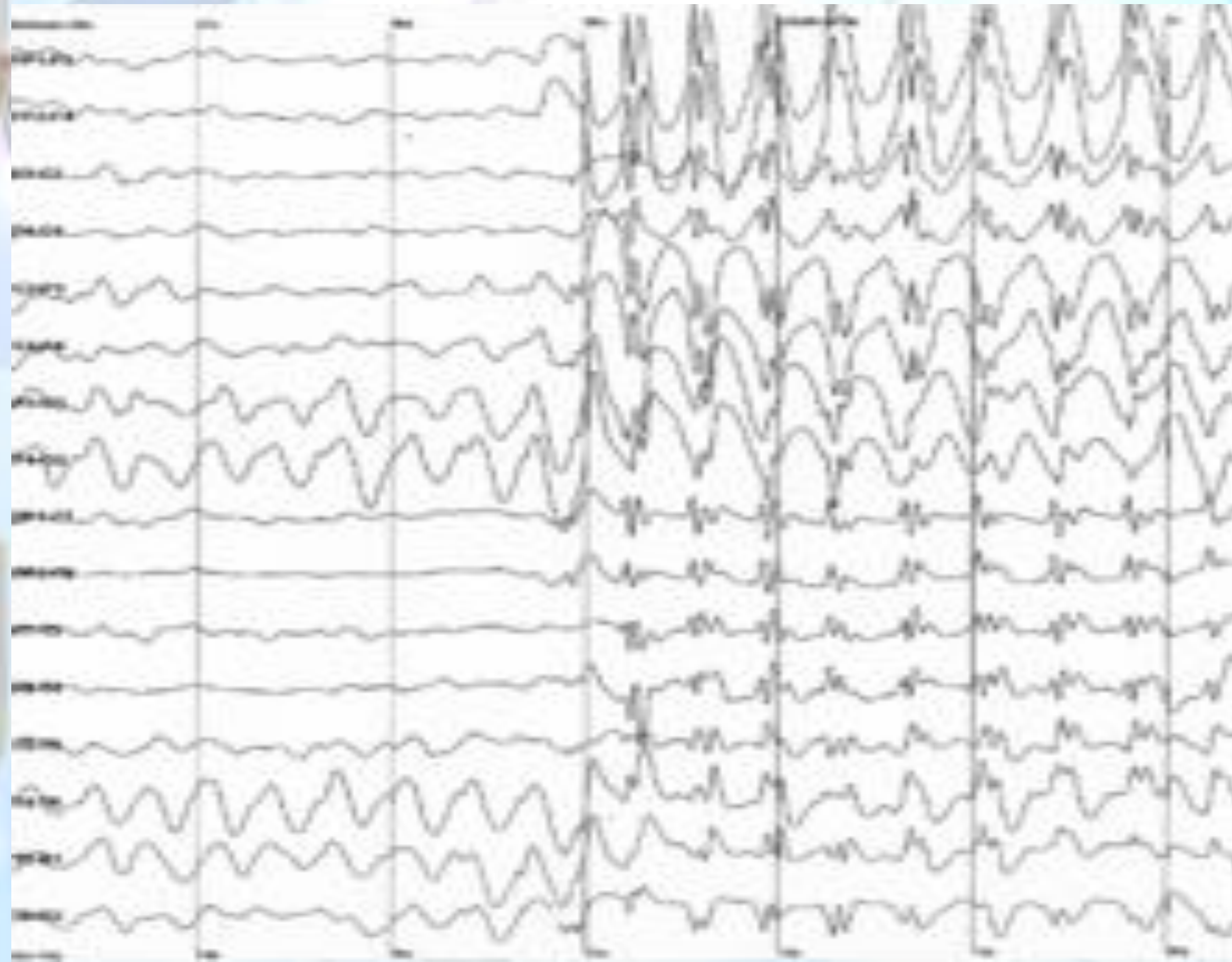


Resting-state EEG analysis of neuropsychological influences on cognitive training

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Introduction/Abstract

Cognitive training has emerged as a promising method to maintain, enhance, and rehabilitate cognitive function. However, conclusive research on the feasibility and effectiveness of cognitive training as such a tool is scarce and this work aims to contribute to resolving this issue. The present study assessed the effectiveness of cognitive training and how it could be affected by neuropsychological influences. Changes in expectation in 20 healthy young and older adults have been evaluated and a pilot test measuring electrical activity in eight healthy young adults using electroencephalography (EEG) has been conducted. EEG data was collected in healthy older adults during resting state. Participants were tested with their eyes open for 10 minutes, fixating a cross or passively watching neutral pictures, and again with their eyes closed. Analysis involved examining individual differences in resting state activity in correlation with subsequent performance on a sentence verification task.

