

Road Safety and Mobility of Older Drivers in Rural versus
Urban Areas

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Table of Contents

List of Tables	viii
Table of Figures	x
Abstract.....	xii
Declaration.....	xiv
List of Publications	xv
Statements of the Contributions on Jointly Authored Papers.....	xvii
Permission for the use of Published Papers	xx
Acknowledgements.....	xxiv
Chapter 1: An Introduction to the Issues of Safety and Mobility in Older Drivers.....	1
Issues Relating to the Safety of Older Drivers	3
Crash involvement of older drivers.	4
Total number of crashes.....	4
Crashes per head of population and per licensed driver.	4
Crashes per distance driven.	5
The ‘low mileage bias’.	6
Cohort effects on crash involvement.	7
The 'fragility bias'.	8
Older driver crash involvement in the next 20 years.	10
Types of crashes.	11
Crash responsibility.	14
Summary of the crash involvement of older drivers.....	15
Health, functional and cognitive factors related to driving ability and crash risk in older drivers.	17
Summary issues relating to the safety of older drivers.	22

Issues Relating to the Safety, Driving Cessation and Mobility of Older Drivers.....	22
Mandatory fitness-to-drive assessments to manage the safety of older drivers.	22
Problems with mandatory fitness-to-drive assessments.	23
Mobility importance and the problems of driving cessation.	27
Transition from driver to non-driver.....	30
Self-regulation.	31
The driving situations that older drivers commonly avoid.	32
Factors that are related to increased self-regulation by older drivers.....	33
Extent of self-regulation by older drivers.	34
Educational interventions to encourage self-regulation.	36
The road safety benefits of practicing self-regulation.	37
Summary: issues of safety management, driving cessation and mobility importance for older drivers.	39
Chapter 2: The Safety and Mobility of Older Rural Drivers	42
The Safety of Older Rural Drivers.....	43
Crash involvement.	43
Serious and fatal injury.	44
Summary of the safety of older rural drivers.....	47
Mobility of Older Rural Drivers	48
Importance of driving to older rural adults.....	48
Consequences of driving cessation for older rural adults.	50
Effect of living in rural or remote areas on the mobility of older drivers.	51
Summary: mobility of older rural drivers.	52
Self-Regulation by Older Rural Drivers	53
Summary: Safety and Mobility of Older Rural Drivers	55
Aims of the Current Research.....	56

Chapter 3: Study 1	60
Preamble	61
Abstract.....	63
Method.....	66
Materials	66
Procedure	67
Results.....	68
Crash rates	68
Crashes involving serious or fatal injury	71
Discussion.....	76
References.....	79
Chapter 4: Study 2	82
Preamble	83
Abstract.....	86
Method.....	89
Materials	89
Measures	89
Procedure and statistical analyses.....	91
Results.....	92
Crash frequency and location	92
Rural vs urban crashes involving older drivers: Frequency of environmental, driver and vehicle factors	94
Environmental and driver factors and their association with injury severity	98
Prediction of serious/fatal injuries in older drivers, controlling for relationships between the environmental factors	101
Discussion.....	103

References.....	108
Chapter 5: Study 3	112
Preamble	113
Abstract.....	116
Method.....	119
Participants	119
Measure.....	120
Procedure and statistical analyses.....	122
Results.....	124
Demographic comparison of rural and urban drivers	124
Driving importance	124
Alternative means of transportation.....	125
Driving self-regulation.....	127
Prediction of levels of self-regulation of driving.....	129
Discussion.....	132
Study limitations and future directions	133
Conclusion	136
References.....	138
Chapter 6: Study 4	143
Preamble	144
Abstract.....	148
Method.....	152
Participants	152
Materials	153
Procedure	157
Results and Discussion	158

Problems with data collection.....	158
Correspondence between distance measured by vehicle odometers and GPS	160
Correspondence between the trips recorded by GPS and those reported by the participants	161
Participant feedback.....	162
Discussion.....	163
References.....	168
Chapter 7: Study 5	170
Preamble	171
Abstract.....	173
Method.....	177
Participants	177
Materials	178
Procedure	180
Data collection.....	180
Data preparation.....	181
Data analysis.....	182
Results.....	183
Demographic comparison of rural and urban drivers	183
Driving mobility	183
Exposure to risk	185
Discussion.....	188
Study limitations and future directions.....	191
Conclusion	194
References.....	195
Chapter 8 : Summary and Conclusions	202

