



Contents lists available at ScienceDirect

Accident Analysis and Prevention

journal homepage: www.elsevier.com/locate/aap



The role of risk-propensity in the risky driving of younger drivers

Julie Hatfield*, Ralston Fernandes

NSW Injury Risk Management Research Centre, The University of NSW, NSW 2052, Australia

ARTICLE INFO

Article history:

Received 18 February 2008

Received in revised form 16 July 2008

Accepted 8 August 2008

Keywords:

Young drivers

Risky driving

Risk-propensity

Risk-motivation

Risk-perception

ABSTRACT

Young drivers are over-represented in road injury statistics, partly because they engage in more risky driving than older people. Although it is assumed that younger people have greater risk-propensity, defined as a positive attitude to risk, relevant theory is imprecise and relevant research is clouded by inappropriate measures. 89 participants aged 16–25 and 110 participants aged over 35 were recruited outside motor registries. Participants completed a battery of questionnaires including Rohrmann's [Rohrmann, B. 2004. Risk attitude scales: concepts and questionnaires. Project report. Available at <http://www.rohrmannresearch.net/pdfs/rohrmann-racreport.pdf> (last accessed 12th February 2008)] measures of risk-aversion, risk-propensity, and risk-related motives for risky driving, as well as measures of risk-perception and risky driving. Compared to older drivers, younger drivers demonstrated lower risk-aversion, and higher propensity for taking accident risks, as well as stronger motives for risky driving in relation to experience-seeking, excitement, sensation-seeking, social influence, prestige-seeking, confidence/familiarity, underestimation of risk, irrelevance of risk, "letting off steam", and "getting there quicker". Further, these variables were associated with risky driving. Some evidence was observed for the possibility that risk propensity moderates the relationship between perceived risk and risky behaviour. These results suggest approaches to targeting the "young driver problem".

© 2008 Elsevier Ltd. All rights reserved.

1. Introduction

Young drivers are over-represented in road crash statistics, at great societal cost (Williamson, 2003). The over-representation of young drivers may result in part from their tendency to engage in more risky driving than older drivers (for reviews see Jonah, 1986; Williamson, 2003; see also Catchpole, 2005; Simon and Corbett, 1982).

There appears to be a general assumption that young drivers' tendency to engage in risky driving owes partly to a willingness, or even a desire, to take risks—a characteristic which may be referred to as "risk-propensity". Risk-propensity is defined as a positive attitude toward taking recognized risks (Rohrmann, 2004). Researchers and laypersons appear to assume that risk-propensity is a trait that influences the extent to which an individual engages in risk. However, both theoretical and experimental consideration of the role of risk-propensity in young drivers' risky driving has suffered from a lack of conceptual clarity regarding distinctions between risk-propensity and related factors (such as risk-perception).

The role of risk-propensity is best understood within a conceptual framework that has been derived (for the present research) from relevant road safety literature, as well as literature regarding risky decisions (e.g. financial decisions) [see Fig. 1].

Sometimes young drivers may engage in risky driving inadvertently (i.e. without realizing that they are risky), partly through inexperience and error. However, inexperience does not account for all of the variance in their risky driving (Catchpole, 2005; Jonah, 1986). Young drivers, like all drivers, may choose to adopt behaviours that they recognize to be risky when the balance between the perceived (possible) costs of the behaviour (e.g. penalties and crashes) and the perceived (possible) benefits of the behaviour (e.g. fun, or getting somewhere quicker) is judged to be favorable (Job, 1995). We propose that the perceived riskiness of the behaviour may be considered as either a cost or a benefit, depending partly on an individual's attitude to taking risks (i.e. risk-propensity or risk-aversion), although according to a number of models of health behaviour [e.g. Health Beliefs Model: Janz and Becker, 1984; Theory of Planned Behaviour: Ajzen and Madden, 1986] perceived risk is simply a deterrent to risky behaviour.

Research regarding inter-relationships between risky driving, risk-perception, and attitudes toward risk has been hampered by lack of conceptual clarity, and lack of appropriate measures. For example, distinctions are seldom made between (a) inadvertent

* Corresponding author. Tel.: +61 2 9385 7949; fax: +61 2 9385 6040.

E-mail addresses: j.hatfield@unsw.edu.au (J. Hatfield), r.fernandes@unsw.edu.au (R. Fernandes).

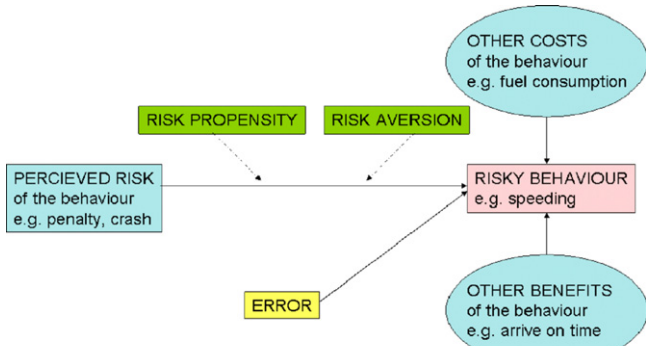


Fig. 1. Schematic diagram of hypothetical factors influencing risky behaviour.

Table 1
Personal characteristics and driving experience for younger and older samples.

	Younger drivers	Older drivers
Age range	16–25	34–74
Mean age (s.d.)	21.10 (2.69)	45.12 (8.26)
% Female	39.3	54.5
% English spoken at home	79.8	87.3
% Learners	11.2	.9
% Red provisional	22.5	.0
% Green provisional	21.3	.0
% Full	42.7% (2 missing)	99.1% (1 missing)
Years licensed range	.20–10.50	1.10–55.00
Mean years licensed (s.d.)	4.10 (2.66) (5 missing)	23.09 (10.83) (4 missing)
Hours/week driving range	.00–60.00	.00–52.00
Mean hours/week driving (s.d.)	10.42 (8.53) (5 missing)	10.98 (8.45) (1 missing)

risky behaviour, (b) choosing a risky behaviour when perceived risks are amongst costs that are outweighed by benefits, and (c) choosing a risky behaviour when perceived risks are amongst benefits (which outweigh costs). All of these have been referred to as risk-taking (see Jonah, 1986; Beirness, 1993). Discussion of motivations for risky driving has conflated perceived benefits of the risk *per se* with perceived benefits of the behaviour that are independent of risk. The possibility that risk-propensity moderates the relationship between risk-perception and risky behaviour has not been recognized explicitly.

Risk-propensity has sometimes been inferred from measures of risky behaviour (for example see Jonah, 1986; Beirness, 1993), which is clearly circular and does not allow investigation of the relationship between these two concepts. Further, some measures of risk-propensity do not sufficiently distinguish the construct from risk-perception. That is, respondents may report a willingness to engage in a risky behaviour, but it is not clear (from the wording of questionnaire) that they recognize the behaviour as risky. Finally, risk-propensity has sometimes been understood, and measured, in terms of sensation seeking (for example see Jonah, 1986; Beirness, 1993). Sensation seeking is “a trait defined by the seeking of varied, complex, & novel sensations & experiences & the willingness to take physical, social, legal, & financial risks for the sake of such experiences” (Zuckerman, 1994, p. 27). Clearly, drivers may have a propensity for taking risks that is motivated by factors besides sensation seeking (for example by a desire for peer approval). Measures of risk-propensity that adequately assess possible motivations for valuing risk positively (such as positive motives for experience, self-enhancement, excitement, physical enjoyment, social approval, and financial gain, and negative motives such as lack of time or resources, lack of concern for health [see Rohrmann, 2004]) have also been lacking.