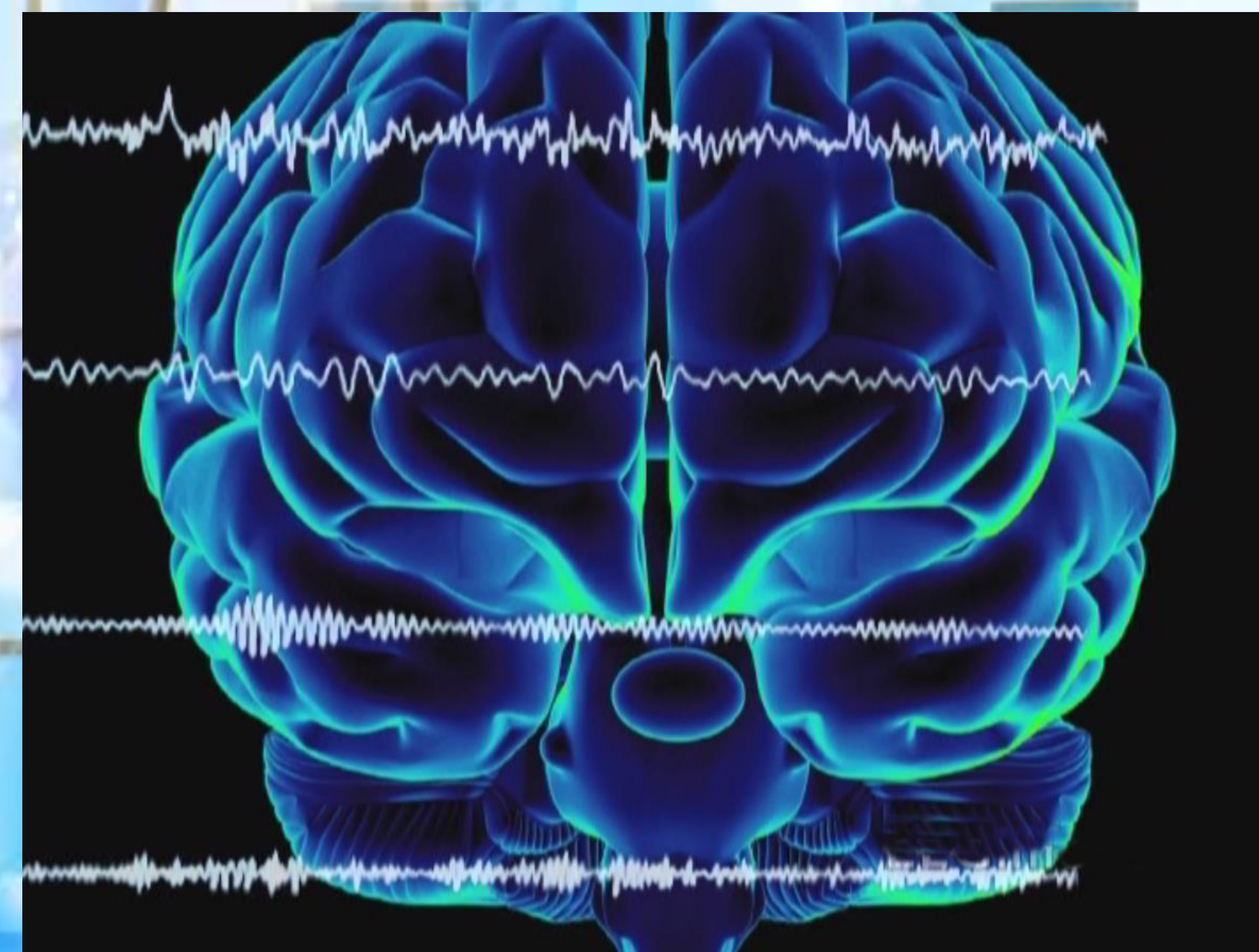


Methodology

Changes in expectation in 20 healthy young and older adults have been evaluated and a pilot test measuring electrical activity in eight healthy young adults using electroencephalography (EEG) has been conducted. The actual cognitive training component was not covered in this stage of the overall study; only its effectiveness in terms of electrical brain activity. The participants were undergraduate and graduate students from the University of Ottawa aged 18-27 and the EEG data was collected during resting state. Participants were tested with their eyes open for 10 minutes, fixating a cross or passively watching neutral pictures, and again with their eyes closed. Electrodes were placed near the eyes to account for blinking. As well, they were asked to complete a sentence verification task, which was later correlated with EEG data.

Results

The expected results are that electrical activity would increase in areas that were involved in the cognitive training tasks, particularly in participants who had high expectations for the training program. The participants who show the most significant changes in electrical activity should also perform best on the sentence verification task; this would likely be a strong correlation.



Conclusions

It can be concluded from the expected results that there is a notable benefit from cognitive training regarding the levels of activity in areas of the brain that were involved in cognitive training tasks when the participant has high expectations. Although it is not clear how much of an effect the actual tasks have on electrical activity in the brain, it is likely that there is at least a slight benefit given the strong correlation found. Further studies regarding expectations, electrical brain activity, and other neuropsychological influences would make it possible to isolate the effects of the actual cognitive training on recovery from brain injury or maintenance and enhancement of cognitive functions. A strong body of conclusive evidence would eventually lead to the possibility of these training programs being made available to the public without the doubt and scepticism currently surrounding this market.

References and Acknowledgements

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