Australian Government

Department of Infrastructure, Transport, Regional Development and Local Government

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

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

Julie Hatfield
Ralston Fernandes

NSW Injury Risk Management Research Centre
The University of New South Wales

April 2009

DOCUMENT RETRIEVAL INFORMATION

Author(s)

Hatfield J., Fernandes R.

Organisation that prepared this document

NSW Injury Risk Management Research Centre
The University of New South Wales

Abstract

Young drivers are over-represented in road injury statistics, partly because they engage in more risky driving than older people, perhaps as part of a broader "risky behaviour syndrome". 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. We aimed to compare younger and older drivers in terms of appropriate measures of risk propensity and related risk motivations, and to examine the association of these measures with risky driving. The study involved 89 participants aged 16-25, and 110 participants aged over 35, recruited outside motor registries, as well as 188 Psychology students (aged 16-25) recruited for course requirements, who completed questionnaires designed to measure risk aversion, risk propensity (general and in accident, health, financial and social domains), and risk-related motives for risky driving (http://www.rohrmannresearch.net/pdfs/rohrmann-racreport.pdf). Questionnaires also assessed self-reported risky driving and risky behaviour in health, financial and social domains. Compared to older drivers, younger drivers demonstrated lower risk aversion, higher propensity for accident, health and social risks, and 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 somewhere". Further, these variables were associated with risky driving, which was also associated with risk propensity, and risky behaviour, in other domains. Results suggest targeting the "young driver problem" by aiming to reduce experience-seeking, excitement, sensation-seeking, confidence/familiarity, underestimation or risk, irrelevance of risk, and "letting of steam" motives for drink-driving, and experience-seeking, excitement, sensation-seeking, and "letting off steam" motives for speeding, for both males and females, as well as irrelevance of risk motives for speeding and social influence motives for drink-driving for males only. For young females only, increasing prestige-seeking and social influence motives in relation to speeding may be beneficial.

Notes

(1)   Road Safety Grant Reports are disseminated in the interest of information exchange.

(2)   The views expressed are those of the author(s) and do not necessarily represent those of the Australian Government.

CONTENTS

EXECUTIVE SUMMARY

Background

Young drivers are over-represented in road crash statistics partly because of their risky driving, perhaps as part of a broader "risky behaviour syndrome". Although it is assumed that younger people have greater risk propensity, defined as a positive attitude to risk, 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 current cross-sectional survey aims to examine the role of risk-propensity in young drivers' risky driving within a clear conceptual framework that has been derived (for the present research).
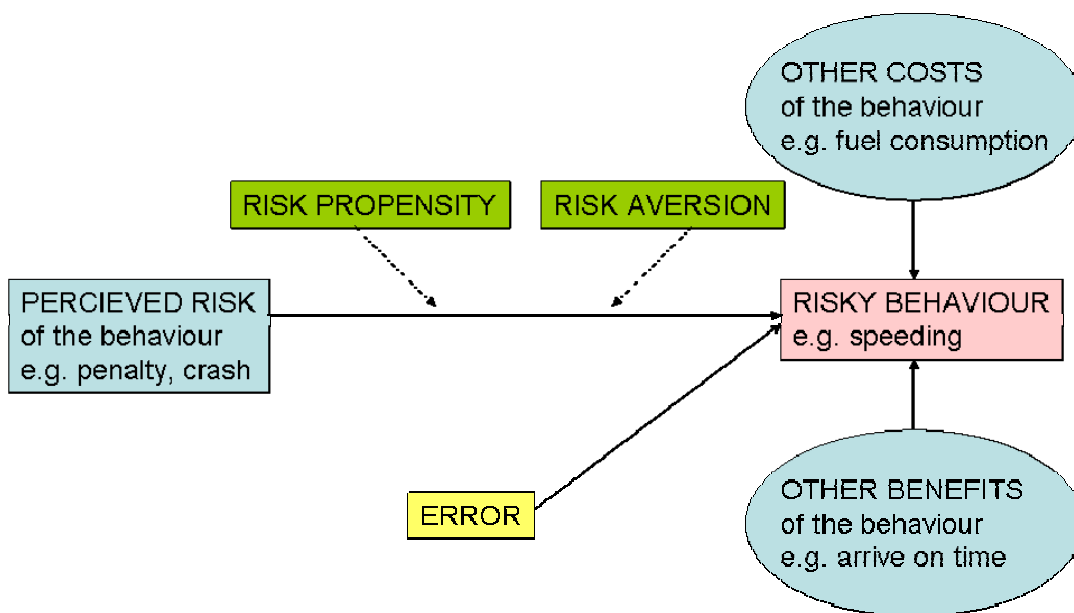
Sometimes young drivers may engage in risky driving behaviours inadvertently (i.e. without realizing that they are risky), partly through inexperience and error. However, young drivers may choose to adopt driving behaviours that they recognize to be risky when the balance between the perceived (possible) costs of the behaviour (e.g. penalties and crashes) and the perceived (possible) benefits of the behaviour (e.g. getting somewhere quickly or fun) is judged to be favourable. 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 (risk propensity or risk aversion). The possibility that risk-propensity moderates the relationship between risk-perception and risky behaviour has not previously been recognized explicitly.

