HEMISPHERIC ASYMMETRY AND INFORMATION PROCESSING IN POST-TRAUMATIC STRESS DISORDER

Thesis submitted for the degree of
Doctor of Philosophy

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# Table of Contents

List of Tables ......................................................................................................................................................................................... ix

List of Figures ................................................................................................................................................................................................. xi

Abstract ................................................................................................................................................................................................. xiii

Declaration ................................................................................................................................................................................................. xv

Acknowledgements ......................................................................................................................................................................................... xvi

1. Overview and Outline of the Thesis ................................................................................................................................. 1
   1.1. General Introduction .......................................................................................................................................................... 1
   1.2. Aims of the Study .............................................................................................................................................................. 1
   1.3. Significance of the Study .................................................................................................................................................. 3
   1.4. Overview of the Thesis .................................................................................................................................................. 4

2. Literature Review: Learning and Memory in PTSD Research .......................................................................................... 7
   2.1. Introduction ........................................................................................................................................................................ 7
       2.1.1. Focus of the Literature Review .................................................................................................................................. 8
       2.1.2. PTSD Symptoms and Memory Functioning ................................................................................................................. 8
   2.2. The Phenomenology of PTSD and Information Processing Models ........................................................................... 11
       2.2.1. Synaptic Plasticity as an Adaptive Mechanism ........................................................................................................ 15
       2.2.2. Abnormal Tonic States in PTSD .................................................................................................................................. 17
   2.3. Distributed Parallel Cortical Systems in PTSD .............................................................................................................. 20
       2.3.1. Summary: Stress Reactions and Memory Functioning .............................................................................................. 21

3. Empirical Findings in PTSD and Literature Review Synthesis .................................................................................. 23
   3.1. Brain Organisation: Function and Structure ...................................................................................................................... 23
       3.1.1. Lateralisation Hypothesis in PTSD Research ............................................................................................................ 25
       3.1.2. Specialisation Theories in Cognition ............................................................................................................................ 30
       3.1.3. Microcircuitry in Cognition: Spatial and Temporal Coding .......................................................................................... 32
   3.2. Executive Functions and Attention Modulation .............................................................................................................. 37
       3.2.1. Link between Neuroanatomical and Neuropsychological Functions .................................................................................. 38
       3.2.2. Fear and Knowledge Structures ..................................................................................................................................... 43
       3.2.3. Right-lateralised Effects of Neurochemical Pathways .................................................................................................. 46
       3.2.4. The Secondary Effects of Shared Resources ............................................................................................................. 50
       3.2.5. Functional Reorganisation in PTSD ............................................................................................................................ 52
   3.3. Compensatory Mechanisms in PTSD ............................................................................................................................ 54
       3.3.1. Summary: Functional Cerebral Asymmetry .................................................................................................................... 58

4. Objectives and General Methodology ............................................................................................................................ 61
   4.1. Objectives and Scope of Study ........................................................................................................................................ 61
4.2. General Methodology

4.2.1. Standardised Measures and Procedures

4.3. Participants

4.3.1. Inclusion and Exclusion Criteria for Non-Clinical Participants

4.3.2. Standardised Inclusion and Exclusion Criteria for PTSD

4.3.3. Characteristics of Participant Sample

4.4. Materials and Procedures

4.4.1. Web Questionnaire

4.4.1.1. Trauma Experience Questionnaire

4.4.1.2. Mood States

4.4.2. Electrophysiological Data Collection and Reduction

4.4.2.1. Quantitative Electroencephalographic Recordings

4.4.3. Cognitive Measures

4.4.3.1. The Motor Tapping Test

4.4.3.2. Verbal Fluency Task

4.4.3.3. The Maze Task

4.5. Data Analysis

5. Preliminary Investigations of Lateralised Functioning in PTSD

5.1. Rationale

5.2. Study 1: Attentional Capacity for Memory and Retrieval Processes

5.2.1. Introduction

5.2.2. Method

5.2.2.1. Participants

5.2.2.2. Instruments and Procedure

5.2.2.3. Behavioural Measures

5.2.3. Data Analysis

5.2.4. Results

5.2.4.1. Verbal Fluency Task

5.2.4.2. Summary: Retrieval of Verbal Information

5.2.4.3. Executive Maze Task

5.2.4.4. Summary: Retrieval of Visuospatial Information

5.2.4.5. Sensori-Motor Tapping Task

5.2.4.6. Summary: Tapping Task and Speed of Processing

5.2.5. Discussion
5.3. **Study 2: Baseline Cortical Arousal** ................................................................. 91
5.3.1. Introduction .................................................................................................... 91
5.3.2. Method ........................................................................................................... 92
  5.3.2.1. Participants .............................................................................................. 92
  5.3.2.2. Instruments and Procedure ...................................................................... 93
5.3.3. Data Analysis ................................................................................................. 93
5.3.4. Results ............................................................................................................ 95
  5.3.4.1. Alpha Peak Frequency Patterns .............................................................. 95
  5.3.4.2. Summary: Alpha Peak Frequency ........................................................... 98
  5.3.4.3. Spectral Power qEEG Characteristics ..................................................... 99
  5.3.4.4. Summary: qEEG Recordings ................................................................ 107
  5.3.4.5. Alpha Frequency ................................................................................... 108
  5.3.4.6. Summary: Alpha Spectral Power .......................................................... 113
5.3.5. Discussion .................................................................................................... 114
5.4. **Study 3: Relationship between Memory Retrieval Patterns and Baseline**
  Rhythms .............................................................................................................. 117
  5.4.1. Introduction .................................................................................................. 117
  5.4.2. Method ......................................................................................................... 118
    5.4.2.1. Participants ............................................................................................ 118
    5.4.2.2. Instruments and Procedure .................................................................... 118
    5.4.2.3. Data Analysis ........................................................................................ 119
  5.4.3. Results .......................................................................................................... 120
    5.4.3.1. Alpha Peak Frequency and Behavioural Data ...................................... 120
    5.4.3.2. Spectral Power and Behavioural Data................................................... 122
    5.4.3.3. Asymmetry and Cognitive Performance ............................................... 124
    5.4.3.4. Summary: Correlation Patterns - Resting EEG and Cognitive
      Performance ........................................................................................................ 126
  5.4.4. Discussion .................................................................................................... 127
5.5. **General Discussion and Conclusions** .......................................................... 134
  5.5.1. Attention and Self-regulation Associated with Local Processing Structures 135
  5.5.2. Speed of Processing in PTSD ...................................................................... 137
  5.5.3. Rehearsal Mechanisms and the Capacity for Intentional Behaviour .......... 139
  5.5.4. Plasticity as a Compensatory Mechanism .................................................... 140
  5.5.5. Limitations ................................................................................................... 144
6. **Reactions to Stress and Resting EEG Patterns** ................................................. 149
  6.1. Rationale .......................................................................................................... 149
7. Neuropsychological and Electrophysiological Asymmetry Patterns in PTSD ...

