Optimizing Students' Working Memory Capacity with Binaural Beats: An Experimental Study on SMA Negeri 28 Jakarta Students

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Existing experimental evidence has linked increased brainwave activity to enhanced working memory capacity. One of the renowned non-invasive methods for manipulating brain waves is binaural beats, which would modify the brain's neural network system function which is responsible for attention and concentration. There are five types of binaural beats based on their frequency: alpha, beta, delta, gamma, and theta. Each type has different effects on the brain waves. Three of them, alpha, beta, and gamma, are claimed to improve the cognitive function of the working memory, the key to one’s productivity. Working memory is a cognitive system that provides access to the information required while cognitive processes are in progress. This study hypothesizes that alpha, beta, and gamma binaural beats affect working memory capacity. In this study, we recruited 64 students and assigned them into four different groups (1 control group and 3 experimental groups). We asked them to do an AOSPAN (Automated Operation Span) task to measure their working memory capacity in the pretest and posttest periods. In our experiment, we exposed all experimental groups with each alpha, beta, and gamma binaural beats and muted audio for the control group. The finding suggests that the three binaural beats had a significant effect ($p < 0.05$) on working memory capacity, which confirms our hypothesis. In addition, we found that binaural beats with beta frequency (12-30Hz) had the most significant effect ($p = 0.01$) on working memory capacity as evidenced by the largest increase of 11.063 in the average AOSPAN score.

Awards Won:
Fourth Award of $500
American Psychological Association: Third Award of $500