

## New Guide to safe vehicle travel for wheelchair users

A new resource for wheelchair users and carers, *Wheels within wheels*, has been produced with funding support from the NRMA-ACT Road Safety Trust. The guide includes advice on a range of issues relating to safe travel in vehicles such as choosing a wheelchair, wheelchair restraint systems, transfer equipment such as hoists and ramps, safe

parking, legal and insurance issues, and contact details for suppliers and service providers.

*Wheels within wheels* is available online at [www.roadsafetytrust.org.au/wheels](http://www.roadsafetytrust.org.au/wheels), or the printed version of the booklet may be obtained free of charge from the Secretary/Manager, NRMA-ACT Road Safety Trust, [Linda.Cooke@act.gov.au](mailto:Linda.Cooke@act.gov.au) or phone 02 6207 7151.

# Peer-reviewed papers

---

## Cautiousness in young rural and semi-rural drivers: Are there influencing factors?

by P J Knight<sup>1</sup>, D Iverson<sup>2</sup> and M F Harris<sup>3</sup>

<sup>1</sup>University of New South Wales, University of Wollongong (corresponding author)

<sup>2</sup>Pro Vice Chancellor, Health, University of Wollongong

<sup>3</sup>Executive Director, Centre for Primary Health Care and Equity, University of New South Wales

### Abstract

All drivers have to be prepared for driving with changed conditions, either intrinsic or external to the vehicle. This study explores factors influencing the cautiousness while driving of high school students in a rural and small semi-rural town community in New South Wales. Perceptions of caution in response to a range of different conditions including driving with passengers, bad weather, driving an unfamiliar car, poor road conditions, driving in heavy traffic and darkness – all conditions which have the potential to affect driving style or speed – were reported.

Many of the young rural students reported having started to drive at a very young age (often off-road). This reduced their reported perceptions of caution in their later driving, on-road, post-licence. Previous involvement in a crash was linked with a less cautious approach to changed lighting conditions when driving. Targeted road safety campaigns for young rural drivers may be needed which focus upon promoting specific rural road hazard perception and awareness of the implications of speed and changed road conditions on driving style and cautiousness.

### Keywords

Cautiousness, Rural, Young drivers

### Introduction

Young drivers continue to be over-represented in crashes worldwide [1]. This is also the case in Australia [2, 3]. Despite an overall declining trend in crash rates over the last ten years [4], young rural drivers still have a higher risk of crash involvement than urban young drivers [5,6]. Although there are numerous potential causal factors, such as lack of experience [3], passengers, fatigue, and poor vehicle control [7], the influence of ‘protective’ attitudinal factors which might mitigate high risk driving behaviours has not been extensively researched.

Driving behaviours are influenced by many factors, with motivation defining the goals or purposes of driving [8]. A study conducted with licensed young people serving in the defence forces in Israel linked cautiousness with self image [8]. *Cautiousness* – defined here as the considered response to a change in conditions which may influence driving behaviours – and *confidence* are contrasting factors which may be at opposing ends of a spectrum of motivational factors that influence driving behaviour, with over-confidence predicting higher risk-taking driving behaviour [8]. That study also demonstrated linkages between young people’s views of the cost and benefit of driving with their own views of themselves as drivers. Mood states have been linked to risk taking in driving in a United States-based study [9]. In relation to vehicle

manoeuvring, mood states of anger-hostility, tension-anxiety and depression-dejection were negatively linked to cautiousness. These linkages were only demonstrated in the young drivers in the study. An unexpected finding was that personality traits were not linked with driving behaviours.

In a national survey of teen drivers in the US [10], protective factors to driving risk were identified. When cautiousness was measured in relation to specific driving manoeuvres or compared to all aspects of driving, a higher cautiousness value was found for males than females. Another study related cautiousness to driving styles [11]. Caution about breaking driving rules was found to be constrained by parental supervision, with those who had the most restrictive supervision having the most cautious attitudes.

A cautious driving style might be a factor that limits high risk behaviours while driving [8]. Driving styles may be influenced by the driving styles of parents of new drivers, as well as by the young driver's personality [12]. Thus links exist between parental driving styles and those of the new driver, with anxiety and anger being the most significant traits.