Thus, relationships of risk-propensity and motives for valuing risks positively with risky driving, and with age, are yet to be examined appropriately, although Jonah and Dawson (1987) found that young drivers placed less importance on safety features when buying a new car compared to older drivers. Personality traits that have been associated with risky driving, such as sensation seeking (Beirness, 1993; Jonah, 1997) and “thrill seeking” (Beirness, 1993), have rarely been compared for younger and older drivers.

Rohrmann (2004) reports on the psychometric properties of four risk-propensity questionnaires that promise to be useful in exploring vulnerability of young drivers, as well as other research regarding risky driving. The questionnaires measure risk-aversion, risk-propensity, and motivations for valuing risk positively. Results indicate that the questionnaires are reliable and demonstrate good

convergent validity (when correlated with previous measures of “risk-propensity”¹ and related constructs).

The current study aims to employ Rohrmann’s questionnaires to compare younger and older drivers in terms of risk-propensity, risk-aversion, and motives for positive attitudes toward risky driving, and to test the relationship of these factors with risky driving amongst younger and older drivers. We also investigate the possibility that risk-propensity modifies the relationship between risk-perception and risky driving. Practical implications for addressing young driver safety will be considered.

2. Methods

2.1. Participants and sampling

199 participants were recruited outside each of five motor registries, chosen to achieve a suitable range of socio-economic status. All people entering the registry who appeared to be in the age ranges 16–25 or 35+ were approached and invited to participate in a study about “attitudes to road safety” being conducted by researchers from the NSW Injury Risk Management Research Centre at the University of NSW. They were told that they were selected at random and asked to complete a survey taking about 15 min while they waited for service in the registry. We have used this methodology successfully in the past (see Fernandes et al., 2007; Hatfield et al., 2005; Hatfield and Job, 2004). It has the advantages of (1) approach to a wide sector of the driving public, (2) a high response rate and (3) an apparently unbiased sample. Purposive sampling was employed to ensure a suitable balance of younger and older drivers, at each registry. The refusal rate was 54.9% (306/557). Amongst those who refused to participate, 45.1% were female, and the average age was approximately 30. After excluding 52 incomplete surveys, there were 89 respondent aged 16–25 years and 110 respondents aged over 35 years. Table 1 provides personal characteristics and driving experience for each sample.

2.2. Materials

A questionnaire booklet was compiled to assess each of the following variables, in order.

2.2.1. Risk-aversion and risk-propensity

Rohrmann’s Risk Orientation Questionnaire (ROQ) (Rohrmann, 2004) was employed to assess risk-propensity separately from

¹ As discussed earlier, most measures of risk-propensity have been logically flawed.

Table 2Cronbach's alpha for final RMQ subscales for speeding and drink-driving, for the younger ($n = 89$) and older ($n = 110$) samples.

Subscale	Items	Speeding		Drink-driving	
		Younger	Older	Younger	Older
Experience-seeking	Satisfaction of new experiences	.943	.958	.961	.935
	For fun/amusement				
	Curiosity about what the activity is like				
	To increase self-confidence				
	Feeling of having control over something				
	Feeling of freedom				
	Wanting to overcome my inner fears				
	Enhancing my view of myself (e.g. as brave, adventurous, skilled)				
	Personal challenge (opportunity to test my limits)				
Relief from the monotony of everyday life					
Excitement	For excitement and thrill	.945	.922	.925	.904
	Enjoyment of the 'adrenalin rush'				
	Tendency to live 'on the edge'				
Sensation-seeking	For physical pleasure, such as pleasant body feelings	.910	.933	.847	.912
	To experience unique sensations (sound, touch, taste, smell)				
Prestige seeking	To prove myself to others	.870	.899	.865	.886
	To attract admiration				
Social influence	To take part in something with others and to be sociable	.910	.892	.903	.920
	Pressure from friends to take part				
	Pressure from other drivers to take part				
	To not look like a coward				
Confidence/familiarity	Everyone else was doing this activity so I trusted it's okay	.862	.868	.827	.804
	Activity is familiar (much experience with it)				
Underestimation of risk	Relying on the effectiveness of my equipment/tools	.842	.836	.895	.833
	Don't see the potential risk				
	Activity not dangerous				
Irrelevance of risk	Severity of consequences not serious	.884	.656	.841	.848
	Because my safety and health are not that important				
	Because of addiction to the activity				
	Alcohol consumption beforehand SPEEDING ONLY				
Added	The future is too bleak to worry that much about my life	N/A	N/A	N/A	N/A
	To let off steam				
	To get to my destination more quickly				

risk-aversion (itself a conceptual advance). Participants rated their agreement with 12 statements expressing risk-aversion (e.g. "I'm quite cautious when I make plans and when I act on them") or risk-propensity (e.g. "I follow the motto 'nothing ventured nothing gained'") on a 7-point Likert scale (anchored at "Not at all" and "Extremely"). Scores were averaged for each scale. For the risk-aversion scale Cronbach's alpha was .55 and .58 for the younger and older samples, respectively. Cronbach's alphas were .66 and .69 for the risk-propensity scale.

Rohrman's Risk-propensity Questionnaire (RPQ) (Rohrman, 2004) was employed to assess risk-propensity for the accident domain, as well as the illness, financial and social domains. Participants made a direct and holistic assessment of their risk-propensity in each of the 4 domains. For example, respondents read: "Some activities involve a physical risk, such as particular occupations (e.g. underground miner) or sports (e.g. rock-climbing) or transportation (e.g. cycling)—that is, there is a chance of getting injured (or possibly even dieing) in an accident. In general my propensity for accepting physical risks is . . .", and responded on a 11-point Likert scale (anchored at "extremely low" and "extremely high").

2.2.2. Risk-motivation

Different risk-relevant reasons for engaging in speeding and drink-driving were assessed using a modification of Rohrman's Risk Motivation Questionnaire (RMQ) (Rohrman, 2004). First, participants rated how often they engage in each behaviour on a fully labeled 6-point Likert scale (ranging from "Never" to "Always").

They then rated the extent to which various factors influenced (or would influence) their decision to engage in this behaviour [for items see Table 2] on fully labeled 5-point Likert scale (ranging from "not at all" to "very much"). Scales were based on Rohrman's (2004) a priori item groupings, and checked against factor analysis and reliability analysis [see Table 2]. Item scores were averaged within each sub-scale.

2.2.3. Social desirability

The Marlow-Crowne Social Desirability Scale—Short Form C (Reynolds, 1982) assessed the extent to which participants tend to respond in a socially desirable fashion. Socially desirable responses were totaled. Cronbach's alpha was .51 and .60 for the younger and older samples, respectively.

2.2.4. Risk-perception (including illusory invulnerability)

Risk-perception was assessed by asking participants to rate their chance of experiencing each of a list of negative events on a fully labeled 7-point Likert scale (ranging from "extremely unlikely" through to "extremely likely"). Events were related to two risky driving behaviours [see Table 3], as well as two behaviours from each of the illness, financial and social domains (not considered in analysis).

