TASK COMPLEXITY DOES NOT INFLUENCE THE EFFECT OF EXERCISE ON REACTION TIME

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For top performance in sports athletes need to take complex decisions in a split second. Taking a few milliseconds more or less can be crucial. Therefore, the influence of physical exercise on reaction time has been topic of many studies. As results have been ambiguous it has been hypothesized that, among other factors, exercise might facilitate reaction time in complex but not in easy tasks (McMorris & Graydon, 2000). The purpose of the present study was to investigate whether task complexity influences the effect of maximal exercise on reaction time.

In the first experiment 24 subjects (14 male, 10 female) were divided into an exercise and a control group. The exercise group performed the finger pre-cuing task (FPT) before and after two incremental graded treadmill runs to volitional exhaustion. The FPT is a four choice reaction time task in which pre-cues reduce it to a two-choice reaction time task in three out of four conditions (Miller, 1982). The control group sat quietly while the exercise group ran. Significant main effects were found for time (before vs after intervention), $F(1,21)=7.45$ and FPT condition, $F(3,63)=216.99$. A significant interaction effect was found between time, FPT condition and group, $F(3,63)=3.71$. T-tests showed that the experimental group was faster than the control group on the neither cued condition. Results did not fully confirm the hypothesis that task complexity influences the relation between physical exercise and reaction time.

To build up on this finding, a second experiment was conducted in which a within subjects design was used, the duration of the run to volitional exhaustion was prolonged and the duration of the pre-cue in the reaction time task was shortened.

13 Subjects (11 male, 2 female) performed the exercise and the control trial. Main effects were found for test (first vs second intervention), $F(1,12)=8.53$, time (before vs after intervention), $F(1,12)=20.14$ and FPT condition, $F(3,36)=44.41$. A significant interaction effect was found between time and trial, $F(1,12)=19.27$. T-tests showed that reaction times were faster after the intervention in the exercise trial only. No interaction effects with FPT condition were found.

In the second experiment the facilitative effect of physical exercise on reaction time was the same for all four FPT conditions. Thus, it must be concluded that the effect of physical exercise on reaction time is not influenced by task complexity.


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