7.1. Rationale

7.2. Study 1: Behavioural Tasks and Local Processing Networks

7.2.1. Introduction

7.2.2. Method

7.2.2.1. Participants

7.2.3. Instruments and Procedures

7.2.3.1. Modality-specific Cognitive Tasks

7.2.3.2. Resting Electrophysiological Measures

7.2.4. Data Analysis

7.2.5. Results

7.2.5.1. Verbal Performance Measures

7.2.5.2. Nonverbal Performance Measures

7.2.5.3. Region-specific Spectral Alpha Amplitude Activity

7.2.5.4. Summary: Cognitive Performance and Alpha Power

7.2.6. Discussion

7.3. Study 2: Cortical Asymmetry Patterns and Traumatic Stressor Events

7.3.1. Introduction

7.3.2. Method

7.3.2.1. Participants

7.3.3. Instruments and Procedures

7.3.3.1. Responses to CIDI Trauma Scales

7.3.3.2. Current Mood Scores

7.3.3.3. Asymmetry Scores

7.3.4. Data Analysis

7.3.5. Results

7.3.6. Discussion

7.4. Study 3: Predictor Variables Associated with Cortical Asymmetry Patterns

7.4.1. Introduction

7.4.2. Method

7.4.2.1. Participants

7.4.3. Instruments and Procedures

7.4.3.1. Self-report Responses to Trauma Events

7.4.3.2. Modality-specific Cognitive Tasks

7.4.3.3. Alpha Asymmetry Index

7.4.4. Data Analysis
List of Tables

Table 4.1. Demographic characteristics of participant sample ............................................ 66
Table 5.1. Descriptive data for verbal fluency task: letter and category words ............... 81
Table 5.2. Descriptive data for maze task – time to completion, average errors and average overruns .................................................................................................................. 82
Table 5.3. Descriptive data for sensori-motor task as number of taps with each hand .... 83
Table 5.4. Results of ANOVA assessing alpha peak frequency effects at midline sites ..... 95
Table 5.5. Results of ANOVA assessing alpha peak frequency inter-hemispheric effects . 96
Table 5.6. Results of ANOVA assessing APF anterior and posterior region effects ........ 98
Table 5.7. Results of ANOVA assessing aggregated global power in each frequency band for left and right hemisphere in each of the eyes open and eyes closed conditions between groups....................................................................................... 104
Table 5.8. Results of simple effects ANOVA assessing delta aggregated power for each hemisphere and in each condition between groups.......................................................... 105
Table 5.9. Results of simple effects ANOVA assessing theta aggregated power for each hemisphere and in each condition between groups...................................................... 106
Table 5.10. Results of simple effects ANOVA assessing alpha aggregated power ........ 107
Table 5.11. Results of simple effects ANOVA assessing beta aggregated power for each hemisphere and in each condition between groups......................................................... 109
Table 5.12. Results of simple effects ANOVA assessing alpha anterior region power for each hemisphere between groups ...................................................................................... 110
Table 5.13. Results of ANOVA assessing alpha frequency for each hemisphere in posterior brain regions between groups ......................................................................................... 113
Table 5.14. Correlation matrix for PTSD participants and control participants showing relationships between anterior and posterior region APF and behavioural indices ...... 121
Table 5.15. Correlation matrix for eyes closed spectral frequencies and behavioural performance measures.................................................................................................................. 123
Table 5.16. Correlation matrix between eyes closed alpha anterior and posterior region asymmetry index and cognitive performance scores ...................................................... 125
Table 6.1. Group descriptor variables .................................................................................. 154
Table 6.2. Self-reported criterion A1 qualifying traumatic events as percentages in each group ........................................................................................................................................... 156
Table 6.3. Summary of most frequently reported events in each group ......................... 157
Table 6.4. DASS descriptive data .................................................................................. 159
Table 6.5. Summary statistics based on self-report items ............................................. 160
Table 6.6. Results of ANOVA assessing sensori-motor task for number of taps with each hand between groups .......................................................................................................... 161
Table 6.7. Results of ANOVA assessing APF midline and condition effects between groups ........................................................................................................................................ 161
Table 6.8. Results of ANOVA assessing global spectral power by each frequency, hemisphere and condition effects between groups ........................................................................ 163
Table 6.9. Descriptive data for left hemisphere total power ............................................. 164
Table 6.10. Descriptive data for right hemisphere total power.................................165
Table 6.11. Results of ANOVA for anterior and posterior regions in global spectral power by frequency band effects between groups.................................169
Table 7.1. Verbal fluency descriptive data ................................................................206
Table 7.2. Executive maze task descriptive data .......................................................206
Table 7.3. Results for ANOVA assessing anterior eyes closed alpha power hemisphere and electrode site effects between groups ..............................................207
Table 7.4. Results for ANOVA assessing posterior eyes closed alpha power hemisphere and electrode site effects between groups ....................................................209
Table 7.5. Characteristic demographic and mood data for a reduced number of participants .................................................................214
Table 7.6. Self-report responses to CIDI detailing previous trauma experiences assessed by criterion A2 and reaction patterns .................................................................216
Table 7.7. Correlation profile for each group between alpha anterior and posterior asymmetry, avoidance, numbing, and mood states ............................................................218
Table 7.8. Regression coefficients: numbing as a predictor of alpha anterior asymmetry.230
Table 7.9. Regression coefficients: avoidance as a predictor of alpha anterior asymmetry .................................................................231
Table 7.10. Regression coefficients: avoidance as a predictor of posterior anterior asymmetry .................................................................................................................233
Table 7.11. Regression coefficients: avoidance as a predictor of verbal fluency (FAS) ....235
List of Figures

