

Effects of Exercise and Exogenous Glucose on Short-Term Memory Recall in Young Adults

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Characterizing the effects of exercise on cognitive function is an important area of investigation. Extensive research has been conducted to examine the effects of exercise on short-term memory. To date the results have been mixed regarding the effects of an acute bout of exercise on memory. In addition, hyperglycemia has been shown to affect cognition in memory-based tasks. **PURPOSE:** The purpose of this study was to determine the independent effects of light exercise (LEC), heavy exercise (HEC), and exogenous glucose (GLU) on performance during a computer based memory recall test. **METHODS:** 15 subjects (male $n = 9$, female $n = 6$; age 20.80 ± 1.26 yr; height 164.6 ± 39.9 cm; mass 72.9 ± 12.1 kg) participated in the study. Subjects viewed 75 images (3 sec/image) prior to the assigned intervention and then were tested on recall (observed or not-observed previously) of the images post-intervention when 25 of the 75 images were replaced with new images. Reaction time of response was also assessed. **RESULTS:** Mean HR was significantly increased during LEC and HEC, 117 ± 14.4 bpm and 161 ± 16.5 bpm, respectively ($p \leq .05$) vs. CON (68.0 ± 9.4 bpm) and GLU (67.8 ± 7.7 bpm). Blood glucose was significantly increased during the GLU condition ($p < .001$) and blood lactate significantly increased during HEC ($p < .001$) vs. all conditions, respectively. Despite these physiologic alterations, no main treatment effects were observed for reaction time (RT), or accuracy. However, RT was significantly faster for correct responses (1005.10 ± 22.0 ms) compared to incorrect responses (1328.2 ± 46.5 ms) across all treatments ($p < .001$). **CONCLUSION:** Based on the study results, different physiologic stressors resulting from acute exercise or hyperglycemia elicited no positive or adverse effects on short-term memory performance. Future research may evaluate applying the intervention during or prior to the initial stimulus period rather than after.