

Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.

**EPIDEMIOLOGY AND CONSEQUENCES OF HEAD INJURY:
A COMPARISON OF FOCAL/SHARP HEAD INJURIES
AND GENERALIZED/BLUNT HEAD INJURIES**

A Thesis Presented in Partial Fulfilment
of the Requirements for the Degree of
Master of Arts in Psychology
at Massey University

JOANNE M. YEATES

1997

ABSTRACT

The purpose of the present study was to compare neurobehavioural outcomes and performance on neuropsychological measures of two groups of subjects with head injuries - those with focal/sharp head injuries and those with generalized/blunt head injuries. The study was conducted in two parts. Part one involved examining epidemiology and neurobehavioural outcomes of 235 subjects with head injuries. As expected, young males with low educational levels were most likely to sustain head injury. Maori subjects were overly represented in comparison to general population statistics. Subjects sustaining head injuries from focal/sharp head injuries, such as assaults, exhibited more irritability than subjects with generalized/blunt head injuries. No conclusive information was obtained concerning post-traumatic epilepsy or post-traumatic stress disorder.

Part two of this study involved a comparison of the performance of subjects on a wide range of neuropsychological measures. It was predicted that subjects with focal/sharp head injuries would exhibit more specific cognitive difficulties than subjects with generalized/blunt head injuries. Some support was provided for this hypothesis, but more often the data contradicted it. Subjects with focal/sharp head injuries were less likely to experience difficulties in areas sensitive to frontal lobe damage. Overall, in most cases, the subjects in this study performed at lower levels on the neuropsychological measures than the norms and control subjects in other studies.

ACKNOWLEDGEMENTS

I would like to thank my supervisor Dr Janet Leathem for her wonderful assistance and encouragement throughout this year. I am particularly grateful for the amount of time Janet spent with me, and her cheerful and optimistic nature. I really enjoyed working with her.

I would like to extend my thanks and love to my parents, Pamela and Ross Yeates, for everything they have done for me throughout my years at university. This would not have been possible without their assistance.

Finally, thanks to my friends who have been wonderful, and my partner Rossco, whose love and encouragement has been overwhelming.

TABLE OF CONTENTS

	Page
Abstract	ii
Acknowledgements	iii
Table of Contents	iv
List of Tables	vii
List of Figures	ix
INTRODUCTION	1
CHAPTER 1 HEAD INJURY	3
Introduction	3
Epidemiology	4
Measures of Severity	6
Post-traumatic Amnesia	6
Glasgow Coma Scale	7
Classifications	9
Minor/Moderate/Severe Head Injury	9
Open/Closed Head Injury	11
Blunt/Sharp Head Injury	13
Deceleration/Acceleration Head Injury	15
Velocity	15
Outcomes	17
Post-concussion Syndrome	17
Neurobehavioural Sequelae of Head Injury	18
Frontal Lobe Syndrome	21
Post-traumatic Epilepsy	26
Post-traumatic Stress Disorder	26
Factors Affecting Recovery After Head Injury	29
Summary	30
CHAPTER 2 FORMULATION/HYPOTHESES	31
Hypotheses	32

CHAPTER 3	METHOD	33
	Overview of the Present Study	33
	Ethical Issues	33
	Research Setting	34
	Subjects	34
	Procedure	36
	Measures	38
CHAPTER 4	RESULTS	42
	Part One - Epidemiology	42
	Factors Affecting Head Injury	42
	a) Causes of Head Injury	42
	b) Severity	44
	c) Velocity	45
	d) Gender	46
	e) Ethnicity	48
	f) Age	50
	g) Education	51
	Forces of Head Injury	53
	Severity and Velocity	54
	Sequelae	55
	a) Causes of Head Injury	55
	b) Severity	56
	c) Forces of Head Injury	57
	d) Velocity	58
	Part Two	59
	MVA's & MBA's / Falls, Assaults, Collisions and Other/ more than one Head Injury	60
	a) Whole Sample	60
	b) Assessment Interval	64
	c) Gender, Ethnicity, Education and Severity	66
	Low Velocity / High Velocity	67
	d) Whole Sample	67
	e) Gender and Education	68
	Acceleration / Deceleration	70
	f) Whole Sample	70
	Nonfocal / Focal	71
	g) Whole Sample	71
	Normative / Present Study	72

Post Hoc Results	75
Nonfocal and Fronto-temporal / Focal	75
h) Whole Sample	75
Mild / Moderate / Severe	77
i) Whole Sample	77
CHAPTER 5 DISCUSSION	78
Part One - Epidemiology	78
Factors Affecting Head Injury	78
Sequelae	81
Part Two	83
REFERENCES	85

