Memory

“Oops! I forgot”... “It slipped out of my mind” - something that we have all said at so many points in our lives. But what do we really mean by saying this? What is really forgetting something? And why do we forget?

To start with, let us consider that our brain is the storage box of the body, just like a computer hard drive. Just as computer hard drives have several partitions, so does the human memory. In our memory, we arrange things according to importance of them in our life - our priorities. Now, if you start asking “how do these memories get generated?” or “How the human memory arranges themselves according to relevance?” that’s where it becomes difficult, because we still don’t have a complete understanding of the process of memory generation. All we have is a handful of hypotheses.

Right now what is known is that several stimuli generates a certain type of nerve impulse, and when that nerve impulse reaches the processing unit (brain), it gets split into two fractions: i) effector response and ii) memory inducer. The effector neurons carry the effector fractions to the region of interest, where effect is needed to be performed. And the memory inducer fraction gets stored possibly in the frontal lobe of the brain. Imagine, a nail has made its way into your foot, and it hurts - this is an indication that something is wrong with your foot; scientifically, the breakage of neuron ends enables the protective mechanism of pain. You take a look at your foot because the stimuli of pain has been processed and given you the indication that something is wrong down there. When you look at your foot and see that nail, the image and the pain acts as the stimuli together, they get processed together, and that help you to take a decision of removing it with your hand, that means the effector part of signal went to your hand to remove that nail. A memory of that incident gets stored in your brain, so that you can do it faster next time, this is the memory inducer fraction. Each and every time your brain processes any information some new neuron connections gets built up, and each time you perform the similar task the connections gets stronger. This connection and network is the key to generation of memories. Sometime, the night before the exam we all try to mug up a few things which we don’t understand completely, but most of them are forgotten even before the exam starts, or may be by the time the exam is over you will definitely forget them. You see, this the difference between understanding something and just mugging it up. When we understand something very clearly, that information is processed with a strong and huge neuron connection network. The stronger and larger the network, the chance of generation of permanent memory is more. On the other hand if you simply mug something up, the network generated for that information to process is too small and weak to generate a permanent memory. When you read something, the more you imagine it, the more chances that you will remember it in greater detail only because of the establishment of a bigger and stronger neuron network. This is why some people remember notes better only after reading it once while some struggle to remember even after reading it 100 times.

Some scientists have hypothesized that storage of memory in human brain is similar as writing some information on to an disk by a magnetic disk writer and gamma brain waves are now being used to prove this hypothesis, but let us consider this-

Everything we see, hear or feel generates a pattern of networks inside the brain for a particular stimuli. The pattern is unique (the colour green generates a different pattern of network than colour red, and if you mix green and red together a new pattern will be formed consisting of some common areas from the pattern responsible for green and red, and there will be some area which are not common to neither green nor red, unique area.) Knowing this, I have inferred that *"our brain does not store the electrical signals passing through its neurons for a particular stimuli, but it stores the pattern of the network generated for that stimuli. And next time when we encounter the same stimuli, the same pattern is generated again. We say we remember it when we are able to reproduce that network of neurons even in the absence of that stimuli, and we say we have forgotten when we are not able to produce the pattern on our own. And this is the memory. There is a bright side of storing patterns instead of storing actual electrical signal signatures, reducing consumption of the memory area. Though a normal human being has around 2.5 petabytes (1 million Giga bytes) of memory to use in his full lifetime but looking at the amount of data we store it would have been finished very soon if we had actually stored electrical signal signatures instead of patterns."*

The point is, once we decrypt the signal and procedure of memory generation in the brain, a sky high standard can be achieved in the fields of BCI (Brain Computer Interface), computer sciences, computational biology and artificial intelligence, which can bring a revolution in living standards. But that requires a dedicated man power and proper infrastructure so that difficult questions like "spontaneous memory flow", "multiple network co-existence", "stimuli co relation", "pattern overlaps", "time dependent erasing of memory", "difference between conscious and subconscious", "metaphysical dimensions of mind" can be explained.

Want to decrypt the brain? Start right now. Imagine, plan, experiment and thrive.

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