In the authors' previous qualitative research [13] some trends and perspectives of young rural Australian people were identified. Young rural and semi-rural drivers appear to have quite different early driving experiences from those in urban areas and this influences their attitudes and behaviour. The aim of this study was to explore the extent to which high school students reported being cautious while driving, and to consider factors that might predict self-reported cautiousness across a range of different driving situations.

## Method

### Context

The study was conducted in two distinctly different areas in New South Wales to allow comparisons to be made between results from the rural and semi-rural areas. Tumut (population 6500) is in a rural area, with agriculture a major employment sector. It is a small town, the nearest regional centre being Wagga Wagga, 102 kilometres away. It is serviced by rural roads, with fewer features for traffic control (for example traffic lights, roundabouts and filter lanes) than in more populous regions. Other characteristics pertinent to this research are the lack of locally available professional driving school tuition and lack of a public transport system, leading to more reliance on driving. The location of Tumut reflects the variance seen in rural areas in factors such as road types and condition, with a high proportion of unsealed roads. The expected range of weather conditions experienced while driving in the region

is considerable, with winter frosts affecting pavement conditions, and a significant annual rainfall. There is also the possibility of snow in the higher altitudes of the region.

The comparison community is Kiama (population 12,300), which is semi-rural, being in the heart of a predominantly dairy industry area, although adjacent to the large regional centres of Wollongong (population 200,000) and Nowra (32,000). Within a ten-minute drive of Kiama CBD all major road structures, such as traffic lights, roundabouts, multi-lane roads and multi-lane intersections, can be experienced. It is a tourist destination with a significant influx of traffic during school holidays and the summer vacation.

### Participants

Participants selected for the survey were high school students from Years 9 to 12, with ages ranging from 13 to 18 years. All those who returned a signed parental consent form were eligible to complete the survey. The rationale for selecting this study population was to gauge responses from a group of students, including some who were not yet eligible to obtain a driving licence but who might be driving for a variety of reasons. The age range covered the crucial stage of gaining a driving licence, which is attained at the same age for both experienced off-road drivers and novice drivers.

### Instrument

A questionnaire was developed to collect demographic information, such as information about age of onset of driving, reasons for pre-licence driving, frequency of driving, availability of teachers used to develop driving skills, as well as attitudinal information on cautiousness, risk taking, differences between rural and non-rural driving, and behavioural information related to involvement in crashes and responses to road safety campaigns. The instrument was developed from concepts discussed in focus groups with young rural drivers [13]. Issues discussed in the focus groups included factors intrinsic to the vehicle (driving with passengers, driving an unfamiliar car) and external to it (bad weather, darkness, roads in poor condition, driving in heavy traffic). The survey was piloted with ten young people to confirm that it was appropriately understood; amendments were incorporated into the final document (see Appendix 1).

### Analysis

Analysis was performed using SPSS Version 17 (Chicago: SPSS Inc.). Initial analysis was performed using univariate methods to determine associations between responses to the individual questions and other characteristics. To analyse

the data, responses to the five-point scale used in the survey ('would never', 'would rarely', 'would sometimes', 'would often' and 'would always affect my driving') were grouped. The three response options representing a less cautious view (would never, rarely or sometimes affect my driving) were grouped, and contrasted against the other two response options (would often, and would always affect my driving) representing a more cautious view. Associations between these response groups and location of school, age started driving, gender, and previous involvement in a crash as driver were evaluated using a Chi Square test.

Principal component analysis was performed on the six 'cautiousness' questions after excluding missing variables. A one-factor solution with an eigen value of 3.748 explained 62% of the variance. This suggested that the variables could be summed and averaged to give a total 'cautiousness' score. This score was then examined for association with the location of school, gender, whether grew up on a property, age when started to drive, whether father taught the child to drive, and previous involvement in a crash as driver or passenger, using multivariate regression.

## Ethics

Prior to use of the survey instrument, permissions were obtained from the Human Research Ethics Committee at UNSW and the NSW Government Department of Education and Training Ethics in Schools Research Committee.

