

Effect of Creatine Supplementation on Cognitive Function of Omnivores and Non-meat Eaters

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Introduction. Creatine is a widely known supplementation for athletes. Yet, it has a significant effect on the CNS. Studies have shown that it can benefit in the treatment of muscular, neuromuscular and neurodegenerative diseases, and depression. Half of the daily needed 2–3 g of creatine is endogenously synthesized; the rest should be obtained through consumption of meat or fish. It is well known that vegetarians and vegans show a deficiency of creatine.

Aim. The aim of this study is to investigate the correlation between creatine consumption and measurable IQ testing results, and to determine its significance. For this purpose, individuals who are more prone to creatine deficiency (vegetarians and vegans) should be compared with individuals who have an adequate supply of creatine due to their eating habits (omnivores).

Material and Methods. The study consisted of 48 participants (aged 19–26; mean age women: 20.92, mean age men: 21.52). Randomised four groups were formed, which were composed according to the participants' type of diet (non-meat eater vs. omnivores) and whether they were taking creatine monohydrate supplementation or not. All participants took the Raven's Progressive Matrices Test (RPMT) to determine their IQ and the Backwards Digit Span Test (BDST) to classify their working and short-term memory. Two groups (a non-meat eater group and an omnivore group) received 5 g creatine twice daily over the course of 7 days (total of 70 g; mean compliance: 94%). After this time, all 4 groups repeated the tests.

Results. There was no significant difference of IQ or working memory scores between the groups during the initial test. The results of the statistical analysis showed a significant increase ($p < 0.05$) of RPMT and BDST in the non-meat eater group taking creatine. Their average IQ score from the initial RPMT increased by 5.83 points (from 111.92 with $s = 6.14$ to 117.75 with $s = 8.15$), whereas the BDST average score increased by 1.42 numbers (from 3.25 with $s = 1.13$ to 4.67 with $s = 1.07$). No significance could be found in the other groups.

Conclusions. The results from this experimental study lead to the conclusion that in case of a vegetarian/vegan lifestyle, a supplementation of creatine can cause an increase in working and short term memory. It can be advisable to supplement creatine to meet the body's need, if this cannot be achieved by the consumption of meat. Further investigations and European Medicines Agency's (EMA) recommendations are needed to determine the exact amount and type of creatine which should be used for the supplementation.