TACSM Abstract

A Comparison of Resistance Exercise to Aerobic Exercise on Cognitive Processing Speed in Young Adults

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ABSTRACT

Processing speed is the progression by which an individual receives information, begins to understand it, and then responds to it. Processing speed affects academic performance and research has established a positive relationship between exercise and processing speed. While the majority of research on cognition has focused on aerobic exercise, several studies have still demonstrated resistance exercise can improve cognitive abilities, including processing speed. However, these studies have relied primarily on a more tradition approach with free weights and machines. Additionally, there are a lack of studies directly comparing these modes of exercise (aerobic *vs*. resistance) and the appropriate duration of exercise to improve processing speed is not fully understood. **PURPOSE:** To explore if an acute 10-minute bout of resistance exercise, using body weight and resistance bands, compares to aerobic exercise on cognitive processing speed in young adults. **METHODS:** Healthy young adults (N = 29; male = 15, female = 14) underwent a repeated measures design with one control and two experimental conditions (aerobic, resistance). Visits took place at least 48 hours, but no more than 72 hours apart. During the control visit, participants completed the Symbol Search Subtest from the Wechsler Adult Intelligence Scale (WAIS-IV) via Inquisit computer software, a validated measure of processing speed. During the two experimental conditions, participants completed a 10-minute bout of moderate intensity aerobic or resistance exercise, determined by heart rate reserve response (40-59% of HRR). Following the brief exercise bout, the Symbol Search subtest was administered 11 minutes post-activity during the optimal window of assessment, as previously determined. **RESULTS:** A one-way repeated measures ANOVA was conducted to assess differences in processing speed across the conditions (control, aerobic, and resistance). The results revealed an overall significant effect ($F(2,56) = 28.18$, $p < 0.001$, $\eta_p^2 = 0.502$) between the three conditions. Follow-up pairwise comparisons revealed participants performed better on processing speed following aerobic exercise compared to the control condition ($p < 0.001$), and performed better following resistance exercise compared to the control condition ($p < 0.001$). However, no statistically significant difference was found on processing speed between the aerobic exercise and resistance exercise conditions ($p = 0.300$). **CONCLUSION:** Our study compared a brief bout of aerobic and resistance exercise and determined that both resistance and aerobic exercise produced improvements in processing speed compared to the control condition, but no difference was found between the two exercise conditions. This suggests that a brief 10-minute bout of moderate intensity aerobic or resistance exercise can be utilized to improve processing speed in healthy college-aged students. Given the large number (40-50%) of college students in the U.S. who are inactive and report time as a barrier to exercise, either 10-minute bout of exercise used in the current study may be feasible for healthy young adults to engage in prior to performing tasks in which processing speed is essential, for example, timed examinations.