Overview.....	202
Summary of Findings	203
Studies 1 and 2.....	203
Study 3.....	204
Studies 4 and 5.....	205
Implications of the Findings	206
The safety of older rural drivers.	206
Recommendations to improve safety.....	209
The mobility of older rural drivers.	215
Recommendations to maintain mobility.....	217
Driving self-regulation by older rural adults.	221
Methodological Strengths of this Research	223
Limitations and Future Directions	226
Final Conclusions	231
References.....	232
Appendices	279

List of Tables

Chapter 3

Table 1: Number of crash-involved drivers by age for rural and urban areas of South Australia for the years 2004 to 2008	69
Table 2: Rural and urban population by age group (aged 16 and over, 5 year average 2004 to 2008) for South Australia	70
Table 3: Number of licensed drivers in South Australia, 2009, by age group and living area.	71

Chapter 4

Table 1: Percentage of total crashes by location of the crash (rural or urban) and residential location (rural or urban) of the driver (aged ≥ 75 years) between 2004 and 2008, South Australia.....	93
Table 2: Percentage of total crashes by lighting/road conditions/weather conditions and residential location (rural or urban) of the driver (aged 75 and Over) for the years 2004 to 2008, South Australia	94
Table 3: Percentage of total crashes by road layout/road surface/horizontal road alignment/vertical road alignment and residential location (rural or urban) of the driver (aged 75 and over) for the years 2004 to 2008, South Australia	95
Table 4: Percentage of total crashes by speed limit and residential location (rural or urban) of the driver (aged 75 and over) for the years 2004 to 2008, South Australia.....	96
Table 5: Percentage of total crashes by driver error/crash type and residential location (rural or urban) of the driver (aged 75 and over) for the years 2004 to 2008, South Australia.....	97
Table 6: Environmental factors of serious or fatal crashes for drivers aged 16 to 74 in South Australia for the years 2004 to 2008: Descriptive statistics	99

Table 7: Driver factors of serious or fatal crashes for drivers aged 16 to 74 in South Australia for the years 2004 to 2008: Descriptive statistics	101
Table 8: Results of logistic regression analysis designed to predict whether a crash will involve a serious or fatal injury to the driver (aged 75 and over) for the years 2004 to 2008, South Australia	102
 Chapter 5	
Table 1: Perceived importance of driving for six reasons: Rural and urban responses.....	125
Table 2: Percentages of rural and urban participants who indicated that convenient public transportation was available to get them to four common destinations.....	126
Table 3: Alternative means of transportation: Percentages of participants (rural and urban) who indicated that the relevant option was available to them	127
Table 4: Avoidance of individual difficult driving situations: Rural and urban responses	128
Table 5: Willingness to stop driving for five reasons: Rural and urban responses	129
Table 6: Results of linear regression to predict avoidance of difficult driving situations (model 1) and willingness to stop driving (model 2), and logistic regression to predict driving reduction in the past year (model 3), for rural and urban participants separately	131
 Chapter 6	
Table 1: Participants' responses (number of participants) to the feedback statements	162
Table 2: Participants' responses (number of participants) to the feedback questions.....	163
 Chapter 7	
Table 1: Comparisons of distance driven, time spent driving and number of trips over one week of driving between rural and urban participants.....	184

Table 2: Activities of rural and urban participants by activity type, as well as discretionary/non-discretionary classification	185
Table 3: Comparisons between rural and urban participants in their exposure to intersections through one week of driving	186
Table 4: Comparisons between rural and urban participants in their exposure to high-speed driving environments through one week of driving.....	187