LIST OF TABLES

Table	Page
1.1 Post-traumatic Amnesia	7
1.2 Glasgow Coma Scale	8
1.3 Glasgow Outcome Scale	8
1.4 Emotional and Personality Changes reported by researchers as resulting from Head Injury	24
1.5 Emotional and Personality Changes reported by researchers as resulting from Frontal Lobe Damage	25
3.1 Demographic Characteristics of Subjects	35
3.2 Groups and Variables Selected for Analysis	37
3.3 Subtests of the WAIS-R	38
4.1 T-test Comparison of Neuropsychological Measures of Subjects sustaining Head Injuries from MVA's and MBA's, and Subjects sustaining Head Injuries from Falls, Assaults, Collisions and Other/ more than one Head Injury	61
4.2 T-test Comparison of Neuropsychological Measures of Subjects sustaining Head Injuries from MVA's and MBA's, and Subjects sustaining Head Injuries from Falls, Assaults, Collisions and Other/ more than one Head Injury (subjects matched for assessment interval)	65
4.3 T-test Comparison of Neuropsychological Measures of Subjects sustaining Head Injuries from MVA's and MBA's, and Subjects sustaining Head Injuries from Falls, Assaults, Collisions and Other/ more than one Head Injury (subjects matched for gender, ethnicity, education and severity)	66

4.4	T-test Comparison of Neuropsychological Measures of Subjects sustaining Head Injuries due to Low Velocity Injuries, and Subjects sustaining Head Injuries due to High Velocity Injuries	67
4.5	T-test Comparison of Neuropsychological Measures of Subjects sustaining Head Injuries due to Low Velocity Injuries, and Subjects sustaining Head Injuries due to High Velocity Injuries (subjects matched for gender and education)	69
4.6	T-test Comparison of Neuropsychological Measures of Subjects with Acceleration Injuries and Subjects with Deceleration Injuries	70
4.7	T-test Comparison of Neuropsychological Measures of Subjects sustaining Nonfocal damage, and Subjects sustaining damage in specific areas - Occipital, Parietal, Temporal and Frontal	71
4.8	Comparison of Means on Neuropsychological Measures between the Present Study and Normative Data	73
4.9	T-test Comparison of Neuropsychological Measures of Subjects sustaining Nonfocal and Fronto-temporal damage, and Subjects sustaining damage in specific areas - Occipital, Parietal and Temporal	76
4.10	Oneway Analysis of Variance Comparison of Neuropsychological Measures of Subjects with Mild, Moderate and Severe Head Injuries	77

LIST OF FIGURES

Figure	Page
4.1 Causes of Head Injury a) Department of Health and Human Services, 1989 (cited in Wright, 1993) b) Present Study	42
4.2 Proportion of Subjects sustaining Mild, Moderate and Severe Head Injuries according to the Cause of Head Injury	44
4.3 Proportion of Subjects sustaining High Velocity and Low Velocity Head Injuries according to the Cause of Head Injury	45
4.4 Proportion of Female and Male Subjects according to the Cause of Head Injury	46
4.5 a) Proportion of Female Subjects sustaining Head Injuries according to the Cause of Head Injury b) Proportion of Male Subjects sustaining Head Injuries according to the Cause of Head Injury	47
4.6 Proportion of Pakeha, Maori and Other Subjects according to the Cause of Head Injury	48
4.7 a) Proportion of Pakeha Subjects sustaining Head Injuries according to the Cause of Head Injury b) Proportion of Maori Subjects sustaining Head Injuries according to the Cause of Head Injury	49
4.8 Proportion of Subjects' Age according to the Cause of Head Injury	50
4.9 Proportion of Subjects' Education according to the Cause of Head Injury	51
4.10 Proportion of Subjects sustaining Head Injuries according to the different Forces of Head Injury	53
4.11 Proportion of Subjects sustaining High Velocity and Low Velocity Head Injuries according to Severity	54

4.12	Proportion of Subjects sustaining Head Injuries from the different Causes according to different Sequelae	55
4.13	Proportion of Subjects sustaining Mild, Moderate and Severe Head Injuries according to different Sequelae	56
4.14	Proportion of Subjects sustaining Acceleration, Deceleration and Compression Head Injuries according to different Sequelae	57
4.15	Proportion of Subjects sustaining High Velocity and Low Velocity Head Injuries according to different Sequelae	58