Research relating to risk-propensity has been clouded by inappropriate measures. Risk-propensity has sometimes been inferred from measures of risky behaviour, which is clearly circular and does not allow investigation of the relationship between these two concepts. Some measures of risk-propensity do not sufficiently distinguish the construct from risk-perception. Further, risk-propensity has sometimes been understood, and measured, in terms of sensation seeking "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"- which is but one

The role of risk propensity in the risky driving of younger and older drivers

motivation for a positive attitude to risk. Measures of 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) have conflated perceived benefits of the risk per se with perceived benefits of the behaviour that are independent of risk.

Thus, relationships of risk propensity and motives for valuing risks positively with risky driving, and with risky behaviour in other domains, are yet to be examined appropriately.

Further, age differences in risk propensity and motivations for valuing risk positively are yet to be tested. Even personality traits that have been associated with risky driving, such as sensation seeking and "thrill seeking", have rarely been compared for younger and older drivers. Further, findings regarding age differences in risk-perception- including "illusory invulnerability" (peoples' tendency to expect a better future than their peers)- have been inconsistent, as have observed relationships between risky-perception and risky driving.

Rohrmann [4] reports on the psychometric properties of four risk-propensity questionnaires that measure risk aversion, risk propensity, and motivations for valuing risk positively, appropriately. The questionnaires appear to be reliable and valid. Although risk-propensity appears somewhat domain-specific, it may underlie the clustering of risky behaviours within a particular domain, and may contribute to "risky behaviour syndrome".

Aims

The current cross-sectional survey aims to

1. investigate:

    a) differences between younger and older drivers in terms of risk-propensity, risk aversion, motives for positive attitudes toward risky driving, risk-perception, risky driving and crashes;

    b) associations of risk-relevant variables with risky driving and crashes;

    c) differences between younger and older drivers in terms of the association of risk-relevant variables with risky driving and crashes;

    d) similarities between risky driving behaviours and risky behaviours from other domains in terms of their relationships with risk-relevant variables, amongst younger drivers;

    e) risky driving as part of a risky behaviour syndrome.

2. further validate Rohrmann's novel and promising risk-propensity questionnaires.

Methods and materials

A sample of 89 participants aged 16-25, and 110 participants aged over 35, recruited outside motor registries, as well as 188 Psychology students (aged 16-25) recruited for course requirements, completed a battery of questionnaires.

- Rohrmann's Risk Orientation Questionnaire (ROQ) assessed risk-propensity and risk aversion.

- Rohrmann's Risk Propensity Questionnaire (RPQ) assessed risk-propensity for the accident, illness, financial and social domains, as well as relative risk propensity.

- Rohrmann's Risk Motivation Questionnaire (RMQ) was modified to assess frequency of speeding and drink-driving, and various risk-relevant reasons for engaging in these behaviours. Factor analysis was employed to confirm RMQ subscales relating to experience-seeking, excitement, sensation-seeking, prestige-seeking, social influence, confidence/familiarity, underestimation of risk, irrelevance of risk, and additional items "to let off steam" and "to get somewhere faster".

- Marlow-Crowne Social Desirability Scale- Short Form C assessed the extent to which participants tend to respond in a socially desirable fashion.

Risk-perception was assessed by asking participants to rate their chance of experiencing each of a list of negative events relating to the risky behaviours included in the Risky Behaviour Questionnaire. 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.

In the Risky Behaviour Questionnaire, participants indicated how frequently (as a proportion of opportunity) they engage in risky behaviours in particular circumstances. Each domain included in the RPQ was represented by two risky behaviours (each assessed for two circumstances). Ratings were averaged for speeding and drink-driving situations separately (for the accident domain). For the health domain ratings were averaged across smoking and sunbathing. For the financial domain ratings were averaged across gambling and investment. For the social domain ratings were averaged across propositioning a potential partner and arguing with friends.

A final section assessed demographic variables (age, gender, language spoken at home, postcode), as well as driving experience (hours spent driving per week, license class, and years licensed). Participants identified how many crashes they had been involved in while driving, and how many times they had been fined for speeding and drink-driving (separately), in the last 2 years.

Results and Discussion

Comparison between older and younger registry samples

This research demonstrates for the first time higher risk propensity among younger drivers than older drivers, using appropriate measures of risk propensity. Compared to older drivers, younger drivers demonstrated lower general risk aversion. Younger drivers demonstrated greater propensity for physical accident risks, as well as illness risks, and social risks, and greater relative risk propensity (all amongst females only).

Results also demonstrated stronger motives for risky driving amongst younger than older drivers, again for the first time. Compared to older drivers, younger drivers reported stronger motives for speeding in relation to experience-seeking, excitement, social influence, and "letting off steam", as well as sensation-seeking, prestige-seeking (females only), and irrelevance of risk (males only). Younger drivers also reported stronger motives for drink-driving in relation to excitement, sensation-seeking, and social influence. Amongst males only, younger drivers reported stronger motives for drink-driving in relation to experience-seeking, prestige-seeking, confidence/familiarity, underestimation of risk, "letting off steam", and "getting somewhere". Amongst females only, younger drivers reported lower motives for drink-driving in relation to irrelevance of risk.

