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## The Effect of Exercise and Different Exercise Intensities on Executive Function in College-Aged Individuals

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An acute bout of exercise improves executive function by facilitating exercise-induced arousal that helps the brain process and store information. There has been very little research on how long the improvements in executive function persist after exercise. PURPOSE: The aim of this study was to compare if different exercise intensities effected how long executive function remained elevated after exercise. METHODS: Thirteen subjects (11 females and 2 males; age  $20.23 \pm 1.3$  years; height 166.7  $\pm$  3.2 cm; weight 65.0  $\pm$  13.0 kg) completed a randomized, cross-over study that consisted of three sessions exercising on a motorized treadmill and a control session. Before each session and immediately, 20 minutes, and 40 minutes after each session subjects completed the incongruent Stroop test and task switching on a computer. Each exercise session consisted of a 5-minute warm-up and then 20 minutes of exercise at either low (20-39% of heart rate reserve [HRR]), moderate (40-59% of HRR), or vigorous (60-85% of HRR) intensity. The control session consisted of subjects sitting quietly in the laboratory for 20 minutes. **RESULTS:** Independent of exercise intensity, one bout of aerobic exercise significantly increased the number of correct responses for incongruent Stroop test from pre  $(62.56 \pm 2.53)$  exercise to immediately  $(66.19 \pm 2.31; p=.047)$ , 20  $(66.44 \pm 2.34; p=.011)$  and 40  $(66.81 \pm 2.54; p=.002)$  minutes post exercise. There was a significant decrease in mean reaction time for incongruent Stroop test from pre  $(.63 \pm .37 \text{ s})$  exercise to 20  $(.58 \pm .31 \text{ s}; p=.017)$  and 40  $(.58 \pm .29 \text{ s})$ s; p=.007) minutes post exercise. There was a significant decrease in mean reaction time for correct responses in incongruent Stroop test from pre  $(.63 \pm .37 \text{ s})$  exercise to 20  $(.57 \pm .32 \text{ s}; p=.008)$  and 40  $(.58 \pm .29 \text{ s}; p=.009)$  minutes post exercise. There was a significant decrease in mean reaction time for task switching from pre (.14  $\pm$  .10 s) exercise to 20 (.13  $\pm$  .95 s; p=.016) and 40 (.12  $\pm$  .98 s; p=.015) minutes post exercise. There was a significant decrease in mean reaction time for correct responses in task switching from pre  $(.15 \pm .18 \text{ s})$  exercise to 20  $(.14 \pm .17 \text{ s}; p=.042)$  minutes post exercise. **CONCLUSION:** An acute bout of aerobic exercise on a motorized treadmill significantly improved executive function for 20 minutes and 40 minutes post exercise in college-aged individuals. Supported by Grove City College Jewell, Moore, & McKenzie Fund