Figure 2-1. Conceptualisation of attention and memory processes as might apply to models of brain-behaviour functions and PTSD symptoms................................................. 22

Figure 3-1. Executive functions have been shown to involve an overlap in cortical processing systems. ......................................................................................................... 60

Figure 5-1: Results of ANOVA at midline APF eyes closed condition......................... 97

Figure 5-2: Results of ANOVA at midline APF eyes open condition. ............................. 97

Figure 5-3. Boxplot of anterior APF means for the eyes closed condition shows a trend toward higher APF in the PTSD group but little variation between groups at each site. ................................................................................................................................ 100

Figure 5-4. Boxplot of posterior APF means for the eyes closed condition indicates greater variation in the control group for a pattern of higher and lower APF but still within the normal range of 8-13 Hz. ............................................................................................................. 100

Figure 5-5. Aggregated means for each frequency bandwidth for left hemisphere (eyes closed condition) shows a trend toward variation in the alpha frequency band between groups................................................................. 101

Figure 5-6. Aggregated means for each frequency at right hemisphere (eyes closed condition) shows an overall similar pattern of means between groups but with differences indicated in the alpha frequency band. ................................................................. 101

Figure 5-7. Boxplot graph showing aggregated means for each frequency for left hemisphere (eyes open condition) indicates a similar pattern of total power for both groups............................................................................................................................. 102

Figure 5-8. Aggregated means for each frequency for right hemisphere (eyes open condition) shows little variation in total power between groups. ........................................ 102

Figure 5-9. Left hemisphere anterior alpha power.......................................................... 110

Figure 5-10. Right hemisphere anterior alpha power.................................................... 110

Figure 5-11. PTSD within-group posterior regions alpha power is significantly different at the T6 (right hemisphere) site for higher power compared to the T5 (left hemisphere) site............................................................................................................. 112

Figure 5-12. Control within-group posterior region alpha power indicates greater variability between hemispheres at temporal and parietal sites for higher right hemisphere amplitudes................................................................. 112

Figure 6-1. Global power analysis (eyes closed) left hemisphere frequency patterns with confidence intervals. ................................................................................................................. 164

Figure 6-2. Global power analysis (eyes closed) right hemisphere frequency patterns with confidence intervals. ................................................................................................................. 165

Figure 6-3. Total beta power in the eyes closed condition for both left and right hemispheres................................................................................................................................. 168

Figure 6-4. Total beta power in the eyes open condition for both left and right hemispheres ................................................................................................................................. 168

Figure 6-5. Global power analysis (eyes closed) in frontal regions indicated a significant difference in alpha power in the TEC group for higher amplitudes compared to the PTSD group and the NC group. ......................................................... 171
Figure 6-6. Global power analysis (eyes closed) in posterior regions indicated no significant differences between groups in any of the amplitude frequency patterns. 171

Figure 7-1. Scatterplot of alpha asymmetry patterns with anxiety items. 219

Figure 7-2. Scatterplot of alpha asymmetry patterns with anxiety items in posterior regions. 219

Figure 7-3. Scatterplot of alpha asymmetry patterns in anterior regions with depression items. 220

Figure 7-4. Scatterplot of alpha asymmetry posterior region patterns with depression items. 220

Figure 7-5. Alpha asymmetry index with high and low numbing regression lines. 230

Figure 7-6. Anterior alpha asymmetry (AAA) index with high and low avoidance regression lines. 232

Figure 7-7. Alpha posterior asymmetry with high and low avoidance regression lines. 233

Figure 7-8. Avoidance as a predictor of verbal fluency (FAS). 235

Figure 7-9. PTSD model based on numbing as a predictor of alpha anterior asymmetry and the interaction with anxiety for a loss of inhibitory functions associated with incoming stimuli and loss of integrative functions in posterior left hemisphere regions. 238

Figure 7-10. Model of TEC group data representing avoidance as a predictor of posterior alpha asymmetry and plausible pathways for processing incoming stimuli - emotionally valent and neutral. 239
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, sensorimotor 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.

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