Findings indicate higher perceived risk of negative outcomes of risky driving (and of other risky behaviours) amongst younger than older drivers. Compared to older drivers, younger drivers perceived higher risks of crashing due to speeding (females only), being fined for drink-driving,

crashing due to drink-driving, or being injured or killed in a car crash. They also perceived higher risks of having gambling debts, having to borrow money, or being rejected by a potential partner.

Illusory invulnerability was higher amongst younger drivers, compared to older drivers, although several aspects of the present results suggest that lower illusory invulnerability is associated with risky driving. Younger drivers demonstrated higher illusory invulnerability than older drivers regarding being fined for speeding, as well as regarding feeling socially awkward or embarrassed, but lower illusory invulnerability regarding being hospitalized (for females only).

Consistent with previous literature regarding risky driving, younger drivers reported speeding more frequently than older drivers, as well as more frequently engaging in behaviours posing illness and social risks. Although younger drivers did not differ from older drivers in terms speeding fines (for either males or females) or crashes, analyses of speeding fines and crashes had low statistical power, and low reliability, because of the relatively low numbers of participants who had ever been fined for speeding or had a crash.

Comparison between student sample and younger registry samples

The comparison between the student sample and the younger registry sample was conducted as a matter of procedure (and indicated that these groups could not be combined for subsequent analysis) rather than theoretical interest. Nonetheless, as in the previous comparison, the group that demonstrated the most risky behaviour (here the younger registry sample), also demonstrated the highest risk propensity, the strongest motives for speeding and risky driving, and the highest perceived risks of outcomes of risky behaviours. (This observation also held true for the comparisons of males and females within each sample). In contrast, whereas the younger registry sample was more "risky" than the older registry sample and demonstrated higher illusory invulnerability, the younger registry sample was more "risky" than the student sample but demonstrated lower illusory invulnerability. Males, who were generally more "risky" than females, demonstrated lower illusory invulnerability. Moreover, in all three samples correlations observed between risky driving and illusory invulnerability were generally negative. The apparent association of risky behaviour with lower illusory invulnerability is consistent with the apparent influence of risky behaviour on risk perception (rather than vice versa).

Comparison between males and females, and the effect of gender on the comparison between the younger and older registry samples

Gender was considered within each of the comparisons. Generally males demonstrated risk-propensity, motives for positive attitudes toward risky driving behaviours, and risk-perceptions, that were more consistent with risky driving than do females.

In the younger samples, compared to females, males reported higher accident risk propensity and financial risk propensity; stronger motives for speeding in relation to sensation-seeking, underestimation of risk, and irrelevance of risk; and stronger motives for drink-driving in relation to experience-seeking, prestige-seeking, confidence/familiarity, underestimation of risk, and irrelevance of risk. In the context of results suggesting that risky behaviour influences risk-perception (rather than vice versa), illusory invulnerability regarding being fined for drink-driving and crashing due to drink-driving was lower for males than females. Males reported drink-driving more frequently than females. In addition, males reported more frequently engaging in financially and socially risky behaviours, as well as lower illusory invulnerability regarding investment losses and borrowing money (though higher illusory invulnerability regarding being hospitalized), and greater perceived risk of investment losses (though lower perceived risk of lung cancer and skin cancer).

These results were largely corroborated in the registry samples (which included older drivers). Further, observed interactions of gender with sample (age group) suggest moderation of the effect of age by gender. Accident, illness, social, and relative, risk propensity, as well as sensation-seeking and prestige-seeking motives for speeding, were greater for younger than older drivers for females only, perhaps reflecting a "ceiling effect" for males. Interactions for experience-seeking, prestige-seeking, confidence/familiarity, underestimation of risk, "letting of steam", and "getting somewhere", motives for drink-driving, all reflected that motives were stronger for younger than older drivers for males only. The gender x sample interaction for irrelevance of risk motives for drink-driving reflected a weaker motive for younger than older drivers for females only.

Association of risky driving with potential predictors

The present research demonstrates an association between risky driving and risk propensity, measured appropriately in terms of positive attitudes to risk rather than in terms of behaviour or related psychological constructs. We focused mainly on relationships for younger drivers.

Risk aversion was negatively associated with speeding for females in the student sample, and with having had a speeding fine as well as drink-driving for females in the younger registry sample. Accident risk propensity was positively associated with speeding for females in the student sample and males in the younger registry sample, with having had a speeding fine for females in the student sample, and with having crashed for males in the younger registry sample. The perception of having higher general risk propensity than average (included as a measure for the first time) was also positively correlated with speeding (amongst females in the student and younger registry samples), drink-driving (amongst females in the student sample), and having crashed (amongst males in the student sample). Classification into low and high scorers for accident risk propensity allowed prediction of speeding and crash history in the younger registry sample. In the student sample, no differences were observed between low and high scorers.

Various risk-related motives for risky driving appeared to be strongly associated with risky driving. Specifically, experience-seeking motives were positively associated with speeding in the student sample, and with drink-driving in the younger registry sample. Excitement motives were positively associated with speeding for females in the student sample and males in the younger registry sample, and with drink-driving for both males and females in the younger registry sample. Sensation-seeking motives were positively associated with speeding for both males and females in the student sample, and with drink-driving for both males and females in the younger registry sample (supporting previous research employing more typical measures of sensation-seeking). Prestige-seeking motives were positively associated with speeding for males in the younger registry sample, and with drink-driving for both males and females in the younger registry sample. In the student sample, prestige-seeking motives demonstrated a negative association with speeding for females (as did social influence motives), and with having crashed for males. Social influence motives were positively associated with drink-driving for males in the younger registry sample. Confidence/familiarity motives were positively associated with speeding for all younger drivers, with drink-driving for males in the student sample, and for both males and females in the younger registry sample, and with having crashed for females in the student sample. Underestimation of risk motives were positively associated with speeding for females in student and younger registry samples, with drink-driving for males and females in the registry sample, and with having crashed for females in the student sample. Irrelevance of risk motives were positively associated with speeding and drink-driving for males in the student and younger registry samples, with speeding fines for females in the student sample, and with drink-driving for females in the younger registry sample. "To let off steam" motives were positively associated with both speeding and drink-driving for males and females in the younger registry sample, and with having crashed for females in the younger registry sample. "To get somewhere" motives were positively associated with speeding for

females in the younger registry sample, and with drink-driving for males and females in the younger registry sample.

Both speeding and drink-driving were positively associated with the perceived risk of corresponding outcomes, suggesting that risky driving influences risk perception rather than vice versa. Perceived risk of outcomes due to a specific behaviour (i.e. being fined due to speeding or drink-driving) were more consistently related to the corresponding behaviour than was the more general perceived risk of being killed or injured in a crash. Further, the even more general perceived risk of being hospitalized was not related to risky behaviour at all.

Illusory invulnerability produced a similar pattern of results to risk perception; its negative relationships with risky driving suggest that risky driving reduces illusory invulnerability, and more for behaviour-specific than general outcomes.

It is exciting that the present results provide the first supporting evidence for the possibility that risk propensity (and similar constructs) moderate the relationship between perceived risk and risky behaviour. The influence of perceived risk on speeding appeared to be moderated by general risk propensity (for females in the student sample), excitement motives for speeding (for females in the younger registry sample) and sensation-seeking (for females in both young driver samples). The influence of perceived risk on drink-driving appeared to be moderated by accident risk propensity (for males in the student sample, and females in the younger and older registry samples), excitement motives for drink-driving (for females in the student sample and the older registry sample, and males in the younger registry sample) and sensation-seeking (for females in the younger registry sample). The influence of perceived risks of speeding on having crashed appeared to be moderated by general risk propensity.

Association of other risky behaviours with potential predictors (younger drivers only)

Risky behaviours in other domains demonstrated relationships with risk propensity and risk perception variables that were roughly similar to the relationships demonstrated by risky driving, increasing confidence in the results for risky driving, and indicate that they generalize to other domains.

Consideration of "risky behaviour syndrome" (younger drivers only)

There was some evidence for "risky behaviour syndrome". Speeding was positively associated with behaviours posing health risks (for females in both younger driver samples), financial risks (for males in the younger registry sample), and social risks (for females in the younger registry sample). Speeding was also positively associated with propensity for health risks (for females in both younger driver samples) and financial risks (for males in the student sample). Drink-driving was positively associated with behaviours posing health risks (for males and females in the student sample, and females in the younger registry sample), with financial risks (for females in the student sample and males in the younger registry sample), and social risks (for females in the younger registry sample). However, frequency of drink-driving was negatively associated with propensity for social risks (for females in the younger registry sample).

Validation of risk propensity and risk motivation scales

The ROQ risk aversion and risk propensity scales demonstrated low but acceptable internal consistency, and nonetheless demonstrated significant relationships with self-reported behaviour, and having been fined for speeding. 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 a priori groupings, high internal consistency, strong and consistent relationships with self-reported risky driving, and relationships with having had a speeding fine and crashing (despite the low reliability of the later analyses). Validation against objective measures, such as observed behaviour or driving records, is desirable.

Methodological concerns

All of the data for the present study was collected via self-report, of necessity in the case of the psychological variables risk aversion, risk propensity, motives for risky driving, and risk perception, and for convenience in the case of risky behaviour, fines, and crashes. 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. Cross-sectional data have limitations with regard to establishing causal direction. Thus, the present research provides a foundation for future longitudinal or experimental research employing observed behaviour and archival driving records.

Practical implications

Results suggest targeting the "young driver problem" via risk propensity variables: risk aversion, accident risk propensity, and relative risk propensity. However, most of these variables appear to be most relevant to females, who are not as crash-involved as young males. Further, because risk propensity variables are considered to be trait variables they may be difficult to change. It is perhaps more feasible to promote the possibility of expressing risk propensity in "safer" ways than risky driving. Risk propensity variables might also be used to identify risky drivers, as was done in the present report employing accident risk propensity, if it was ever considered politically or ethically acceptable to do so.

Risk motivation variables may be more amenable to change, and results suggest aiming to reduce experience-seeking, excitement, sensation-seeking, confidence/familiarity, underestimation or risk, irrelevance of risk, and "letting of steam" motives for drink-driving, and experience-seeking, excitement, sensation-seeking, and "letting off steam" motives for speeding, for both males and females, as well as irrelevance of risk motives for speeding and social influence motives for drink-driving for males only. For young females only, increasing prestige-seeking and social influence motives in relation to speeding may be beneficial. Nonetheless, care should be taken not to increase prestige-seeking motives for speeding for young males or older females, or experience-seeking motives for speeding for older drivers (which demonstrated positive associations with speeding).