## Results

The survey was completed by 217 high school students in Tumut and 235 students in Kiama, representing 82% and 74% of the students in the relevant age groups within the schools surveyed, respectively. Those who did not respond to the survey were either not at school on the day of the survey's administration, or had not returned parental permission letters to take part in the survey.

Of those surveyed, the majority (90.5%) reported having had some driving experience, on- or off-road. Non-drivers were excluded from the analysis. Within Australia, it is common practice for young people in rural areas to experience early (pre-licensing-age) driving on private property off-road, either for leisure, to help on rural properties, or for a combination of these reasons. Table 1 summarises characteristics of the students surveyed, including those who had started to drive at age 15 years or below (n=293), with the youngest reported age at which a participant started to drive being 4 years.

**Table 1. Characteristics of the young drivers surveyed**

	Tumut	Kiama
Age range (years)	13-18	14-18
Male	n=103	n=129
Female	n=114	n=106
Live on a property	n=62 (28.6%)	n=37 (15.7%)
Started driving at 15 or under	n=171(78.8%)	n=124 (52.8%)
Have driving experience	n=206 (94.9%)	n=199 (84.7%)
Learned to drive to help on the property	n=70 (32.3%)	n=18 (7.7%)
Father was main teacher	n=124 (57.1%)	n=118 (50.2%)

The survey also asked who had taught driving skills, and who the main teacher was. Parents were the most frequent teachers of driving skills, with the father the main teacher in both localities. Additionally, it asked about personal experience of crashes as either a passenger or driver. For the purposes of the current paper, not all the questions included in the survey instrument are analysed; also no questions within the survey were related to mood states.

## Cautiousness

Six questions concerned factors that might impact on cautiousness when driving: inside the vehicle – driving with passengers, vehicle related – driving an unfamiliar car, and external factors – heavy traffic, bad weather, darkness, and roads in poor condition. Each question asked for a judgement on how much each factor might affect driving, with a five-point scale from 'would never affect my driving' through to 'would always affect my driving'. The results were then cross-tabulated with independent variables: the region, gender, early driving experience and previous involvement in a crash as a driver or passenger. Additionally, multivariate analysis, using the scores summed to give a cautiousness score between 6 (meaning that no factor would affect driving) and 30 (meaning that all the factors would always affect driving), was completed.

## Univariate analysis

### Location of School

There were significant associations between reported cautiousness while driving and location of school (Table 2 – Appendix 2). Students from Kiama reported higher levels of cautiousness than the Tumut group when driving in bad weather ( $\chi^2 = 8.4, p < .003$ ), driving with passengers ( $\chi^2 = 2.9, p < .027$ ), and driving in an unfamiliar car ( $\chi^2 = 6.6, p < .007$ ). There were no significant differences between the two regions in terms of driving in darkness, with poor road conditions, or in heavy traffic.

### Age started to drive

Students who started to drive at a younger age were less likely to report high levels of cautiousness. Students who started to drive at or below 12 years of age (which is four years before the licensing age for drivers in NSW) were more likely to report that the following would rarely or never affect their driving, compared with those who started after 12 years of age:

- bad weather (39.9% compared to 20.9%  $\chi^2 = 27.8$ ,  $p < 0.001$ )
- driving with passengers (70.7% compared to 53.1%  $\chi^2 = 18.8$ ,  $p = 0.001$ )
- darkness (49.4% compared to 40.7%  $\chi^2 = 12.7$ ,  $p = 0.01$ )
- road conditions (50.8% compared to 30.3%  $\chi^2 = 21.8$ ,  $p < 0.001$ )
- driving an unfamiliar car (39.9% compared to 20.9%  $\chi^2 = 27.8$ ,  $p < 0.001$ ).

There was no association between age of starting to drive and level of cautiousness in heavy traffic.

### Gender influences

There was a significant association between gender and cautious driving with poor road conditions, with males being significantly less cautious in their attitudes than females (72.5% compared to 63.9%  $\chi^2 = 3.6$ ,  $p < 0.037$ ). There were no other significant differences by gender.