Participants made the same ratings for the "average driver of your age and gender", so that illusory invulnerability scores could be computed by subtracting self ratings from peer ratings. Illusory invulnerability – peoples' tendency to believe that bad things are

Table 3
Events for which participants rated likelihood, and related driving behaviours for which participants rated frequency of performing.

Domain	Risky behaviour	Event
Accident	Speeding • How often would you drive at 66–75 km/h in a 60 km/h speed zone? • How often would you drive at more than 75 km/h in a 60 km/h speed limit zone?	• Be fined for speeding • Have a crash due to speeding • (Be injured or killed in a car crash, as a driver at fault) • (Not be hospitalised in the next 5 years for illness or injury) ^a
	Drink-driving • When it would be desirable to drive, and you are under the influence of alcohol BUT NOT above the legal limit, how often would you drive? • When it would be desirable to drive, but you are above the legal limit for alcohol, how often would you drive?	• Be fined for drink-driving • Have a crash due to drink-driving • (Be injured or killed in a car crash, as a driver at fault) • (Not be hospitalised in the next 5 years for illness or injury) ^a

^a This item was reverse-scored.

less likely to happen to themselves than their peers – is hypothesised to promote risk-taking and inhibit precaution-taking (Job et al., 1995; Weinstein, 1989). In support of this extension of typical health behaviour models, perceived relative risk has been shown to influence behaviour to at least as great an extent as perceived absolute personal risk (Klein, 1997; Morgan and Job, 1995).

Each driving-related item was considered separately (because preliminary checks indicated low reliability of possible sub-scales).

2.2.5. Risky behaviour

Participants indicated how frequently (as a proportion of opportunity) they engage in various risky behaviours in particular circumstances on a fully labeled 5-point Likert scale (ranging from “never” to “almost all the time”). Ratings for speeding and drink-driving situations [see Table 2], separately, were averaged with the respective RMQ behaviour frequency measure. For speeding, Cronbach’s alpha was .86 and .76 for the younger and older samples, respectively. For drink-driving, Cronbach’s alphas were .75 and .72. Four behaviours relating to each of the risk domains included in the RPQ (and to events included in the risk-perception questionnaire) were also rated (but are not considered in analyses).

2.2.6. Demographic variables

A final section assessed age, gender, ethnicity (language spoken at home), and socio-economic status (postcode), as well as driving experience (hours spent driving per week, license class, and years licensed). Several questions relating to experience of being fined or crashing due to speeding and drink-driving were not analysed due to the infrequency of these events.

2.3. Procedure

Data collectors waited outside selected registries during peak times (e.g. lunchtimes) and approached everyone entering the registry who appeared to be in the targeted age ranges. All participants were urged to respond accurately and honestly, and assured of their anonymity and right to withdraw.

3. Statistical analysis

A Type 1 error rate of .05 was employed throughout, and all tests were conducted two-tailed.

Correlation of scores on the social desirability scale with all cognitive and behavioural self-report variables was evaluated, so that social desirability could be employed as a covariate in analysis involving the variables with which it was significantly associated. In the younger sample, social desirability demonstrated significant correlations only with the “getting there quicker” motivation for speeding ($r = -.214, p = .044$) and illusory invulnerability regarding being killed or injured in a crash ($r = .265, p = .012$). In the older sample, social desirability demonstrated significant corre-

lations with the “getting there quicker” motivation for speeding ($r = -.210, p = .028$), experience- and prestige-seeking motivations for drink-driving ($r = .197, p = .039$; $r = .198, p = .038$; respectively), and for perceived risk relating to being fined for speeding ($r = -.326, p = .001$), crashing due to speeding ($r = -.371, p < .001$), being injured or killed in a crash ($r = -.259, p = .006$), and not being hospitalized ($r = .315, p = .001$).

Younger driver and older samples were compared in terms of risk-aversion, risk-propensity, motives for positive attitudes toward risky driving, risk-perception, and self-reported risky driving, considering interactions with gender. Where an interaction with gender was observed, the effect of sample was tested for males and females separately employing *t*-tests, or Univariate General Linear Model when the social desirability score was required as a covariate. The effect of sample was also considered separately for males and females when main effects of both gender and sample were observed, to avoid spurious effects of sample (resulting from the gender imbalance between the groups).

The association of risk-aversion, risk-propensity, motives for positive attitudes toward speeding, and risk-perception, with self-reported speeding was assessed in each sample, for males and females separately. Parallel analyses were conducted for drink-driving.

In order to examine the moderation of this relationship by risk-propensity, for each risk-propensity measure the top and bottom 20th percentile were classified as high and low scorers, respectively. The correlation of self-reported speeding with perceived risk of crashing due to speeding, and of self-reported drink-driving with perceived risk of crashing due to drink-driving, was computed for low and high scorers on each measure separately. This analysis was conducted across both samples to maximize statistical power, and because the basic role of risk-propensity should not vary with age (although levels of it may).

4. Results

4.1. Comparison of younger and older drivers for all cognitive and behavioural variables

Table 4 presents mean scores (and s.d.) for all cognitive behavioural variables, and results of statistical tests for main effects of age and gender, and their interaction. Many variables demonstrated a significant age \times gender interaction, such that age group differences were observed only for one gender.

Younger drivers demonstrated lower general risk-aversion than older drivers (across males and females), and greater propensity for physical accident risks amongst females only.

Younger drivers reported stronger motives for speeding in relation to experience-seeking, excitement, social influence, and “letting off steam” (males and females), as well as sensation-seeking (females only, but for males $p = .055$ suggesting the

Table 4

Mean (and s.d.) for each variable, for younger and older males and females; statistics for comparison of younger sample ($n = 89$) with older sample ($n = 110$), showing interaction with gender, and main effect of gender (M: $n = 104$; F: $n = 95$).