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. Thus, in addition to the variables mentioned above, confidence and familiarity (males and females), underestimation of risk (females only), and "getting somewhere" (males only) motives for speeding, might also be targeted.

ACKNOWLEDGEMENTS

1   INTRODUCTION

1.1   Background

Road trauma is a significant public health problem, in Australia and overseas. In 1999/2000 in NSW alone, road casualties cost the community an estimated $600million, in direct costs of treating and managing injuries, as well as in indirect costs associated with lost or degraded life-years. The indirect costs of road trauma are particularly high because of the over-representation of young people in crash statistics [see 1]. Improved understanding of the over-involvement of young drivers is likely to benefit road safety.

From a relevant literature review, Jonah [2] concluded that a primary reason for the over-representation of young drivers in road trauma is their tendency to engage in risky driving behaviours (including speeding and driving while impaired by alcohol).

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". 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). Disentangling the roles of the various factors involved may be a key to understanding young drivers' risky driving.

The current cross-sectional survey aims to examine the role of risk-propensity in young drivers' risky driving within a clear conceptual framework, in order to inform better countermeasures.

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). Sometimes young drivers may engage in risky driving behaviours 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 behaviour [2]. Sometimes young drivers, like all drivers, choose to adopt behaviours that they recognize to be risky. It has been suggested that risks are accepted and risky behaviours chosen when the balance between the perceived (possible) costs and the perceived (possible) benefits of the behaviour is judged to be favourable [3]. The possible costs of risky driving behaviours include getting a penalty, or having a crash (and resulting injuries). The possible benefits depend on the specific behaviour involved, but for speeding might include getting to an appointment on time, or the pleasing sensation of driving fast. For drink driving, a benefit may be the convenience of getting home despite having drunk too much to drive. 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 [see Figure 1].

Figure 1: Schematic diagram of hypothetical factors influencing risky behaviour
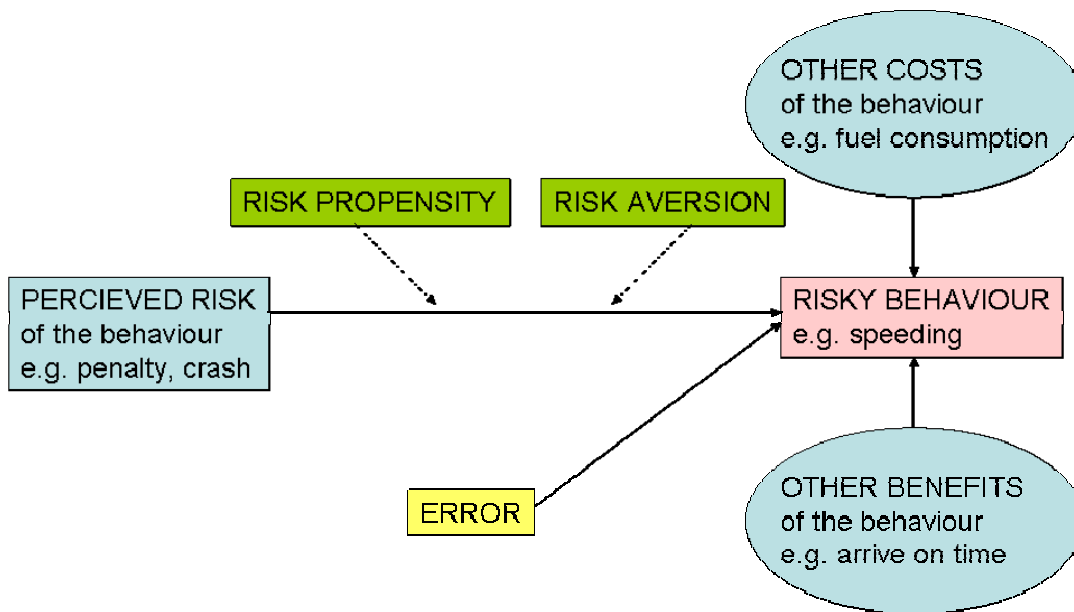
Risk-propensity may be defined as a positive attitude toward taking recognized risks [4]. Researchers and laypersons appear to assume that risk-propensity is a trait that influences the extent to which an individual engages in risk. (Although it has not been explicitly recognized that risk-propensity should moderate the relationship between risk-perception and risky behaviour as suggested by the model above).

Independently of age, inexperience may influence all of the factors in the model depicted in Figure 1. For example, inexperienced drivers may be more likely not to recognize (or to underestimate) risk, may have higher risk propensity and/or lower risk aversion, and may perceive different costs and benefits to risky driving, compared to experienced drivers.

The factors in the model may also be related to gender (as well as to age).

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 inadvertent risky behaviour, choosing a risky behaviour when perceived risks are amongst costs that are outweighed by benefits, and choosing a risk behaviour when perceived risks are amongst benefits (which outweigh costs). All of these have been referred to as risk-taking [see 2, 5]. Risk-propensity has sometimes been inferred from measures of risky behaviour [for example see 2, 5], 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 2, 5]. 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" [6, 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). Discussion of motivations for risky driving has also conflated perceived benefits of the risk per se with perceived benefits of the behaviour that are independent of risk.

A considerable body of literature has examined the relationship between risk-perception and risky driving [for example see 3, 2], and the possibility that underestimation of risk contributes to the over-involvement of young drivers in road trauma. "Illusory invulnerability" may be a particularly important error in risk-perception. Illusory invulnerability refers to peoples' tendency to expect a better future than their peers [for a review see 7]. For example, people believe that compared to their average peer they are less likely to be injured or killed in a car crash as a driver or to be booked for speeding (and other offences)[8]. Illusory invulnerability is hypothesised to promote risk-taking and inhibit precaution-taking [8, 7]. According to a number of leading models of health behaviour [e.g.10] perceived absolute personal risk is a primary determinant of risk-taking and perceived relative risk has been shown to influence behaviour to at least as great an extent as perceived absolute personal risk [11; in relation to road safety in particular: 12]. Although young people do not rate absolute risk lower than do older drivers, some studies suggest that, illusory invulnerability is more pronounced in younger drivers [for a review see 2]. However, in a sample of Australian drivers the opposite appeared to be the case [13].

Relevant reviews suggest a relationship of risky driving (sometimes operationalised as convictions and crashes) with personality traits such as sensation seeking [5, 14] and "thrill seeking" [5], although the role of risk-propensity in this relationship has not been clarified. Further, examination of age differences in personal characteristics has been rare [2].

In order to disentangle the potentially complex interrelationships between risky driving, risk-propensity, risk-perception, and inexperience [see 17], measures of risk-propensity that are clearly distinct from the other constructs are required.

Improved understanding of risky driving (and risky behaviour more generally) also requires 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 4]). Such measures may also improve understanding of young drivers' risky behaviour because some motivations may change with age whereas others may not. For example, the motive for physical enjoyment may be particularly constant, whereas the motive for social approval may decline with age. Further, our recent research identifies that different factors (such as risk-perception and social norms) contribute to different risky behaviours [15]. Similarly, different motivations for risk-propensity are likely to relate to different risky driving behaviours. For example, speeding may be related to thrill seeking, whereas drink-driving may be more strongly related to social pressures.

Rohrmann [4] reports on the psychometric properties of four newly developed risk-propensity questionnaires. Results indicate that the questionnaires are reliable and demonstrate good convergent validity (when correlated with previous measures of "risk-propensity" and related constructs). Results suggest that "risk-propensity" should be regarded separately from "risk aversion", and that it is somewhat domain-specific. That is risk-propensity is not perfectly correlated across the different domains: accident, illness, financial and social risks. The "risk motivation questionnaire" identifies that risk-propensity may be motivated by different factors, and that the relevance of different motivations differs across risk domains. For example, for accident risks, experience-seeking and excitement may be the most important motivations, whereas for social risks, prestige-seeking is salient.

These questionnaires promise to be useful in exploring vulnerability of young drivers, as well as other research regarding risky driving, and regarding risky behaviour more generally. The present study offers an opportunity to further validate these scales, for the first time against self-reported risky behaviour (driving in this instance).

Some theory and evidence suggests that risky behaviours may cluster as a "risky behaviour syndrome" [16]. That is, drivers who take one driving risk are likely to take other driving risks, and possibly also risks in other areas [see 5, 2]. Such drivers are likely to represent a large proportion of road trauma (and may be largely comprised of young drivers). Problem Behaviour Theory [16] identifies personality characteristics that may underlie the clustering of risky behaviours, but relevant research has been hampered by the issues already discussed. Risk-propensity may contribute to "risky behaviour syndrome" (although related factors, such as sensation-seeking [see 2] and risk-perception, may also play a role). Although Rohrmann's [4] results suggest that risk-propensity is domain-specific, domain-specific risk-propensity may underlie the clustering of risky behaviours within a particular domain (e.g. driving). Investigation of the relationship of risk-propensity in the accident, illness, financial and social risk domains with self-reported risky driving (in the accident domain) may shed further light on this issue. Examination of differences between "high" and "low" risk drivers may also be edifying.

1.2 Aims

The current study aims to contribute towards reducing the incidence of road trauma, by further advancing our understanding of factors that contribute to road casualties, especially amongst younger drivers. More specific expected outcomes are improved understanding of:

1. the over-involvement of young drivers in road trauma.

2. differences between younger and older drivers in terms of risk-propensity, risk aversion, motives for positive attitudes toward risky driving behaviours, risk-perception, risky driving and crashes.

3. the association of risk-propensity, risk aversion, motives for positive attitudes toward risky driving behaviours, and risk-perception, with risky driving and crashes.

4. differences between younger and older drivers in terms of the association of risk-propensity, risk aversion, motives for positive attitudes toward risky driving behaviours, and risk-perception, with risky driving and crashes.

5. similarities between risky driving behaviours and risky behaviours from other domains in terms of their relationships with risk-perception and risk-propensity, amongst younger drivers.

6. risky driving as part of a risky behaviour syndrome, in terms of relationships with other risky behaviours, and influence of propensity for taking risks in other domains on risky driving, amongst younger drivers.

7. differences between high and low scorers on risk propensity amongst younger drivers.