### Previous involvement in a crash, as a driver

There was a significant negative association between previous involvement in a road crash as a driver and reported cautious driving in relation to driving in darkness. Those who had previous crash experience were less likely to report greater caution in darkness (92.3% compared to 75.7%  $\chi^2 = 3.8$ ,  $p < 0.035$ ). There were no significant associations between previous involvement in a crash and other cautious driving indicators.

### Multiple regression analysis

Multivariate regression analysis was conducted with the summed cautiousness score from the six questions as the independent variable and school, gender, where the student grew up, age when started to drive, whether father taught the student to drive, and previous involvement in a crash as predictors (Table 3). Age at which driving was started and previous involvement in a crash were associated with cautiousness ( $p < 0.001$ ). Students who started to drive at an older age reported more caution, whereas those who had previous involvement in a crash were less cautious. The other variables were not significant.

**Table 3. Estimates of regression coefficients for multivariate regression analysis of cautiousness sum ( $R^2 = 0.086$ )**

Constant	Coefficient		Correlation with cautiousness sum
	Adjusted $\beta$ coefficient	95% confidence interval for $\beta$	
School (Tumut or Kiama)	0.032	-0.82 to 1.52	0.107
Gender	0.038	-0.71 to 1.55	0.091
Grew up on a property	-0.01	-1.43 to 1.17	-0.103
Age started to drive (yrs)	<b>0.228</b>	<b>0.19 to 0.57</b>	<b>0.262</b>
Father taught to drive	-0.036	-1.54 to 0.72	-0.062
Involvement in a crash, as driver or passenger	<b>-0.118</b>	<b>-2.61 to -0.24</b>	<b>-0.135</b>

### Discussion

The majority of those who completed the survey were early drivers, having had driving experiences prior to the usual licensing age. As the age at which a participant started to drive was demonstrated to have a significant effect on cautiousness, this factor may be significant in relation to either health promotion campaigns relating to driving in young people, or to graduated licensing schemes that might not recognise the diversity of experience in novice licence holders from rural areas. It may be that early (usually off-road) driving experience in an environment with little traffic, and therefore requiring less caution in driving judgements, enhanced the young drivers' confidence in their driving skills. This could put them at risk on the road.

In a review of licensing ages [3], the origins of early licensing in the US, Canada and New Zealand have been attributed to earlier agriculturally-based economies where the need for young driving was a consideration for the age of licensing. This review highlights the continuing debate concerning the appropriate age of licensing to reduce the crash rate in young drivers, and the benefits, at all ages, of a graduated licensing scheme with restrictions on night-time and passenger-bearing driving. The results of this study appear to bring new data to the debate, in a group with extensive pre-licensing experience.

The survey question discussed in this study asked specifically about perceptions of caution when faced with changes in driving conditions. These are self-assessments, collected in the context of a survey of driving-related questions which were developed following focus groups. Self-assessment, in this context, will produce a response indicative of the individual participant's view of the cautiousness they may apply in relation to the range of conditions described. The use of five response levels enables a range of views to be recorded. This may indicate

potential weakness in the data, as the results were recorded for each participant on a single occasion.

There were differences in univariate analysis between the two locations, with bad weather being rated as more likely to have an impact on driving in Kiama. This might be related to the area's coastal position and associated high levels of rainfall and fog. The respondents from Tumut were less cautious with passengers on board, and when driving an unfamiliar car. The students from Kiama were in general more cautious in their views about factors, intrinsic and extrinsic to the vehicle, that might affect their driving. The experience of heavy traffic might be location-dependent, with Kiama, although semi-rural, being closer to urban conurbations and experiencing heavy seasonal traffic, as it is a holiday destination and experiences heavy through-traffic seasonally as visitors access the South Coast. Tumut, in contrast, is in an area that does not constantly experience heavy traffic, so the students would be less familiar with driving in it.

This is one of the first studies in which young rural people in Australia have reported exercising greater caution when driving. Although there were differences between those living in semi-rural and rural environments in the univariate analysis, in the multivariate analysis overall cautiousness was only associated with the age at which the students started to drive and previous involvement in a crash.

Students who had previous involvement in a crash as a driver or passenger reported less caution than those who had not. The extent of the crashes is not known. It may be that many were minor and, having escaped relatively unharmed, the students' perceived risk of harm through crash involvement was lessened. Research indicates [14] that risk of injury is associated with high-risk behaviours; conversely, if a high-risk activity is observed to have been taken multiple times with no negative consequences (examples might be frequent driving without using seatbelts, or using a quad bike without a helmet), then the tendency to without using seatbelts or using a quad bike without a helmet) then the tendency to continue with the high-risk activity will not necessarily be modified by the experience of negative outcomes. The same applies to someone who has been involved in a crash in which there were limited adverse results.

Social cognitive theory [15] suggests that the influences on behaviours are varied, and include environmental, individual and developmental factors which interrelate to influence behaviours. This theoretical basis [16] can be used to understand how skills are acquired and practised in driving, and how the amount of experience increases confidence. This skill development with practice and in a staged development model is the basis of graduated driving schemes [17]. The key element of these schemes to

produce skills is extended periods of supervised driving, in which the skill-learning period is extensive, with usually a certain minimum number of hours required to progress to unsupervised driving. There is limited evidence, however, that the age at which the driving experience is obtained has an impact on later driver safety.

This study suggests that early exposure to driving increased the confidence of young drivers. Many of the students involved in this study had had significant vehicle handling time to develop and hone their skills in early off-road driving. This experience allows for skills to develop and evolve into a practised set of actions which are performed with increasing skill gained through experience.

Within a rural community, of which Tumut is an example, the driving-related behavioural beliefs of many students are based upon their individual experiences of early driving. It is widely reported that the value of being able to drive is that it signifies an important stage in adolescent development [3]. In rural agriculturally-based areas, the stage of becoming a driver is significant, partly as public transport is rarely available but also as it enables independent activities and involvement in work tasks on properties. Behavioural beliefs about when driving is initiated are influenced by the normative beliefs of the community. In rural NSW, for example, it is common for very young people to learn to drive – for leisure, to drive across a property, to get to the school bus, or to help on a property. It may be that these behavioural beliefs and their formative foundations are pertinent to the formation of views about cautiousness in driving.

In a study of intentions towards high-risk-taking driving, either with excessive speeding or drink driving [12], the theory of planned behaviour was applied to explain the influence of parental driving supervision on the factors affecting driving intention, and ultimately driving behaviours. The theory of planned behaviour explains linkages between beliefs, intentions and behaviours, in the context of specific environments. The results demonstrated that when parental supervision was 'strongest' there was least intention to be involved in high-risk driving. Study participants who drove early were usually taught by a parent, mainly by their father; this seems to be the norm for many rural communities.

Understanding why the experience of early driving, often with associated responsibility for tasks on a rural property, can reduce caution in on-road driving situations is important to the development of strategies to address the road toll. It may be that early driving makes young people over-confident. It may also be that, if the subjective norm of driving on a property for work-related practice is not 'cautious' (e.g. seatbelt usage is disregarded) young people maintain these attitudes when they drive on-road.

Another study based upon the theory of planned behaviour examined the intention to speed of experienced motorcyclists in two contrasting road conditions [19]. The findings demonstrated that intention to speed on divided roads with a 70 mph limit was predicted by self-belief and group norms; those with intention to speed on an urban road with a speed limit of 30 mph were concerned with attitude and perceived control. It may be that there are similar variations in this study on cautiousness, influenced by learning to drive in situations that are different and distinct from the on-road driving environment. Early off-road driving is undertaken in situations unlike those on the road: there are no speed limits, road rules, or signage.

A limitation of the present study is that the surveys were both completed by those attending school, and did not include those who did not attend school for either a valid or invalid reason (e.g. truancy). The study may therefore have excluded the views of some who might have more extreme tendencies to risk taking, as other research has shown that habitual risk-takers are often also poor attendees at school [15]. The study also excluded those who had chosen to leave school early before completing their final school examinations. However, it did capture responses from students in a wide age range attending the two schools. This research may indicate that the issue of caution and young rural drivers would benefit from further vigorous research, possibly including observational studies of driving behaviours.

## Appendix 1

### Young rural drivers research study questionnaire:

*Thinking of factors that make you drive in a more cautious way, can you rate these situations?*

Please tick one box in each line.

	Would <b>never</b> affect my driving	Would <b>rarely</b> affect my driving	Would <b>sometimes</b> affect my driving	Would <b>often</b> affect my driving	Would <b>always</b> affect my driving
<b>Bad weather</b>					
<b>Driving with passengers</b>					
<b>Darkness</b>					
<b>Roads in poor condition</b>					
<b>Driving an unfamiliar car</b>					
<b>Driving in heavy traffic</b>					

## Conclusions

The driving experiences of young drivers had an influence on their perception of factors that would affect their cautiousness in driving. This implies that recognition of (i) the driving experience prior to licensing of some rural young drivers, and (ii) the apparent behavioural norms in a rural region may warrant a special case for tailored rural road safety campaigns. These may include acknowledgement of vehicle-handling skills while also recognising the need for development of on-road hazard perception, specific to rural driving. It might also be pertinent to develop road safety campaigns that emphasise the development of staged skill development for families to teach their children in both off- and on-road driving situations. Such an approach could reflect the models used in graduated driving schemes. Both these health promotion campaigns would potentially complement the advances which the graduated licensing schemes have made in reducing the crash toll in young drivers.

## Acknowledgements

The authors acknowledge the support from teachers and principals of the high schools in Tumut and Kiama, and the participation of their students.

## Appendix 2

Table 2. Cautiousness: Proportion of students reporting influence of particular situations on their driving by school (Tumut n=217, Kiama n=235)

		Would never affect my driving		Would rarely affect my driving		Would sometimes affect my driving		Would often affect my driving		Would always affect driving		Nil response	
		n	%	n	%	n	%	n	%	n	%	n	%
Bad weather	Tumut	30	13.8	41	18.9	76	35.1	25	11.5	30	13.8	15	6.9
	Kiama	14	6	37	15.7	79	33.6	52	22.1	37	15.7	16	6.8
Driving with passengers	Tumut	63	29	73	33.6	45	20.7	10	4.6	11	5.1	15	6.9
	Kiama	53	22.6	65	27.7	65	27.7	25	10.6	11	4.7	16	6.8
Darkness	Tumut	50	23	48	22.1	61	28.1	26	12	17	7.8	15	6.9
	Kiama	24	10.2	65	27.7	75	31.9	32	13.6	23	9.8	16	6.8
Roads in poor condition	Tumut	36	16.6	49	22.6	59	27.2	32	14.7	26	12	15	6.9
	Kiama	15	6.4	43	18.3	85	36.2	50	21.3	26	11	16	6.8
Driving an unfamiliar car	Tumut	32	14.7	53	24.4	78	35.9	21	9.7	18	8.3	15	6.9
	Kiama	22	9.4	57	24.3	74	31.5	47	20	19	8.1	16	6.8
Driving in heavy traffic	Tumut	28	12.9	49	22.6	57	26.3	37	17.1	31	14.3	15	6.9
	Kiama	30	12.8	60	25.5	62	26.4	40	17	27	11.5	16	6.8

## References

1. Peden M, Scusfield R, Sleet D, Mohan D, Hyder AA, Jarawan E, Mathers C. (2004) World Health Organisation: World Report on Road Traffic Injury Prevention
2. Williams 2003. Teenage drivers: Patterns of risk. Journal of Safety Research, 34, 5-15.
3. Williams 2009. Licensing Age and Teenage Driver Crashes: A Review of the Evidence. Traffic Injury Prevention, 10, 9 - 15.
4. Chen H Y, Senserrick T, Martiniuk ALC, Ivers R Q, Boufous S, Chang H Y. (2010). Fatal crash trends for Australian young drivers 1997-2007: Geographic and socioeconomic differentials. Journal of Safety Research, 41(2), 123-128.

