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Effect of Different Exercise Modalities on Executive Function in College-Aged Individuals

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Despite the well-documented neurophysiological effects of exercise, most Americans, specifically college-aged individuals, do not meet the recommended level of physical activity. Thus, it is important to investigate other interventions that may have neurophysiological effects similar to exercise. Mechanical whole-body vibration (WBV) is one technique that has been shown to elicit similar physiological effects as aerobic exercise; however, the effects on the brain are not well documented. **PURPOSE:** The aim of this study is to compare the effects of different exercise modalities on executive function. **METHODS:** Seventeen subjects (11 females and 6 males; age 19.59 ± 1.21 years; height 171.15 ± 5.0 cm; weight 84.48 ± 39.5 kg) completed a randomized, cross-over study that consisted of exercising on a recumbent bicycle and treadmill, WBV, and a control session. Before and immediately after each session, subjects completed a series of computerized cognitive tests that measured attention, response inhibition, visuo-spatial working memory and reaction time. Each exercise session consisted of a 5-minute warm-up and 20 minutes of moderate (40-59% of heart rate reserve) intensity exercise on the designated modality (recumbent or treadmill). The WBV session consisted of subjects standing barefoot on a vibrating platform with an oscillating vibration of 30Hz for 20 minutes. The control session consisted of subjects sitting quietly in the laboratory for 20 minutes. **RESULTS:** An acute bout of recumbent cycling significantly decreased attention (pre: 70.50 ± 1.26 s; post: 69.69 ± 1.49 s; p=.049) and reaction time (pre: 121.99 ± 9.44 s; post: 128.03 ± 8.40 s; p=.026) when compared to an acute bout of exercising on a treadmill and WBV. A single session of WBV significantly decreased visuo-spatial working memory (pre: 43.29 ± 10.49 s; post: 47.95 ± 11.64 s; p=.008) when compared to an acute bout of exercising on a treadmill and recumbent bicycle. A significant interaction for main effect of group occurred in response inhibition (F=3.117, p=.041). **CONCLUSION:** A single session of exercising on a recumbent bicycle and WBV impaired executive function in college-aged individuals, whereas exercising on a treadmill did not impair executive function.

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