Variable	Scale	Males		Females		Sample × Gender interaction	Gender main effect	Sample main effect
		Younger	Older	Younger	Older			
Risk-propensity	ROQ Risk-aversion	3.97 (.78)	4.40 (.87)	4.18 (.89)	4.28 (.88)	1.823	.133	4.575*
	ROQ Risk-propensity	4.58 (1.00)	4.48 (1.20)	4.63 (.96)	4.59 (.97)	.026	.263	.234
	RPQ Accident risk-propensity	6.02 (2.42)	5.44 (2.84)	5.71 (2.50)	3.43 (2.53)	5.194*	9.570*	M: 1.119 F: 4.251** c
Risk-motivation: Speeding RMQ	Experience-seeking	2.42 (1.15)	2.05 (1.11)	2.30 (1.12)	1.68 (.81)	.761	2.661	10.692*
	Excitement	2.58 (1.36)	1.84 (.92)	2.46 (1.32)	1.52 (.79)	.399	1.930	28.321**
	Sensation-seeking	2.44 (1.42)	1.95 (1.17)	2.13 (1.30)	1.47 (.79)	.243	5.537*	M: 1.941 F: 2.731* d
	Prestige-seeking	2.00 (1.27)	1.79 (1.12)	1.73 (1.04)	1.32 (.55)	.472	6.418*	M: .893 F: 2.174* d
	Social influence	2.21 (1.13)	1.76 (.96)	1.81 (.91)	1.34 (.46)	.009	10.073*	M: 2.192* F: 2.886* d
	Confidence & familiarity	2.37 (1.10)	2.45 (1.15)	2.30 (1.34)	1.87 (1.05)	2.409	3.913*	1.146
	Underestimation of risk	2.41 (1.13)	2.09 (1.01)	1.90 (1.02)	1.72 (.94)	.246	8.971*	2.759
	Irrelevance of risk	1.90 (1.08)	1.44 (.62)	1.41 (.77)	1.23 (.39)	1.646	10.054*	M: 2.676* F: 1.290 d
	"let off steam"	2.20 (1.29)	1.96 (1.01)	2.11 (1.28)	1.70 (1.00)	.268	1.124	3.987*
	"get there quicker" ^b	3.46 (1.24)	3.00 (1.31)	3.09 (1.46)	2.98 (1.46)	.981	.931	.773
Drink-driving RMQ	Experience-seeking ^b	2.14 (1.20)	1.41 (.65)	1.50 (.72)	1.60 (.76)	10.694*	3.246	M: 15.590** F: .129 ^c
	Excitement	2.05 (1.22)	1.20 (.55)	1.80 (1.10)	1.50 (.86)	3.879	.037	17.080**
	Sensation-seeking	1.83 (1.19)	1.30 (.71)	1.63 (.91)	1.49 (.99)	1.973	.002	5.641*
	Prestige-seeking ^b	1.91 (1.27)	1.34 (.85)	1.26 (.63)	1.50 (.97)	7.910*	3.045	M: 7.260* F: .928 ^c
	Social influence	2.02 (1.20)	1.40 (.74)	1.56 (.87)	1.46 (.81)	3.719	2.122	7.388*
	Confidence & familiarity	2.00 (1.26)	1.51 (.85)	1.34 (.55)	1.60 (.93)	7.14*	4.114*	M: 2.333* F: -1.687 ^c
	Underestimation of risk	2.07 (1.25)	1.46 (.70)	1.32 (.60)	1.53 (1.00)	8.809*	6.059*	M: 3.104* F: -1.276 ^c
	Irrelevance of risk	1.22 (.72)	1.03 (.57)	.87 (.27)	1.14 (.67)	6.767*	1.907	M: 1.519 F: -2.710* ^c
	"let off steam"	1.76 (1.23)	1.34 (.82)	1.26 (.66)	1.38 (.89)	3.982*	2.817	M: 2.059* F: -.733 ^c
	"get there quicker"	2.57 (1.51)	1.92 (1.14)	2.00 (1.11)	2.22 (1.29)	5.430*	.551	M: 2.502* F: -.863 ^c
Perceived risk	Fined for speeding ^b	3.56 (1.84)	3.22 (1.89)	3.63 (1.83)	2.87 (1.50)	.633	.256	2.387
	Crash due to speeding ^b	3.07 (1.71)	2.80 (1.65)	3.23 (1.52)	2.10 (1.05)	3.923*	1.534	M: .115 F: 15.082** ^c
	Fined for drink-driving	2.07 (1.50)	1.58 (1.16)	1.89 (1.28)	1.37 (.74)	.003	1.321	8.566*
	Crash due to drink-driving	2.17 (1.55)	1.48 (1.07)	1.86 (1.22)	1.33 (.73)	.232	1.824	12.844**
	Injured or killed in a crash ^{b e}	2.67 (1.49)	2.28 (1.37)	3.15 (1.40)	2.30 (1.27)	1.174	1.698	6.136*
	Not be hospitalised ^{a b}	4.31 (1.55)	4.42 (1.73)	3.94 (1.51)	4.09 (1.76)	.000	2.539	.013
Illusory invulnerability ^f	Fined for speeding	1.07 (1.98)	.64 (1.32)	1.49 (1.77)	.93 (1.59)	.059	2.105	4.121*
	Crash due to speeding	1.26 (2.13)	.84 (1.30)	1.66 (1.86)	1.28 (1.29)	.009	3.056	2.716
	Fined for drink-driving	2.06 (1.84)	1.76 (1.62)	2.83 (2.67)	2.03 (1.51)	.935	4.115*	M: .867 F: 1.845 ^d
	Crash due to drink-driving	1.70 (1.93)	1.66 (1.45)	2.63 (1.90)	2.02 (1.47)	1.360	6.926*	1.810
	Injured or killed in a crash ^b	1.43 (1.88)	1.10 (1.33)	1.21 (2.24)	.82 (1.37)	.031	1.095	3.090
	Not be hospitalised ^a	-.06 (1.97)	-.28 (1.65)	-.71 (1.60)	.09 (1.72)	4.011*	.325	M: .620 F: -2.231* ^c
Behaviour frequency	Speeding average	2.00 (1.25)	1.49 (.78)	1.84 (1.28)	1.31 (.80)	.004	1.190	11.763*
	Drink-driving average	1.02 (1.13)	.67 (.69)	.76 (.80)	.67 (.90)	.901	.815	2.571

^a This item was reverse-scored.

^b Tests included social desirability as a covariate.

^c Tests for males and females conducted separately due to significant sample × gender interaction.

^d Tests for males and females conducted separately due to significant main effects of gender and sample.

^e Younger: $n = 88$, Female: $n = 94$.

^f Higher score indicates greater illusory invulnerability.

* $p < .05$.

** $p < .001$.

effect may be significant in a larger sample), prestige-seeking (females only), and irrelevance of risk (males only). Younger drivers reported stronger motives for drink-driving in relation to excitement, sensation-seeking, and social influence (males and females), as well as experience-seeking, prestige-seeking, and confidence/familiarity, underestimation of risk, "letting off steam", and "getting there quicker" (males only). Amongst females only, younger drivers reported *lower* motives for drink-driving in relation to irrelevance of risk (for confidence/familiarity $p = .095$ suggesting the effect may be significant in a larger sample).

Compared to older drivers, younger drivers perceived *higher* risks of crashing due to speeding (females only), being fined, or crashing, due to drink-driving, and being injured or killed in a car crash (males and females). Younger drivers also demonstrated *lower* illusory invulnerability than older drivers regarding being

hospitalized (females only). However, younger drivers demonstrated higher illusory invulnerability than older drivers regarding being fined for speeding. Regarding being fined for drink-driving, when tests were conducted separately for males and females, due to both gender and sample effects being significant, neither gender demonstrated an age group difference (although for females $p = .071$).

Younger drivers also reported speeding more frequently than did older drivers.

Within the comparison of the younger and older samples, compared to females, males reported higher accident risk-propensity; stronger motives for speeding in relation to sensation-seeking, prestige-seeking, social influence, confidence/familiarity, underestimation of risk, and irrelevance of risk; and stronger motives for drink-driving in relation to confidence/familiarity and under-

estimation of risk. Illusory invulnerability regarding being fined, or crashing, due to drink-driving was higher amongst males than females.

4.2. Association of risk-aversion, risk-propensity, motives for positive attitudes toward risky driving, and risk-perception, with self-reported risky driving

Table 5 presents correlations of risk-aversion, risk-propensity, motives for positive attitudes toward speeding, and risk-perception, with self-reported speeding and with self reported drink-driving in each sample, for males and females separately.

