Brainwaves Affect Cognitive Abilities

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This project is an analytic experiment on the effects of brainwave entrainment on cognitive ability. Hypothesis: Human participants will demonstrate the best cognitive performance when their brains are entrained in the theta zone. After researching brainwaves and brainwave entrainment, the experimenter set up 3 exams testing long-term memory, short-term memory, and problem solving skills. Long-term memory was tested through vocabulary, short-term memory through number sequences participants were asked to repeat back to the experimenter, and problem solving skills via arithmetic tests. Participants were asked to complete tests for all three beforehand and then listened to isochronic pulses to entrain brainwaves. Completing the tests again, the data was analysed before and after to see if different brainwaves affected task results. Analysis of testing results determined that cognitive performance in arithmetic problem solving was best during theta wave entrainment (greater arithmetic accuracy) and beta brainwave entrainment (faster processing speed). Short term memory test results were best when the brain was entrained in the theta wave state. Long term memory results were best in the delta brainwave state, but it may have been that language acquisition and not true memory influenced the results. Conclusion: The brain entrained in theta waves did not perform the best in all tasks, only improving in accuracy for arithmetic problem solving and in short term memory. The results of this experiment could be used to provide therapy for students to perform better on exams and increase short term and long term memory in older individuals.

Awards Won: