

Amelioration of the Impact of Physical Fatigue on Cognitive  
Performance by Phytochemicals: The Effect of a Blackcurrant  
Supplement

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## Abstract

Exercise-induced physical fatigue is thought to impair the cognitive functioning, and therefore mental performance, of the brain. Intervention studies have demonstrated that phytochemical supplementation can facilitate improved cognitive and physical performance. However, little is known about phytochemical supplementations' ability to ameliorate physical fatigue effects on cognitive performance upon congestion. To investigate this hypothesis, the present study investigated the effects phytochemical compounds, from a blackcurrant supplement, had in regards to reducing physical fatigue effects on cognitive performance while under mental loads. Seventy-two healthy participants completed >10 mins of a high intensity intermittent cycling task (HIIT) (physical fatigue cohort) or >10 mins watching an emotionally neutral documentary (control cohort). Half of the participants in each condition received a blackcurrant supplement one hour before beginning the experimental session. Baseline cognitive tasks and mood questionnaires were completed before ingestion of a blackcurrant extract, again before post-task measurements were completed, and also immediately following the experimental session. Analysis of the subjective self-reports revealed that HIIT was successful at inducing physical fatigue, however, had no effect on subsequent cognitive performance. Further analyses demonstrated that supplementation with a blackcurrant extract had no influence on cognitive performance. The null results for an effect of physical fatigue on cognitive performance made interpretation of this finding difficult. Overall, effect size calculations indicated that a larger sample size would not have resulted in statistically significant findings. It was concluded that the specific high intensity intermittent exercise used in the present study, did not induce a level of fatigue in participants' that would subsequently impair cognitive performance. Blackcurrant supplement did not demonstrate an ability to enhance cognitive performance following a physically fatiguing task. Possible explanations for these findings are discussed and some potentially useful future studies outlined in the second and third chapters.

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