

Coffee vs. Caffeine

"The Best Part of Wakin' Up Is Folgers in Your Cup®"?

A lot of people depend on a cup of coffee to begin their day, as it aids in making them more alert and productive. We commonly associate this with the caffeine it contains, but is caffeine the only element that contributes to improved cognitive function and work productivity? Or is there another factor involved?



Abstract

Habitual coffee consumers justify their life choices by arguing that they become more alert and increase motor and cognitive performance and efficiency; however, these subjective impressions still do not have a neurobiological correlation. Using functional connectivity approaches to study resting-state fMRI data in a group of habitual coffee drinkers, we herein show that coffee consumption decreased connectivity of the posterior default mode network (DMN) and between the somatosensory/motor networks and the prefrontal cortex, while the connectivity in nodes of the higher visual and the right executive control network (RECN) is increased after drinking coffee; data also show that caffeine intake only replicated the impact of coffee on the posterior DMN, thus disentangling the neurochemical effects of caffeine from the experience of having a coffee.

Did you know that coffee can affect human behavior? This is due to two main compounds found in coffee: caffeine and chlorogenic acids. Caffeine can improve brain metabolism and memory performance, while chlorogenic acids may have an impact on neuronal performance.

A recent study conducted functional MRI scans on regular coffee drinkers before and after consuming caffeine or a standardized cup of coffee. Both groups showed more prepared brain networks associated with task performance. However, drinking coffee also increased connectivity in areas of the brain involved in working memory, cognitive control, and goal-directed behavior. This effect was not observed with caffeine alone.

This suggests that there may be additional benefits to drinking coffee beyond just the caffeine content. It could be due to a "placebo effect" or our expectation that coffee will wake us up and make us ready for the day. Although the exact mechanism is not yet known, it appears that those who enjoy a cup of coffee to start their day are on the right track!

Magalhães, R., Esteves, M., Vieira, R., Castanho, T. C., Amorim, L., Sousa, M., Coelho, A., Moreira, P. S., Cunha, R. A., & Sousa, N. (2023). Coffee consumption decreases the connectivity of the posterior Default Mode Network (DMN) at rest. *Frontiers in Behavioral Neuroscience*, 17, 1176382. <https://doi.org/10.3389/fnbeh.2023.1176382>