4.2.1. Risk-aversion and risk-propensity

Risk-aversion was associated with self-reports of drink-driving less frequently for *younger females*, and with self-reports of speeding less frequently for older males (for younger males $p = .064$). Accident risk-propensity was associated with more frequent speeding in *younger males*, and with more frequent drink-driving in older females (for older males $p = .057$), whereas general risk-propensity was associated only with more frequent drink-driving amongst older males).

4.2.2. Motivations for risky driving

Experience-seeking motives (such as “satisfaction of new experiences” and “to increase self-confidence”) were positively associated with self-reported frequency of drink-driving for *younger males*. Excitement motives (such as “for excitement and thrill” and “to enjoy being at risk”) were positively associated with self-reported frequency of speeding and drink-driving for *younger males* (for speeding for older females $p = .077$). Sensation-seeking motives (such as “for physical pleasure” and “to experience unique sensations”) were positively associated with self-reported frequency of drink-driving again for *younger males*. Prestige-seeking motives (such as “to prove myself to others” and “to attract admiration”) were positively associated with self-reported frequency of speeding and drink-driving for *younger males*. Older females also demonstrated a positive association between prestige-seeking motives and self-reported speeding. Social influence motives (such as “to take part in something with others and to be sociable” and “pressure from others”) were positively associated with self-reported frequency of speeding and drink-driving for *younger males*, and with self-reported frequency of speeding for older females. Confidence/familiarity motives (such as “activity is familiar” and “relying on the effectiveness of my equipment”) were positively associated with self-reported frequency of speeding and drink-driving for *younger males and females*, and with self-reported frequency of speeding for older females. Underestimation of risk motives (such as “don’t see the potential risk” and “severity of consequences not serious”) were positively associated with self-reported frequency of speeding and drink-driving for *younger males*, and with self-reported frequency of speeding for both *younger and older females*. Irrelevance of risk motives (such as “because my safety and health are not that important” and “the future is too bleak to worry that much about my life”) were positively associated with self-reported frequency of speeding and drink-driving for *younger males and females* and self-reported frequency of speeding for older females. “To let off steam” motives were positively associated with self-reported frequency of speeding and drink-driving for *younger males*. “To get there quicker” motives were positively associated with self-reported frequency of speeding and drink-driving for *younger males and females* and with self-reported frequency of drink-driving for *younger females*. These motives were also positively associated with self-reported frequency of speeding and drink-driving for older

females and with self-reported frequency of speeding for older males.

4.2.3. Perceived risk

Perceived risk of outcomes due to a specific behaviour (being fined for the behaviour, or crashing due to the behaviour) was consistently significantly positively related to the corresponding behaviour across all four sub-samples (except that young males showed no relationship for crashing due to speeding). Perceived risk of being killed or injured in a crash demonstrated a significant positive relationship with speeding for *younger females*, and with drink-driving for *younger males*.

4.2.4. Illusory invulnerability

Illusory invulnerability regarding being fined for speeding was negatively associated with self-reported frequency of speeding for *younger males and females*, and for older males. Illusory invulnerability regarding crashing due to drink-driving was negatively associated with self-reported frequency of drink-driving for *younger males and females*. Illusory invulnerability regarding being fined for drink-driving was negatively associated with self-reported drink-driving for *younger males*. For the negative association between illusory invulnerability regarding crashing due to speeding and self-reported speeding amongst *younger females* the p -value was low (.077). Illusory invulnerability regarding being injured or killed in a crash was positively associated with speeding for older females.

4.3. Moderation of the relationship between perceived risk and self-reported risky driving

Table 6 presents the correlation of self-reported speeding with perceived risk of crashing due to speeding, and of self-reported drink-driving with perceived risk of crashing due to drink-driving, for low and high scorers on each measure of risk-aversion and -propensity separately.

High scorers on the accident risk-propensity measure demonstrated a significant positive correlation between perceived risk of crashing and behaviour for both speeding and drink-driving, whereas low scorers did not. The same pattern was observed for the general risk-propensity measure in relation to speeding. In relation to drink-driving, significant positive correlations were stronger for high scorers (significance not tested). For risk-aversion, 3 significant positive correlations were observed.

5. Discussion

5.1. Comparison between older and younger samples

The third column of Table 7 presents all observed significant age differences.

This research demonstrates for the first time, lower risk aversion, higher risk-propensity (for physical accident risks amongst females only), and stronger motives for risky driving amongst younger than older drivers. Younger drivers scored higher for 7 of 10 motives for speeding (1 of these for males only, and 2 for females only) and for 9 of 10 motives for drink-driving (6 of these for males only). Younger drivers reported lower motives for the remaining motive for drink-driving, amongst females only.

Examination of age differences in personal characteristics has been rare (Jonah, 1986), although age-related changes in risk-propensity and risk-motivation are likely. The age differences demonstrated here are consistent with Jonah and Dawson's (1987) finding that young drivers placed less importance on safety features when buying a new car compared to older drivers, and

Table 5
Correlations of potential predictors with self-reported speeding and drink-driving, for males and females, in the younger and older samples.

Variable	Scale	Speeding				Drink-driving			
		Males		Females		Males		Females	
		Younger <i>n</i> = 44-47	Older <i>n</i> = 45-48	Younger <i>n</i> = 30-34	Older <i>n</i> = 53-57	Younger <i>n</i> = 41-44	Older <i>n</i> = 45-48	Younger <i>n</i> = 28-32	Older <i>n</i> = 48-52
Risk-propensity	ROQ Risk-aversion	-.273	-.531**	-.085	-.172	.155	.036	-.498*	-.082
	ROQ Risk-propensity	.036	.037	.256	.189	-.067	.365*	.158	.114
	RPQ Accident risk-propensity	.374*	.201	.117	.187	.104	.277	.106	.455*
Risk-motivation: Relevant RMQ	Experience-seeking	.138	-.265	.062	.086	.600**	-.133 ^b	.099	-.030 ^b
	Excitement	.341*	-.065	.126	.236	.356*	-.164	.206	.217
	Sensation-seeking	.228	-.140	.201	.197	.566**	-.215	.192	-.087
	Prestige-seeking	.395*	-.213	.195	.266*	.540**	-.067 ^b	.122	-.110 ^b
	Social influence	.307*	-.185	.090	.477**	.635**	-.136	.181	.053
	Confidence & familiarity	.387*	.082	.431*	.535**	.616**	-.112	.429*	.226
	Underestimation of risk	.311*	.069	.485*	.285*	.427*	.017	.176	-.091
	Irrelevance of risk	.401*	-.055	.241	.279*	.724**	-.013	-.057	.131
	"let off steam"	.307*	.063	.162	-.031	.628**	-.098	-.010	.036
	"get there quicker"	.410 ^b	.440 ^b	.159 ^b	.290*	.317*	.053	.385*	.362*
Perceived risk	Fined for behaviour	.657**	.574** ^b	.742**	.431* ^b	.615**	.588**	.533*	.762**
	Crash due to behaviour	.139	.333* ^b	.711**	.527** ^b	.732**	.402*	.544*	.684**
	Injured or killed in a crash	.245	.006 ^b	.505*	-.130 ^b	.323*	-.018 ^b	.145	-.048 ^b
	Not be hospitalised ^a	-.172	-.219 ^b	-.111	-.051 ^b	-.138	.018 ^b	-.249	-.224 ^b
Illusory invulnerability	Fined for behaviour	-.295*	-.327*	-.490*	-.204	-.489*	-.198	-.179	-.149
	Crash due to behaviour	.225	-.118	-.307	-.063	-.534**	-.190	-.118	-.329*
	Injured or killed in a crash	-.010 ^b	.076	-.193 ^b	.280*	-.159 ^b	.263	.126 ^b	.097
	Not be hospitalised ^a	-.102	.182	-.199	.027	-.057	-.198	.114	.167

^a This item was reverse-scored.

