PERFORMANCE OF TASKS WITH HIGH DEMANDS OF ANTICIPATION AND CONCENTRATION UNDER VARIOUS CONDITIONS OF PHYSICAL EXERTION
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Introduction
Research on the impact of physical exertion on performance of cognitive tasks requiring concentration, decision-making and anticipation has produced conflicting results. Whilst some studies found that steady-paced aerobic exercise improved subjects’ decision-making and problem-solving ability, other studies reported no impact on cognitive performance following exercise. This unequivocal situation is possibly due to inconsistent designs and procedures employed. Research findings and anecdotal evidence suggest that moderate aerobic exercise may bring about positive impact on performance of cognitive tasks but that effect appears to diminish following high intensity exercise. The implications of this phenomenon to sport are particularly relevant to those in which decision-making and anticipation is paramount. This study aimed to investigate the effects of physical exertion on concentration and anticipation, and heart rate response during performance of cognitive tasks.

Methods
Twenty physically active adults volunteered to participate in this study. Their mean age, height and weight were: 22.63 ± 16.17 yrs, 1.66 cm and 76.38 ± 16.17 kg respectively. Participants performed the Stroop colour-word test to measure concentration, and the Bassin Anticipation Timer to measure anticipation, under three conditions: rest, moderate and high intensity physical exertion. An incremental protocol on a cycle ergometer was used to induce the different levels of physical exertion which were estimated by both heart rate reserve (HRR) and rating of perceived exertion (RPE). Participants were required to perform the tasks from a sitting position on a cycle ergometer and to maintain the cycling cadence during performance. Testing conditions were counterbalanced.

Results
Repeated Measures ANOVA indicted no significant differences on performance of the Stroop test or the coincidence anticipation under the three experimental conditions (rest, 50% and 80% of Maximal HRR). The results of the paired t-tests indicated that there was a significant difference (T (17) = 4.546, p = .000) in heart rate before and during performance of the anticipation task (81.7bpm and 75.2bpm respectively). However, the difference in heart rate before and during performance of the Stroop test was not significant (82.39bpm and 79.94bpm respectively).

Discussion
The findings of this study indicated that physical exertion has limited impact on performance of tasks with high demands on concentration and anticipation. However, performing cognitive tasks appear to cause lowering of heart rate. This may have been caused by focus of attention on the task which in turn impacted on the parasympathetic nervous system taking over. The findings also suggest that the nature of the task being performed may determine the extent of the adverse impact of physical exertion on performance. Further research on cognitive motor skills is needed to develop an understanding of how exercise affects performance.

Keywords: Sport Performance, Exertion, Intensity