

I Remember... with Coffee!



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If it were possible to take a snap shot of all the early mornings happening in the world, there would seldom be one without a cup of coffee resting on the table. For some, a sip of coffee has become an act of routine while reading the morning paper. For others, it is a major element in a special breakfast with friends or family, and for many it is essential to survive the hardships of the day. According to the U.S. Food and Drug Administration, “caffeine occurs naturally in more than 60 plants including coffee beans, tea leaves, kola nuts used to flavor soft drink colas, and cacao pods used to make chocolate products”. Since caffeine was discovered in around 800 A.D.⁽¹⁾ its savour carried it across the continents of the old world till it became an element of tradition for the many cultures who experienced its taste. As its use escalated and was handled in different ways, caffeine gradually was the subject of numerous research to study its effect on the human body. **Aside from its reputable effect – wakefulness – a recent study has shown that caffeine also has a remarkable effect on memory!**

A study was published on January 12, 2014 in *Nature Neuroscience* by Daniel Borota et al. from Krieger School of Arts and Sciences at Johns Hopkins. It demonstrated that caffeine enhances certain memories to at least up to 24 hours after it has been consumed.⁽²⁾ In order to ensure non-biased trustworthy results, a double-blind

trial was performed on participants who don't consume coffee on a regular basis. The participants were divided into 2 groups. Then they were asked to study a series of images. 5 minutes later, each group was given either a placebo or 200 milligrams of caffeine. Salivary samples were taken at certain intervals of time as a reflection of the amount of caffeine present in their body. The following day, the examiners showed the two groups again

3 sets of images: one set had the same exact images they saw the day before, another had “similar” but not identical images, and the third had new images. The results showed that the group that was given caffeine had more members that could differentiate the “similar” images as not identical to first ones they saw the day before.

It is important to note that the techniques implemented in this study were not chosen by chance. On the contrary, they helped fill the gaps where other studies have failed when attempting to study caffeine's effect on memory. To begin with, many previous studies showed that caffeine has no pronounced effect on memory because their research didn't yield significant results.⁽³⁾ On the contrary, this study highlighted the concept of “pattern separation” which is defined as “the process of making similar patterns of neural activity more distinct”.⁽⁴⁾ Hence, being part of the hippocampus – the part of the brain involved in learning and memory – this emphasizes its role in memory functions.⁽⁴⁾ In other words, through activating “the pattern



of separation”, the brain makes more effort remembering small details that help it differentiate similar things from each other. The use of such images as part of the experiment was, therefore, of critical significance in assessing memory. As the participants who were given caffeine – as compared to those who were given placebo – were able to distinguish between the “similar” and identical images, this provided reliable evidence that caffeine actually enhanced memory. With all this in hand, however, detailed explanation of caffeine's effect on long-term memory is still poorly studied.

Another tactic that this study has used but others have overlooked is the time that caffeine was administered in the experiment. Previous studies have introduced caffeine before they conducted their experiments, i.e before they asked their participants to perform the cognitive tasks that were to be tested. Although the experiments performed yielded enhancements in cognitive functions, it was unclear whether they were due to caffeine's effect on memory, alertness, focus, attention or the like. This has rendered scientists unable to objectively assess memory changes due to caffeine intake. On the contrary, Daniel Borota et al.'s experiment has introduced caffeine after the tests were done, which helped to exclude all the variables, leaving memory as the only variable to be clearly tested.



Finally, as the U.S. Food and Drug Administration has published in the year 2007, the worldwide consumption of caffeine reached around 90% of people.⁽⁵⁾ Furthermore, in the United States, 80% of people consume around 200mg of caffeine per day in different forms, which is the same amount used in the experiment. This shows that the results of this study are not so far from being applicable in everyday life.

As caffeine was demonstrated to improve many health conditions like some forms of cancer⁽⁶⁾, type 2 diabetes mellitus, Parkinson's disease and liver disease⁽⁷⁾, many

more studies are still being conducted in an attempt to test the wide range of its effects on the human body.



Finally, as more extensive research is being done to explain the detailed physiology of caffeine on memory, there is no doubt of its end result in enhancing memory. Therefore, for students who resort to coffee to wake them up for their morning classes, why not make use of it in exams that focus on memory capacity? That would prove to be useful!

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