^b Tests included social desirability as a covariate.

* *p* < .05.

** *p* < .001.

Table 6
Correlations of self-reported speeding and drink-driving with perceived risk of crashing due to each behaviour, for high (H) and low (L) scorers on the ROQ risk-aversion, ROQ Risk-propensity and RPQ accident risk-propensity measures, in the younger and older samples combined.

	ROQ risk-aversion	ROQ risk-propensity	RPQ accident risk-propensity
Speeding	L: .385* H: .267	L: .229 H: .365*	L: .197 H: .298*
Drink-driving	L: .647** H: .762**	L: .496** H: .545**	L: -.008 H: .719**

* $p < .05$.
** $p < .001$.

may contribute to the more risky driving of younger drivers (see [Jonah, 1986](#); [Jonah and Dawson, 1987](#)), and consequently the over-representation of young drivers in crash statistics (“the young driver problem”).

Compared to older drivers, younger drivers demonstrated higher perceived risk of negative outcomes of risky driving (for females only: crashing due to speeding; for males and females: being fined due to drink-driving, crashing due to drink-driving, and being injured in a car crash). This is inconsistent with the view that younger drivers are less able to recognize risk than older drivers—sometimes used to explain the more risky driving of younger drivers (see [Williamson, 2003](#)). However, in the context of observed positive associations between perceived risk and risky behaviour (see later Section 5), *higher* perceived risk is consistent with the more risky driving often observed for younger drivers ([Catchpole, 2005](#); [Jonah, 1986](#); [Williamson, 2003](#)).

Similarly, younger drivers demonstrated *lower* illusory invulnerability than older drivers regarding being hospitalized (females only), supporting previous Australian data ([Lee et al., 1993](#)), and consistent with findings suggesting that risky driving reduces illusory invulnerability (rather than vice versa; see later Discussion).

Table 7
Summary of variables that demonstrated a difference between older (OR) and younger (YR) samples, and their significant relationships with risky driving and crashing in the younger sample (showing gender that demonstrated the effect where relevant; M/F).

Variable	Scale	Younger vs older	Relationship with speeding	Relationship with drink-driving
Risk-propensity	ROQ Risk-aversion	OR > YR	(Neg $p = .064$: M)	Neg (F)
	RPQ Accident risk-propensity	YR > OR (F)	Pos (M)	–
Risk-motivation: Speeding RMQ	Experience-seeking	YR > OR	–	N/A
	Excitement	YR > OR	Pos (M)	N/A
	Sensation-seeking	YR > OR (F)	–	N/A
	Prestige-seeking	YR > OR (F)	Pos (M)	N/A
	Social influence	YR > OR (M, F)	Pos (M)	N/A
	Irrelevance of risk	YR > OR (M)	Pos (M)	N/A
	“to let off steam”	YR > OR	Pos (M)	N/A
Drink-driving RMQ	Experience-seeking	YR > OR (M)	N/A	Pos (M)
	Excitement	YR > OR	N/A	Pos (M)
	Sensation-seeking	YR > OR	N/A	Pos (M)
	Prestige-seeking	YR > OR (M)	N/A	Pos (M)
	Social influence	YR > OR	N/A	Pos (M)
	Confidence and familiarity	YR > OR (M)	N/A	Pos (M)
	N/A	Pos (M, F)		
	Underestimation of risk	YR > OR (M)	N/A	Pos (M)
	Irrelevance of risk	OR > YR (F)	N/A	Pos (M)
	“to let off steam”	YR > OR (M)	N/A	Pos (M)
“to get to destination quicker”	YR > OR (M)	N/A	Pos (M, F)	
Perceived risk	Crash due to speeding	YR > OR (F)	Pos (F)	N/A
	Fined for drink-driving	YR > OR	N/A	Pos (M, F)
	Crash due to drink-driving	YR > OR	N/A	Pos (M, F)
	Injured or killed in a crash	YR > OR	Pos (F)	Pos (M)
Illusory invulnerability	Fined for speeding	YR > OR	Neg (M, F)	N/A
	Fined for drink-driving	(YR > OR overall, but not M or F)	N/A	Neg (M)
	Not be hospitalised	OR > YR	–	–

Nonetheless, younger drivers demonstrated higher illusory invulnerability than older drivers regarding being fined for speeding, consistent with some earlier findings that illusory invulnerability is more pronounced in younger drivers (for a review see [Jonah, 1986](#)).

Consistent with previous literature regarding risky driving (for a review see [Jonah, 1986](#); see also [Catchpole, 2005](#)), younger drivers reported speeding more frequently than older drivers. However, younger drivers did not differ from older drivers regarding frequency of drink-driving.

5.2. The effect of gender on the comparison between the younger and older samples, and comparison between males and females, and

Gender was considered within the sample comparison, because males are generally found to engage in more risky driving than females (e.g. [Catchpole, 2005](#); [Simon and Corbett, 1982](#)), although not in the present study.

Observed interactions suggest that gender modifies the observed age effect. In most cases, younger drivers scored higher than older drivers on risk-propensity and motives for risky behaviour for one gender but not the other. Experience-seeking, prestige-seeking, confidence/familiarity, underestimation of risk, “letting of steam”, and “getting there quicker”, motives for drink-driving were stronger for younger than older drivers *for males only*. Accident risk-propensity indicated that propensity was greater for younger than older drivers *for females only*. Sensation-seeking and prestige-seeking motives for speeding were also stronger for younger than older drivers *for females only* (when tests were conducted separately for males and females due to both gender and sample effects being significant). However, younger drivers scored *lower* than older drivers on irrelevance of risk motives for drink-driving *for females only*, who demonstrated a near-significant relationship in this direction near for confidence/familiarity. These

results suggest the importance of targeting interventions differently for males and females.

Although males did not report speeding or drink-driving more frequently than females, they demonstrated risk-propensity, and motives for positive attitudes toward risky driving, that are more consistent with risky driving than did females. Males demonstrated higher propensity for accident risks, stronger motives for speeding in 6 of 10 cases, and stronger motives for drink-driving in 2 of 10 cases. However males demonstrated *higher* illusory invulnerability in relation to being fined, or crashing, due to drink-driving, whereas in the context of results consistent with an influence of risky behaviour on risk-perception (rather than vice versa; see later Discussion), males could be expected to demonstrate lower illusory invulnerability.