A secondary aim was to further validate Rohrmann's novel and promising risk-propensity questionnaires.

1.3 Methods

1.3.1 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 grounds of the motor registry who appeared to be in the age ranges 16-25 (n=89) or 35+ (n=110) 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 minutes while they waited for service in the registry. We have used this methodology successfully in the past. 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.

As a more efficient (but potentially more biased) means of sampling younger drivers, a further 188 participants were recruited via the subject pool of the University of NSW School of Psychology. In keeping with standard subject pool procedures, these participants received course credit for their involvement.

Table 1 provides personal characteristics and driving experience for each sample.

Table 1: Personal characteristics and driving experience of student, younger driver registry and older driver registry samples.

	Student	Younger drivers, Registry	Older drivers; Registry
Age range	17 - 25	16 – 25	34 – 74
Mean age (s.d.)	18.67 (1.49)	21.10 (2.69)	45.12 (8.26)
% Female	70.2%	39.3%	54.5%
% English spoken at home	68.1%	79.8%	87.3%
% Chinese spoken at home	19.7%	9.0%	3.6%
% Other language	12.2%	11.2%	9.1%
% Learners	29.4%	11.2%	0.9%
% Red provisional	35.3%	22.5%	0.0%
% Green provisional	28.3%	21.3%	0.0%
% Full	7.0%	42.7%	99.1%
	(1 missing)	(2 missing)	(1 missing)
Years licensed range	0.10 – 9.67	0.20 – 10.50	1.10 – 55.00
Mean years licensed (s.d.)	2.29 (1.57)	4.10 (2.66)	23.09 (10.83)
	(1 missing)	(5 missing)	(4 missing)
hrs/week driving range	0.00 – 30.00	0.00 – 60.00	0.00 – 52.00
Mean hrs/week driving (s.d.)	6.54 (5.74)	10.42 (8.53)	10.98 (8.45)
	(1 missing)	(5 missing)	(1 missing)

The two younger samples differed significantly in terms of all personal characteristics (p<.001) except for language spoken at home (p=.066).

1.3.2   Materials

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

Risk-propensity and risk aversion

To assess risk-propensity separately from risk aversion (itself a conceptual advance) Rohrmann's Risk Orientation Questionnaire (ROQ) [4] was employed. 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.

To assess risk-propensity for each of the domains: accident, illness, financial and social, Rohrmann's Risk Propensity Questionnaire (RPQ) [4] was employed. 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"). Further, participants rated their risk-propensity in comparison to others (relative risk propensity).

Risk motivation

Different risk-relevant reasons for engaging in speeding and drink-driving were assessed using a modification of Rohrmann's Risk Motivation Questionnaire (RMQ) [4]. First, participants rated how often they engage in each behaviour on a fully-labelled 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 Tables 3 and 4 in Results section] on fully-labelled 5-point Likert scale (ranging from "not at all" to "very much"). Student sample participants were also given the opportunity to nominate up to three additional factors. Factors which were nominated by more that 10 participants were included in the questionnaires given to the registry samples [see Tables 3 and 4 for added items].

Scales were based on Rohrmann's [4] a priori item groupings, and checked against factor analysis and reliability analysis. Item scores were averaged within each sub-scale.

Social desirability

The Marlow-Crowne Social Desirability Scale- Short Form C [18] assessed the extent to which participants tend to respond in a socially desirable fashion. This measure allows statistical control of socially desirable responding, in order to dismiss concerns that responses on the self-report measures are influenced by participants' beliefs about the aims of the research. Socially desirable responses were totalled.

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-labelled 7-point Likert scale (ranging from "extremely unlikely" through to "extremely likely"). Events related to two risky behaviours from each of the risk domains [see Table 2].

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.

All items were considered separately (because of preliminary checks indicated low reliability of possible sub-scales).

Perceived absolute and relative risk have been assessed using these techniques in many studies, and the choice of response scale is based on findings that participants are better able to understand verbal than numeric scales [9], and that a 7-point scale is more reliable than a 5-point scale [17].

Table 2: Events for which participants rated likelihood, and related behaviours for which participants rated frequency of performing, from each risk domain.

Domain	Risky behaviour	Event
Accident	Speeding How often would you drive at 66-75km/hr in a 60km/hr speed zone? How often would you drive at more than 75km/hr in a 60km/hr 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]
Illness	Smoking When out with friends, how often would you smoke cigarettes? When on a break from work or during lunchtime, how often would you smoke?	Have lung cancer (Not be hospitalised in the next 5 years for illness or injury) [a]
	Sunbathing During summer, how often would you sunbathe? When at the beach, how often would you sunbathe for more than 2 hours?	Have skin cancer (Not be hospitalised in the next 5 years for illness or injury) [a]
Financial	Gambling When you are at a club or pub, how often would you gamble on a poker machine? How often would you gamble?	Be significantly in debt, due to gambling at the casino/on poker machines (Borrow money to cover financial loses)
	Investing in the stockmarket When you have some extra money to invest, how often would you speculate on the stock market? When you need to make some extra money, how often would you speculate on the stock market?	Lose money/investments, due to fluctuations in the stock market (Borrow money to cover financial loses)
Social	Propositioning guy/girl When you are out with friends, and you see a guy/girl that you like, how often would you ask them out or ask for their phone number? If there is a guy/girl that you like, and you've gotten to know them considerably, how often would you ask them out or ask for their phone number?	Be rejected by a person when asking them out on a date (Be made to feel socially awkward or embarrassed)
	Challenging friends' point of view When having a discussion with your friends, and you disagree with the majority of your friends' point of view, how often would you say so? When discussing with your friends what social activities to do or where to go, and you disagree with the majority of your friends' point of view, how often would you say so?	(Be made to feel socially awkward or embarrassed)

[a] This item was reverse-scored.