5. Stevenson M R and Palamara P. 2001. Behavioural factors as predictors of motor vehicle crashes: differentials between young urban and rural drivers. *Australian and New Zealand Journal of Public Health*, 25, 245-249.
6. Chen H Y Ivers R Q Martiniuk A L C Boufous S Senserrick T Woodward M Stevenson M Williamson A and Norton R. 2009. Risk and type of crash among young drivers by rurality of residence: Findings from the DRIVE Study. *Accident Analysis & Prevention*, 41, 676-682.
7. Braitman K A Kirley B B McCartt A T and Chaudhary N K. 2008. Crashes of novice teenage drivers: Characteristics and contributing factors. *Journal of Safety Research*, 39, 47-54.
8. Taubman - Ben-Ari O. 2008. Motivational sources of driving and their associations with reckless driving cognitions and behavior. *Revue Européenne de Psychologie Appliquée/European Review of Applied Psychology*, 58, 51-64.
9. Garrity R D and Demick J. 2001. Relations Among Personality Traits, Mood States, and Driving Behaviors. *Journal of Adult Development*, 8, 109.
10. Ginsburg K R Ed M S Durbin D R Garcia-Espana J F Kalicka E A & Winston F K. 2009. The Association Between Parental Style and Adolescent Driving Safety-Related Behaviors. *Journal of Adolescent Health*, 44, S40-S40.
11. Desrichard O Roche S and Begue L. 2007. The theory of planned behavior as mediator of the effect of parental supervision: A study of intentions to violate driving rules in a representative sample of adolescents. *Journal of Safety Research*, 38, 447-452.
12. Miller G and Taubman - Ben-Ari O. 2010. Driving styles among young novice drivers--The contribution of parental driving styles and personal characteristics. *Accident Analysis & Prevention*, 42, 558-570.
13. Knight PJ Iverson D and Harris M F. 2011, Early driving experience and influence on risk perception in young rural people, *Accident Analysis & Prevention*, ( Article in Press)
14. Pickett W Schmid H Boyce W F Simpson K Scheidt P C Mazur J Molcho M King M A Godeau E Overpeck M Aszmann A Szabo M & Harel Y. 2002. Multiple risk behavior and injury: An international analysis of young people. *Archives of Pediatrics and Adolescent Medicine*, 156, 786-793.
15. Bandura A. 1986 *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs,NJ: Prentice-Hall.
16. Bandura A. 1989. Human Agency in Social Cognitive Theory, *American Psychologist*, Vol44, No9, p1175-1184.
17. McKnight A J and Peck R C. 2003. Graduated driver licensing and safer driving. *Journal of Safety Research*, 34, 85-89.
18. Aizen I. 2006, Viewed 20 August 2011. <http://people.umass.edu/aizen/tpb.diag.html>
19. Elliott M A. 2010. Predicting motorcyclists' intentions to speed: Effects of selected cognitions from the theory of planned behaviour, self-identity and social identity. *Accident Analysis & Prevention*, 42, 718-725.

## Understanding the fear of bicycle riding in Australia

by E Fishman<sup>1</sup>, S Washington<sup>2</sup>, N Haworth<sup>1</sup>

<sup>1</sup>Centre for Accident Research and Road Safety – Queensland (CARRS-Q), Queensland University of Technology, Kelvin Grove, Queensland

<sup>2</sup>Faculty of Built Environment and Engineering and Centre for Accident Research and Road Safety – Queensland (CARRS-Q), Faculty of Health, Queensland University of Technology, Brisbane

### Abstract

Rates of bicycle commuting currently hover around 1 - 2% in most Australian capital cities, although 17.8% of Australians report riding at least once per week. The most commonly stated reason for choosing not to ride a bicycle is fear of motorised vehicles. This paper sets out to examine the literature and offer a commentary regarding the role fear plays as a barrier to bicycle riding. The paper also provides an estimate of the relative risk of driving and riding, on a per trip basis. An analysis of the existing literature finds

fear of motorised traffic to be disproportionate to actual levels of risk to bicycle riders. Moreover, the health benefits of bicycling outweigh the risks of collision. Rather than actual collisions forming the basis of people's fear, it appears plausible that *near collisions* (which occur far more frequently) may be a significant cause for the exaggerated levels of fear associated with bicycle riding. In order to achieve the Australian Government's goal of doubling bike riding participation, this review suggests it will be necessary to counter fear through the creation of a low risk traffic environment (both perceived and real), involving marketing/promotional campaigns and the development of