5.3. Association of risky driving with risk-aversion, risk-propensity and risk motivation

5.3.1. Risk-aversion and risk-propensity

The present research demonstrates an association between self-reported risky driving and risk-propensity and -aversion, measured appropriately in terms of attitudes to risk rather than in terms of behaviour or related psychological constructs. Risk aversion demonstrated a significant negative relationship with drink-driving for younger females, and a near significant negative relationship with speeding for younger males. Accident risk propensity demonstrated a significant positive relationship with speeding for younger males. Also supportive of a relationship between attitude to risk and risky driving, older males demonstrated a significant relationship between risk aversion and speeding, whereas both older males and females demonstrated a significant positive relationship between risk propensity and drink-driving.

5.3.2. Motivations for risky driving

Various risk-related motives for risky driving appeared to be strongly associated with risky driving, especially for younger males. Older females also demonstrated several significant relationships. Each type of motive was significantly positively related to at least one risky driving behaviour for young males (with the only non-significant relationships observed between speeding and experience-seeking and sensation-seeking motives). For younger females, speeding was significantly positively related only to confidence/familiarity and underestimation of risk motives, and drink-driving was significantly positively related only to confidence/familiarity and “get there quickly” motives. Thus for young females, confidence/familiarity motives appear to be the most consistent. For older males, motives for risky driving were much less consistently related to risky driving, with the only significant positive relationship for older males observed between speeding and “get there quickly” motives. Older females demonstrated significant positive relationships with speeding for 6 of 10 motives, and with drink-driving for 1 of 10 motives.

The observed positive association between sensation-seeking motives for drink-driving and self-reported frequency of the behaviour (young males only) is consistent with previous research employing more typical (and more general) measures of sensation-seeking (for a review see [Jonah, 1997](#)). The observed positive association of prestige-seeking and social influence motives with self-reported frequency of speeding and drink-driving (for younger males), emphasizes the importance of peer influence amongst younger drivers ([Fernandes et al., 2007](#)).

These findings suggest that these motives for risk are more relevant to the behaviour of young males, and to a lesser extent to older females, than to other sub-samples.

5.4. Association of risky driving with risk perception variables, and moderation by risk-aversion and risk propensity

5.4.1. Perceived risk

Self-reported frequency of both speeding and drink-driving were *positively* associated with the perceived risk of corresponding outcomes. This finding is inconsistent with claims of prominent theories of health-relevant behaviour (e.g. [Janz and Becker, 1984](#); [Ajzen and Madden, 1986](#); see [Fig. 1](#)) that high perceived risk of a particular behaviour discourages that behaviour, and with some previous findings ([Weinstein et al., 1998](#)). Indeed, in the present study underestimation of risk motives were associated with both self-reported speeding and drink-driving. Naturally, the relationship between perceived risk and risky driving may be bidirectional, with risky behaviour resulting in higher perceptions of risk, and there is also previous evidence for this ([Weinstein et al., 1998](#)).

Nonetheless, the observed positive relationship between perceived risk and risky behaviour is also consistent with the view that risk propensity modifies this relationship (see later), and a sample relatively high in risk propensity. However, in this case one would expect different patterns of correlation between perceived risk and risky behaviour for older and younger drivers, whereas the observed pattern of results was generally similar for older and younger drivers, and for male and female drivers.

5.4.2. Illusory invulnerability

Illusory invulnerability produced a similar pattern of results to risk-perception; its primarily *negative* relationships with self-reported risky driving are consistent with risky driving reducing illusory invulnerability (more for behaviour-specific than general outcomes), and rather than with theories that illusory invulnerability contributes to risky behaviour (e.g. [Weinstein, 1989](#)). However, again, a bidirectional relationship may operate, and older females demonstrated a *positive* relationship between illusory invulnerability regarding being injured or killed in a crash and speeding. Illusory invulnerability appeared to be somewhat more consistently related with risky driving for younger than older drivers.

5.4.3. Moderation of risk-perception by risk-propensity

Very little theory, and no research, examines the logical possibility that risk-propensity (and similar constructs) moderate the relationship between perceived risk and risky driving, as depicted in [Fig. 1](#). Thus, it is exciting that the present results provide some support for this possibility.

We proposed that the implications of perceiving a particular behaviour to have a high risk of producing a negative outcome would differ markedly for people with different attitudes to risk. An individual with high risk-propensity may be encouraged to engage in the behaviour (producing a positive relationship between perceived risk and risky behaviour), whereas an individual with low risk-propensity may be less attracted or even deterred (producing a less positive or a negative relationship). An individual with high risk-aversion may be deterred from engaging in the behaviour (producing a negative relationship between perceived risk and risky behaviour), whereas an individual with low risk-aversion may be less deterred or even attracted (producing a less negative or a positive relationship). Thus, the relationship between perceived risk and behaviour may be moderated by risk-aversion or risk-propensity, or indeed sensation-seeking or excitement-seeking.

There was evidence for a moderating effect of risk propensity on the relationship between perceived risk and risky driving. High but not low scorers on the accident risk-propensity measure demonstrated a significant positive relationship between perceived risk of crashing due to speeding and self-reported frequency of speeding, and between perceived risk of crashing due to drink-driving

and self-reported frequency of drink-driving. Further, there was also some indication of a stronger relationship between perceived risk and drink-driving for high (versus low) scorers on the general risk-propensity measure (although the correlations were not compared statistically). Results for risk-aversion were less compelling, because even for high scorers a positive relationship between perceived risk and behaviour were observed.

Finally, it should be acknowledged that to the extent that observed relationships reflected an influence of risky driving on perceived risk, the present study did not provide a suitable context in which to test whether risk-propensity modifies the effect of perceived risk on risky driving.

5.5. Validation of risk-propensity and risk-motivation scales

The ROQ risk-aversion and risk-propensity scales demonstrated low but acceptable internal consistency. Nonetheless, risk-aversion demonstrated significant relationships with self-reported speeding and drink-driving. ROQ risk-propensity demonstrated only one significant relationship with self-reported drink driving. The RPQ risk-propensity scales also demonstrated significant relationships with relevant risky behaviours.

The RMQ risk-motivation subscales for speeding and drink-driving demonstrated good consistency with Rohrmann's (2004) a priori groupings, high internal consistency, and strong and consistent relationships with self-reported risky driving. Validation against objective measures, such as observed behaviour or driving records, is desirable.

5.6. Methodological concerns

All of the data for the present study was collected via self-report, of necessity in the case of the psychological variables of risk-aversion, risk-propensity, motives for risky driving, and risk-perception, and for convenience in the case of risky behaviour. We controlled for response biases statistically by employing a measure of the tendency for socially desirable responding as a covariate in relevant analyses, and this increases confidence in the present results. Nonetheless, it would be optimal to repeat this research employing observed behaviour (where possible) and archival sources of penalty and crash data.

Because of the cross-sectional nature of the present research, direction of causality cannot properly be inferred from significant relationships. Thus, the present research provides a foundation for future longitudinal or experimental research employing longitudinal and experimental methodologies.

5.7. Practical implications

Interventions which seek to target the “young driver problem” might focus on variables that distinguish younger from older drivers and demonstrate an association with risky driving amongst younger drivers. Table 7 summarises significant relationships with speeding and drink-driving for variables that demonstrated a difference between younger and older drivers, amongst younger male and/or female drivers. Relationships are emboldened if they were observed for the gender that demonstrated an age difference.

