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.

THE OLDER DRIVER
STUDIES OF ASSESSMENT AND PERFORMANCE

A thesis presented in partial fulfillment of the requirements for the degree of

Master of Arts
in
Psychology

At Massey University, Palmerston North, New Zealand

Anita M. Ciesionik
2001

ACKNOWLEDGEMENTS

The current dissertation presents findings from three studies of older drivers, encompassing issues of medical assessment of fitness to drive and the decrements in driving performance associated with both primary and secondary aging. This research was conducted in the year 2000, under the supervision of Dr. Nancy Pachana and Professor Nigel Long in the School of Psychology at Massey University.

The author would like to acknowledge the invaluable support and guidance given by Dr. Nancy Pachana – thanks for taking up the challenge. Appreciation must also be extended to Professor Nigel Long for taking over at such short notice.

The contribution of both time and effort by staff of the School of Psychology at Massey University is also gratefully acknowledged, in particular Harvey Jones, for his invaluable technical contribution, and Fiona Alpass for her assistance with all things mathematical.

Thanks to my family for their support and understanding, and to Greg for his patience, one-touch typing skills and high tolerance level.

TABLE OF CONTENTS

Acknowledgements ii

List of Tables and Figures v

I. Older drivers: A review of the issues

The natural decrements associated with age 1

Visual changes 1

Cognitive demands 3

Motor capacity 6

Dementia and driving 8

Decrement and driving performance 9

The importance of a drivers licence 11

Driving cessation in older drivers 12

Rationale for the present study 14

II. Models of driving behaviour 18

Taxonomic models of driving behaviour 19

Functional models of driving 21

Error theories of driving behaviour 23

Michon's three level hierarchy model 25

III. Deciding when to stop: Assessing medical fitness to drive in the elderly

Abstract 28

Introduction 28

Method 30

Results 31

Discussion 36

IV. A comparison of major and minor urban areas and their assessment of older drivers

Abstract 40

Introduction 40

Method 42

Results 43
Discussion 47

V. Increasing age and dementia: The effect on perception and reaction time in older drivers

Abstract 51
Introduction 51
Method 54
Results 59
Discussion 63

VI. Where to from here?

The focus of the thesis 69
Older driver assessment
An overview of the principle findings 70
The basis of assessment in driver behaviour models 71
Study limitations and directions for future research 72
Age related declines in perception and reaction time
An overview of the principle findings 76
Perception-reaction time and driver behaviour models 77
Study limitations and directions for future research 79

VII. References 84

VIII. Appendices

Appendix A. Ethical Approval for Study I and II 93
Appendix B. Older Driver Assessment Questionnaire 95
Appendix C. Facts on Aging Quizz 99
Appendix D. Information Sheet for Study I and II 100
Appendix E. Ethical Approval for Study III 102
Appendix F. Information Sheet for Study III 104
Appendix G. Demographic Sheet 106
Appendix H. Mini Mental State Examination 107
Appendix I. Common Traffic Signs Driving Assessment Tool 111

LIST OF TABLES AND FIGURES

FIGURE	TITLE	PAGE
Figure 1	New Zealand driver casualties in reported crashes, 1991, per 100,000 people, per 100 million kilometres driven (LTSA, 1996)	19
Figure 2	The hierarchical structure of the road user task (Michon, 1985)	26
Figure 3	General Practitioners views on the suitability of the LTSA common traffic signs driving assessment tool for older drivers	32
Figure 4	General Practitioners views on the association between referral and breeching patient/doctor confidentiality	35
Figure 5	General Practitioners views on the impact of an aging population on driver safety.	35
Figure 6	Main and minor urban comparison of commonly used methods for assessing fitness to drive in the elderly	44
Figure 7	Main and minor urban comparison as to who GP's regard as the most appropriate to assess driving skills in the elderly.	46
Figure 8	Main and minor urban comparison of the association between referral and breeching patient/doctor confidentiality.	46
Figure 9	The 6 road signs used in both the LTSA common traffic signs driving assessment tool and the perceptual experiment.	57
Figure 10	Photographs depicting the position of the video camera (i and ii) and the placement of the sign on the side of the road.	58
Figure 11	Average distance from the sign for each of the 6 signs across all 3 groups of participants.	60
Figure 12	Average distance from the sign for each of the 3 vehicle speeds across all 3 groups of participants.	61

TABLE	TITLE	PAGE
Table 1	Reasons given by older participants (N=56) for stopping driving.	13
Table 2	Most common methods used by General Practitioners in assessing fitness to drive in older persons.	32
Table 3	Circumstances under which General Practitioners most often refer.	33

Table 4	General Practitioners views on the most appropriate person(s) for the evaluation of driving skills in older adults.	34
Table 5	Respondent demographics with regard the location of their medical practice.	43
Table 6	Differences in stopping distance from the sign for each of the 6 signs and 3 speeds.	62
Table 7	The influence of vehicle speed on the ability to accurately perceive sign information.	63
Table 8	The influence of road signs on the ability to accurately perceive sign information.	63