# Dietary boron, brain function, and cognitive performance.

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Although the trace element boron has yet to be recognized as an essential nutrient for humans, recent data from animal and human studies suggest that boron may be important for mineral metabolism and membrane function. To investigate further the functional role of boron, brain electrophysiology and cognitive performance were assessed in response to dietary manipulation of boron (approximately 0.25 versus approximately 3.25 mg boron/2000 kcal/day) in three studies with healthy older men and women. Within-subject designs were used to assess functional responses in all studies. Spectral analysis of electroencephalographic data showed effects of dietary boron in two of the three studies. When the low boron intake was compared to the high intake, there was a significant ($p < 0.05$) increase in the proportion of low-frequency activity, and a decrease in the proportion of higher-frequency activity, an effect often observed in response to general malnutrition and heavy metal toxicity. Performance (e.g., response time) on various cognitive and psychomotor tasks also showed an effect of dietary boron. When contrasted with the high boron intake, low dietary boron resulted in significantly poorer performance ($p < 0.05$) on tasks emphasizing manual dexterity (studies II and III); eye-hand coordination (study II); attention (all studies); perception (study III); encoding and short-term memory (all studies); and long-term memory (study I). Collectively, the data from these three studies indicate that boron may play a role in human brain function and cognitive performance, and provide additional evidence that boron is an essential nutrient for humans.

**The following study is a gold mine. The study shows that boron supplementation increases estradiol and testosterone and for reasons given above I believe that these results suggest that boron might be deficient in hyperthyroidism.**
**Additionally boron was shown to decrease plasma concentrations of calcium. High calcium levels may be associated with increased heart rate. Since calcium and magnesium act as antagonists, this reduction of calcium by boron may allow magnesium levels to rise and thereby lower the heart rate and muscle cramps.**
**Additionally boron was shown to increase plasma copper, copper-zinc superoxide dismutase (SOD is one of the body's most important free radical scavengers), and ceruloplasmin (a protein which transports copper). Here is direct evidence that boron is essential for copper metabolism and therefore quite probably for the correction of hyperthyroidism and possibly hypothyroidism.**
**Furthermore, the study offers a possible explanation for why estrogen may slow thyroid function: it increases plasma copper, SOD, and ceruloplasmin. Boron also increased these variables whether estrogen was administered or not.**