Table of Figures

Chapter 3

Figure 1: Proportion of rural and urban population (based on 5 year averages of population, 2004 to 2008) who were drivers involved in crashes by age group, South Australia	70
Figure 2: Percentage of rural and urban licensed drivers involved in crashes by age, South Australia.....	71
Figure 3: Percentage of serious or fatal injury crashes by age group and residential location of the driver (rural or urban) for the years 2004 to 2008, South Australia	73
Figure 4: Comparison of the serious or fatal crash involvement of older drivers (aged 75 and over) and drivers aged 16 to 74 by residential location of the driver (rural and urban) for the years 2004 to 2008, South Australia.....	74
Figure 5: Percentage of rural and urban drivers seriously injured or killed by age group for the years 2004 to 2008, South Australia.....	75
Figure 6: Comparison of the proportions of seriously or fatally injured rural and urban drivers by age (75 and over; 16 to 74 years) for the years 2004 to 2008, South Australia	76

Chapter 4

Figure 1: Percentage of drivers (aged 16 to 74) seriously injured or killed by crashes at locations with various speed limits for the years 2004 to 2008, South Australia.....	100
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Chapter 6

Figure 1: Digital photograph of the 747ProS GPS Trip Recorder shown with the car charger	154
Figure 2: The proportional difference between odometer and Trip Recorder measurements of total distance travelled over one week for each participant.....	161

Abstract

Research indicates that older drivers have an increased risk of being seriously or fatally injured if they crash. However, it is important that older drivers do not cease driving prematurely because driving enables them to remain mobile, which is important for their independence, health and well-being. Older drivers who live in rural or remote areas are of particular interest because the nature of their driving environments may further increase their risk on the road and restrict their mobility. In terms of risk, certain factors that are more common in rural driving environments, such as roads with high speed limits, may contribute to an increased likelihood that older rural drivers will be seriously or fatally injured if they crash, compared to older urban drivers. With respect to mobility, the longer distances that older rural drivers have to travel to reach their destinations, compared to older urban drivers, may restrict their ability to undertake everyday lifestyle activities, particularly those activities that are discretionary in nature (e.g. social activities).

The aim of this thesis was to examine the safety and mobility of older drivers who live in rural areas of South Australia, compared to their urban counterparts. This was achieved through five independent studies. Studies 1 and 2 involved the analysis of crash, serious injury, and fatality data for drivers of different ages from both rural and urban areas of South Australia. Study 1 found that rural drivers aged 75 years and older were more than twice as likely to be involved in crashes that resulted in a serious or fatal injury than urban drivers of the same age. Study 2 found that certain environmental factors - undivided, unsealed, curved and inclined roads, and roads with a speed limit of 100km/h or greater - were more likely to be present in the crashes of older rural drivers than those of older urban drivers and increased the chances that the driver would be seriously or fatally injured. In particular, crashing on a road with a speed limit of 100 km/h or greater produced the largest increase in the risk of serious or fatal injury to the driver.

Study 3 involved an examination of the perceptions of 170 drivers (aged ≥ 75) from rural and urban areas of South Australia regarding: the importance of driving, their access to alternative transportation (e.g. public transport), and the degree to which they self-regulate their driving. It was found that rural participants viewed their driving as being more important than did their urban counterparts and believed that they had fewer alternative transportation options available to them. However, they did not differ on various indices of self-regulation, namely: avoidance of difficult driving situations, reductions in amount of driving and willingness to stop driving. Thus, older rural drivers did not appear to be restricted in their ability to self-regulate because of greater perceived driving importance or limited alternative transportation.

Prior to investigating the driving mobility and exposure of 56 drivers (aged ≥ 75) from rural and urban areas of South Australia, using GPS data loggers and telephone-based travel diaries, the suitability of these methods of data collection was firstly evaluated in Study 4. The participants (who were a sub-sample of the 170 drivers in Study 3) had their driving monitored for a period of one week. Subsequent interviews regarding the data collection process were also undertaken with a subset of 16 participants. It was found that these methods of data collection provided a broad range of accurate information relating to driving exposure (e.g. distance driven, time spent driving, number of trips, travelling speed, road characteristics) and travel patterns (e.g. discretionary and non-discretionary activities, driving routes) for all participants. Furthermore, the participants who were interviewed provided favourable feedback regarding the data collection process.