Thus, these findings suggest targeting excitement-seeking, social influence, irrelevance of risk and “let off steam” motives for speeding, all motives for drink-driving except irrelevance of risk motives, and various risk perception factors for younger males, and targeting risk aversion and various risk perception factors for younger females.

Differences between younger and older drivers might also arise from differential relationships between risky driving and risk-

relevant factors. Variables that might be added to the list above because they were associated with risky driving for younger but not older drivers are: accident risk propensity and irrelevance of risk motives for drink-driving for males, confidence/familiarity motives for drink-driving for females.

The present results suggest the value of targeting the “young driver problem” via risk-propensity for males and risk-aversion for females. However, these are considered to be trait variables and so may be difficult to change.

Risk-motivation variables may be more amenable to change, and the present study suggests aiming to reduce excitement, social influence, irrelevance of risk, and “letting off steam” motives for speeding, and all motives for drink-driving, for younger males. For females, there may be some value to reducing confidence/familiarity motives for drink-driving. Interventions targeting risky driving via such variables could, for example, promote other avenues for satisfying these motives, while promoting driving as serving primarily for transport.

Results raise concerns about the common practice of impressing upon young drivers the high risks of risky driving. For some individuals, and probably those most “at risk”, perception of high risk may encourage risky behaviour.

Naturally, all modifiable variables that demonstrated a relationship with risky driving amongst younger drivers might be worth addressing in road safety campaigns for young drivers, even if they do not contribute to the difference between younger and older drivers. In addition to the variables mentioned above, self-reported frequency of speeding was associated with prestige-seeking, confidence and familiarity, and “get there quicker” motives (all males only), as well as underestimation of risk motives (males and females).

6. Summary and conclusions

Employing Rohrmann's (2004) questionnaires, the present research has indicated for the first time that younger drivers demonstrate greater risk-propensity, and stronger motives for speeding and drink-driving, than older drivers. Observed cross-sectional correlations suggest the value of targeting various motives for speeding and drink-driving amongst young-drivers, and provide a foundation for future experimental research in which risk attitudes are manipulated and risky behaviour is measured (perhaps without reliance on self-report).

Acknowledgements

The authors acknowledge the funding support provided by the Australian Government, through the Australian Transport Safety Bureau's Road Safety Research Grants Programme.

Dr. Julie Hatfield was supported by an NHMRC Population Health Capacity Building Grant in Injury Prevention, Trauma and Rehabilitation [ITR]. ITR is a collaborative program auspiced by the NSW Injury Risk Management Research Centre, UNSW; The George Institute for International Health, University of Sydney; Prince of Wales Medical Research Institute (UNSW); the School of Public Health and Community Medicine (UNSW); and the Rehabilitation Studies Unit.

References

- Ajzen, I., Madden, T.J., 1986. Prediction of goal-directed behaviour: attitudes, intentions, and perceived behavioural control. *Journal of Experimental Social Psychology* 22, 453–474.
- Beirness, D.J., 1993. Do we really drive as we live? The role of personality factors in road crashes. *Alcohol, Drugs and Driving* 9 (3–4), 129–143.
- Catchpole, J., 2005. Learning to take risks: the influence of age and experience on risky driving. Research Report ARR362, ARRB Group Victoria Australia.

- 734 Fernandes, R., Job, R.F.S., Hatfield, J., 2007. A challenge to the assumed general-
735 izability of prediction and countermeasure for risky driving: different factors
736 predict different risky driving behaviours. *Journal of Safety Research* 38,
737 59-70.
- 738 Hatfield, J., Murphy, S., Kasparian, N., Job, R.F.S., 2005. Risk perceptions, attitudes
739 and behaviours regarding driver fatigue in NSW Youth: The development of an
740 evidence-based driver fatigue educational intervention strategy. Report to the
741 Motor Accidents Authority of NSW.
- 742 Hatfield, J., Job, R.F.S., 2004. Beliefs and attitudes about speeding and its counter-
743 measures. Report to the Australian Transport Safety Bureau.
- 744 Janz, N.K., Becker, M.H., 1984. The Health Belief Model: a decade later. *Health Edu-
745 cation Quarterly* 11, 1-47.
- 746 Job, R.F.S., 1995. The road safety problem: causes and countermeasures. In: Kenny,
747 D.T., Job, R.F.S. (Eds.), *Australia's Adolescents: A Health Psychology Perspective*.
748 University of New England Press, Armidale, pp. 128-138.
- 749 Job, R.F.S., Hamer, V., Walker, M., 1995. The effects of optimism bias and fear on
750 protective behaviour. In: Kenny, D., Job, R.F.S. (Eds.), *Australia's Adolescents:
751 A Health Psychology Perspective*. New England University Press, Armidale, pp.
752 151-156.
- 753 Jonah, B.A., 1986. Accident risk and risk-taking behaviour among young drivers.
754 *Accident Analysis and Prevention* 18, 255-271.
- 755 Jonah, B.A., 1997. Sensation seeking and risky driving: A review and synthesis of the
756 literature. *Accident Analysis and Prevention* 29 (5), 651-665.
- 757 Jonah, B.A., Dawson, N.E., 1987. Youth and risk: age differences in risky driving, risk
perception, and risk utility. *Alcohol Drugs and Driving* 3, 13-29.
- Klein, W.M., 1997. Objective standards are not enough: Affective, self-evaluative, and
behavioral responses to social comparison information. *Journal of Personality
and Social Psychology* 72 (4), 763-774.
- Lee, S.H.V., Prabhakar, T., Job, R.F.S., 1993. Optimism bias, risk utility, and risk-taking
on the road. Report to the Federal Office of Road Safety.
- Morgan, G.A., Job, R.F.S., 1995. Red light cameras: driver's knowledge, attitudes, and
behaviours. In: Kenny, D., Job, R.F.S. (Eds.), *Australia's Adolescents: A Health
Psychology Perspective*. New England University Press, Armidale, pp. 144-150.
- Reynolds, W.M., 1982. Development of reliable and valid short forms of the Mar-
low-Crowne Social Desirability Scale. *Journal of Clinical Psychology* 38, 119-125.
- Rohrmann, B., 2004. Risk attitude scales: concepts and questionnaires. Project
report. Available at [http://www.rohrmannresearch.net/pdfs/rohrmann-
racreport.pdf](http://www.rohrmannresearch.net/pdfs/rohrmann-racreport.pdf) (last accessed 12th February 2008).
- Simon, F., Corbett, C., 1982. Road traffic offending, stress, age, and accident history
among male and female drivers. *Ergonomics* 39, 757-780.
- Weinstein, N.D., 1989. Effects of personal experience on self-protective behaviour.
Psychological Bulletin 105, 31-50.
- Weinstein, N.D., Rothman, A.J., Nicolich, M., 1998. Use of correlational data to exam-
ine the effects of risk perceptions on precautionary behavior. *Psychology &
Health* 13, 479-501.
- Williamson, A. 2003. Why are young drivers over represented in crashes? Available
at www.maa.nsw.gov.au/roadsafety36reports.html (last accessed 12th February
2008).
- Zuckerman, M., 1994. *Behavioral Expressions and Biosocial Bases of Sensation Seek-
ing*. Cambridge University Press, Cambridge.

UNCORRECTED PROOF