

THE EFFECT OF CREATINE SUPPLEMENTATION ON COGNITIVE
PERFORMANCE, PSYCHOMOTOR PERFORMANCE, MOOD STATE AND
CATECHOLAMINE AND CORTISOL LEVELS DURING SLEEP DEPRIVATION
AND NON-EXHAUSTIVE EXERCISE

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Submitted in part fulfilment of the requirements
for the award of Master of Science at
University of Chichester

August 2005

The aim of this study was to examine the effects of creatine supplementation on cognitive performance, psychomotor performance and mood state during 24 hours of sleep deprivation and non-exhaustive exercise. In addition chemical messengers during sleep deprivation were studied. The participants ($N=19$) all completed two bouts of sleep deprivation and exercise. Prior to the second experimental 24 hr period 10 participants took $20 \text{ g}\cdot\text{day}^{-1}$ of creatine-monohydrate each day for 7 days in a 4x 5 g protocol. The remaining 9 participants took a placebo in accordance to a double blind protocol. Random movement generation, choice reaction time, postural control and mood state were tested during the study. Blood samples were taken at 10.00 hrs and again 24 hours later in the sleep deprived condition. Adrenaline, noradrenaline, dopamine and cortisol plasma levels were analysed for differences between stage, condition and group. Relationships with performance and affect variables were explored.

Significant differences were found for postural control with performance in the creatine group appearing to remain consistent despite sleep deprivation whilst the placebo groups performance declined in terms of rate of postural responses ($t_{17} = 2.75$, $P = 0.007$). Displacement per response also increased in the placebo group whilst being maintained close to pre-sleep deprivation levels in the creatine supplementation group ($t_{10.16} = 2.02$, $P = 0.035$). It was concluded that postural control appeared to be maintained by creatine supplementation.

POMS responses showed that the affective response of the placebo group to sleep deprivation appeared to be worse than that of the creatine group for fatigue ($U = 7.5$, $P = 0.003$) and vigour ($U = 11.5$, $P = 0.010$). The response of the placebo group was in line with previous research so it was concluded that the creatine supplementation appeared to have had an effect on reported affective state. Only noradrenaline changes had any predictive power for POMS vigour ($R^2 = 0.20$, $P = 0.019$) and POMS fatigue ($R^2 = 0.17$, $P = 0.034$).

No significant differences were found for random movement generation and it was concluded that working memory did not appear to have been affected in either group during the sleep deprivation. No relationships were found between cognitive or motor performance and chemical messengers.

It was suggested that the results were generally positive and indicated that further research into the effectiveness of using creatine-monohydrate to maintain performance and mood states during activities including planned sleep deprivation was needed. It did appear that creatine supplementation could have a positive effect on mood state and motor performance during sleep deprivation