The data collected for Study 4 were used in Study 5, in order to assess whether older rural drivers are more restricted in their everyday driving mobility, and whether they differ in their exposure to risk while driving, compared to older urban drivers. It was found that, in terms of mobility, rural participants drove further over the week than urban participants, but did not differ in the number of trips that they made or the number that were for discretionary

or non-discretionary activities. With respect to risk-exposure, rural participants were exposed to fewer intersections (potential conflict points) per kilometre¹ and minute driven than urban participants, but drove further and for longer periods on roads with speed limits of 100 km/h or higher and at GPS-measured speeds of 100 km/h or faster.

Overall, the findings suggest that living in rural areas affects the driving safety of older adults, such that the rural driving environment increases the likelihood that they will be seriously or fatally injured in the event of a crash. Importantly, their day-to-day driving mobility is not affected by living in rural areas because they undertake as much driving, and as many activities through their driving, as older urban drivers. Therefore, the challenge for the future is to reduce the risk of serious and fatal injury for older rural drivers without reducing their mobility and, consequently, quality of life in the process. This research does suggest some means by which safe and sustainable mobility may be achieved for older rural drivers, including: modifying the rural driving environment (e.g. decreasing speed limits) and encouraging the use of newer vehicles, which provide better protection in a crash.

¹ Australian/UK English spelling is used throughout this thesis.

Declaration

I, James Thompson, certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint award of this degree.

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List of Publications

Publications are listed in order of appearance in this dissertation

Thompson, J.P., Baldock, M.R.J., Mathias, J.L., & Wundersitz, L.N. (2010). *Older drivers in rural and urban areas: Comparisons of crash, serious injury, and fatality rates*. Paper presented at the Australasian Road Safety Research, Policing and Education Conference, Canberra, Australian Capital Territory. Retrieved from <http://acrs.org.au/files/arsrpe/R2010672.pdf>

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Statements of the Contributions on Jointly Authored Papers

Chapter 3

Title: Older drivers in rural and urban areas: Comparisons of crash, serious injury, and fatality rates

Co-Authors: M.R.J., Baldock, J.L., Mathias, L.N., Wundersitz

Contributions: M.R.J. Baldock and I were responsible for the study inception. I was solely responsible for the study design, methodology (which included data extraction, statistical analyses and data interpretation), and manuscript preparation. All three co-authors acted in a supervisory capacity during all stages of this research and manuscript preparation.

Chapter 4

Title: An examination of the environmental, driver and vehicle factors associated with the serious and fatal crashes of older rural drivers

Co-Authors: M.R.J., Baldock, J.L., Mathias, L.N., Wundersitz

Contributions: M.R.J. Baldock and I were responsible for the study inception. I was solely responsible for the study design, methodology (which included data extraction, statistical analyses and data interpretation), and manuscript preparation. All three co-authors acted in a supervisory capacity during all stages of this research and manuscript preparation.

Chapter 5

Title: Do older rural drivers self-regulate their driving? The effects of increased driving importance and limited alternative transportation

Co-Authors: M.R.J., Baldock, J.L., Mathias, L.N., Wundersitz

Contributions: M.R.J. Baldock and I were responsible for the study inception. I was responsible for the study design, methodology (which included participant recruitment, data

collection, statistical analyses and data interpretation), and manuscript preparation. All three co-authors acted in a supervisory capacity during all stages of this research and manuscript preparation.

Chapter 6

Title: The benefits of measuring driving exposure using objective GPS-based methods and subjective self-report methods concurrently

Co-Authors: M.R.J., Baldock, J.L., Mathias, L.N., Wundersitz

Contributions: M.R.J. Baldock and I were responsible for the study inception. I was responsible for the study design, methodology (which included participant recruitment, data collection, statistical analyses and data interpretation), and manuscript preparation. All three co-authors acted in a supervisory capacity during all stages of this research and manuscript preparation.

Chapter 7

Title: A-GPS based examination of the mobility and exposure to risk of older drivers from rural and urban areas

Co-Authors: M.R.J., Baldock, J.L., Mathias, L.N., Wundersitz

Contributions: M.R.J. Baldock and I were responsible for the study inception. I was responsible for the study design, methodology (which included participant recruitment, data collection, statistical analyses and data interpretation), and manuscript preparation. All three co-authors acted in a supervisory capacity during all stages of this research and manuscript preparation.

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