

Effects of Two Intensities of Exercise on Memory, Concentration, Planning, and Reasoning

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ABSTRACT

Active workstations (e.g., desk cycles) have recently gained popularity as a means of reducing sedentary behavior in schools. In addition to physical benefits, teachers who have adopted active classrooms anecdotally report cognitive benefits such as students being more focused during instruction. In contrast, empirical work suggests that concurrent exercise has a negative effect on cognition (Lambourne & Tomporowski, 2010). The purpose of this study was to compare the effects of no exercise (CON), low-intensity exercise (LOW), and moderate-intensity exercise (MOD) on a series of cognitive measures. Young, healthy participants (n=48) were randomly assigned to either CON (sedentary), LOW (25-30% HRR), or MOD (50-55% HRR) groups. Those assigned to LOW and MOD exercised with a DeskCycle to achieve desired HR while those in CON sat passively at the Deskcycle. Four Cambridge Brain Sciences Inc. computerized tests were completed to assess planning, concentration, short-term memory, and reasoning while exercising. A self-paced word pair recall test was also administered during the exercise bout, and long-term recall of the word pairs was assessed 24 hours later. Separate one-way ANOVAs were conducted on each cognition test. A 3 (group) × 2 (test) RM ANCOVA with the amount of time spent during each test as covariates was used to assess immediate and delayed recall of word pairs. Groups did not differ in planning, concentration, short-term memory, or reasoning scores (p 's > .05). In both immediate and delayed memory tests, MOD recalled fewer words than CON when controlling for test time ($p=.049$), and LOW was not different from either group ($p>.05$). In the present study, exercise did not show any effect on planning, concentration, reasoning, or short-term memory. While previous research shows long-term memory is improved by exercise before or after learning (Roig, et al., 2013), moderate-intensity exercise that occurs during learning seems to impair long-term memory recall.