think of a really nice memory you have for an event that has happened in your past. When you do this –you will most likely come up with a picture of an event and as you think about it other memories of the same event will cluster together. You will probably also be able to recall when this event happened – the memory will have a “date stamp “

Next think of a sound – a piece of music, or a smell, that when you hear or smell it brings back for you a really strong positive memory. Again you will probably be able to remember when that event happened

We have the same brain for processing good memories and upsetting memories – it is just that in situations where we experience a very high level of stress or arousal – this high level of arousal has different effects on different parts of our brain

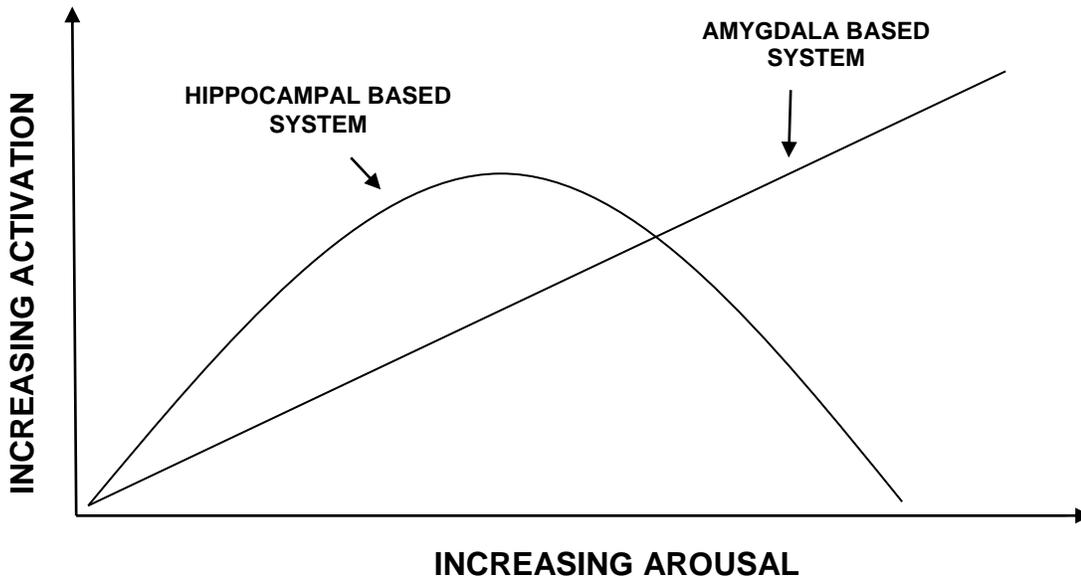
Two particular parts of the brain are important here – the HIPPOCAMPUS and the AMYGDALA –

The hippocampus is a small seahorse shaped part of the brain (hippocampus is Greek for seahorse) that has a role in giving memories a “date stamp”. Information comes in – it is stored for a while – it is given a date stamp and then passed on to the right “department” for long term storage.

As levels of arousal build up to modest levels the hippocampus gets better at its job. However when levels of arousal or stress get too high then the hippocampus starts to fail in its job of giving a date stamp to the memories it is processing.

The amygdala is a small almond shaped part of the brain and works, in part, to process sensory memories. Unlike the hippocampus, as levels of arousal or stress increase then the amygdala just keeps on getting better and better at its job.

The diagram below illustrates how increasing levels of arousal affect the ability of the hippocampus and the amygdala.



So, if we go back to your really nice memories, then these will have been encoded and stored with a date stamp and will be available for you to reconstruct whenever you want to think about the event. You will also be aware that this is an event from your past – you won't think that this is an event that is happening now.

Memories of traumatic events, though will be different. They may well be encoded and stored in very rich detail – but without a date stamp.

The lack of a date stamp has some potentially serious implications that are highlighted below.

Remember that one of the key tasks for your brain is to keep you safe and out of danger. If needed your brain will react first and then think about it afterwards – always helpful when we need to jump out of the way of a car or a bus.

If we have been involved in a seriously traumatic event then – as we have seen above – it is likely that your brain will have stored a great deal of information about this event – but not given the information a date stamp. As a result your brain will be working as though the event is about to happen again now.

You will be aware that you are on “red alert” and that you will react suddenly to “cues” or “triggers” that are possible reminders of the traumatic event.

Have a read of this example

*Joanne had been involved in a gun attack and at one point a pistol had been fired at her. She remembers thinking at that moment that she was about to die but luckily the bullet just missed her. Since that event Joanne had been especially sensitive to sudden loud noises and showed clear signs of fear when they occurred often diving for the floor. She described the situation as though the attack was happening again **right now** not as though it was an event in the past.*

In this example what may have happened is that in the situation of high stress or arousal the event was encoded and stored in great detail but without a date stamp. This means that any cue – in this case a noise in any way similar to the gun – leads to the brain believing that the event is happening again and that there is a need to take action.