HEMISPHERIC ASYMMETRY AND INFORMATION PROCESSING IN POST-TRAUMATIC STRESS DISORDER

Thesis submitted for the degree of

Doctor of Philosophy

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Abstract

Previous studies have suggested that mechanisms for neural compensation involve a reorganisation to right hemisphere processing in people with post-traumatic stress disorder (PTSD), and are associated with functional alterations in the capacity for behavioural flexibility. However, research has not established a direct relationship between the complex physiological and psychological processes of the heterogeneous disorder and right hemisphere cortical activity. The present study examined cognitive information processing in people with PTSD, reaction patterns associated with perceived traumatic stressors, and quantitative electroencephalographic (qEEG) indices of hemispheric asymmetry.

Individuals with PTSD (N=34) and age and sex-matched normal controls (N=136) completed standardised web-based self-report questionnaires assessing traumatic stressor events and reaction patterns to those events. Neuropsychological indices of verbal, visuospatial, sensori-motor performance, and electrophysiological recordings, were examined for right hemisphere coding. The relationships among traumatic characteristic reaction patterns of numbing and avoidance, cognitive performance, and frontal and posterior EEG alpha asymmetry were also investigated.

Structural and functional alterations were shown in those with PTSD, using indices of working memory for the retrieval of verbal and psychomotor information, indicating a reduced speed of processing and alterations to background cortical arousal in left hemisphere frontal regions. The study supported and extended previous findings of verbal working memory abnormality, alterations to left frontal cortical rhythmic oscillations, and low EEG alpha amplitudes in those diagnosed with PTSD. Results indicated a pattern of compensatory mechanisms associated with reduced speed of information processing and right-sided activation patterns in PTSD participants and control participants who experienced strong reactions to perceived traumatic events.

Findings support the impact of traumatic events on psychobiological health in high-risk populations, implicating an association with specific patterns of neural and cognitive functioning in characteristic numbing and avoidance behaviours.

Declaration

This work contains no material which has been accepted for the award of any other degree or diploma in any university and to the best of my knowledge and belief the thesis contains no material previously published or written by another person, except where due reference is made in the text.

I give consent to this copy of my thesis, when deposited in the University Library, being available for loan and photocopying.

Therese Mayo
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