Risky behaviour

Participants indicated how frequently (as a proportion of opportunity) they engage in various risky behaviours in particular circumstances [see Table 2] on a fully-labelled 5-point Likert scale (ranging from "never" to "almost all the time").

These ratings were averaged for speeding and drink-driving situations separately, and supplemented the frequency ratings made as part of the RMQ. Other behaviours related to the risk domains included in the RPQ (and to events included in the risk perception questionnaire) [see Table 2]. Scores were averaged across the 4 items relating to each domain.

Demographic variables

A final section assessed demographic variables such as 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). Participants identified how many crashes they had been involved in while driving in the past 2 years, and, if any, how many were due to speeding and drink-driving (separately). Finally, participants identified how many times they had been fined for speeding and drink-driving (separately) in the last 2 years.

1.3.3 Procedure

UNSW data collection

The study was advertised on the School of Psychology subject pool website, and participants volunteered by booking themselves in for a group-testing session. A data collector ran each session, by meeting participants in a room of the School of Psychology at an appointed time.

Registy data collection

Data collectors attended selected registries during peak times (e.g. lunchtimes) to achieve efficient data collection. They positioned themselves on the footpath immediately outside registry grounds 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.

1.3.4 Statistical analysis

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

Response distributions were checked for all variables, to ensure adequate heterogeneity for analyses, and to ensure appropriate classification into older and younger drivers.

Factor analysis (using principal components extraction with a criterion of Eigenvalues greater than 1, and varimax rotation) was conducted on all RMQ items, for speeding and drink-driving, separately, as a check on Rohrmann's [4] a priori item groupings. We aimed to maintain consistency in the items comprising each subscale across samples, although not necessarily across behaviours.

As a measure of internal consistency, Cronbach's alpha was computed for all scales. For the RMQ, factor analysis results directed the internal consistency analysis. For all scales, items were deleted as

necessary to maximize internal consistency (again aiming to maintain consistency in the items comprising each subscale across samples).

The association of the Social Desirability questionnaire with all self-reported cognitive and behavioural variables was evaluated, in order to determine whether to include social desirability as a covariate in subsequent analyses. Pearson's correlations were employed for continuous variables, and t-tests were employed for the (dichotomized) speed fine and crash variables. When a family of tests (e.g. those relating for risk propensity variables) demonstrated more significant correlations than would be expected by chance, then social desirability scores were used in all subsequent analysis of subscales or items which produced the significant correlations.

Descriptive statistics were computed for all cognitive and behavioural variables, in each sample, for males and females separately.

Younger driver and older driver registry samples were compared in terms of risk aversion, risk-propensity, motives for positive attitudes toward risky driving behaviours, risk-perception, self-reported risky driving, penalties and crashes, considering interactions with gender. Univariate General Linear Model was employed for continuous variables, with sample and gender as fixed factors, and social desirability scores as covariate where appropriate (based on the social desirability analysis). Chi-squared was employed for the (dichotomized) speed fine and crash variables.

Student and younger driver registry samples were compared in the same way.

The association of risk aversion, risk-propensity, motives for positive attitudes toward risky driving behaviours, risk-perception, with self-reported risky driving, penalties and crashes was assessed in each sample, for males and females separately. Measures of risk aversion and propensity were the two scales from the ROQ, and accident risk propensity and relative risk propensity from the RPQ. Sub-scales and items from the RMQ were the measures of motives for speeding and motives for drink-driving. Measures of perceived risk and illusory invulnerability were items specifically relevant to each risky driving behaviour [see Table 2]. Multiplicative indices of perceived risk (for each risky driving behaviour) by risk aversion, general risk propensity, accident risk propensity, and excitement and sensation-seeking motives (for each risky driving behaviour) were also considered to assess moderation effects. Pearson's correlations were employed for associations between continuous variables, with social desirability scores entered as a covariate where appropriate (based on the social desirability analysis). For associations with the (dichotomized) speed fine and crash variables, these variables were employed as fixed factors in Univariate General Linear Models.

Pearson's correlations were employed to test the associations of general risk aversion, general risk propensity, domain-specific risk propensity, relative risk propensity, and relevant perceived risk and illusory invulnerability items [see Table 2], with self-reported risky behaviours in health, financial and social domains, in the two younger driver samples, for males and females separately.

Risky behaviour syndrome was considered in the two younger driver samples (for males and females separately) by assessing Pearson's correlations of self-reported risky driving behaviours with self-reported risky behaviours in health, financial and social domains. Correlations of propensity for taking risks in other domains with risky driving were also computed.

A tertile split of the combined younger driver samples was employed to classify low and high scorers on whichever risk propensity measure demonstrated the most consistent relationships with risky driving. These groups were compared in terms of risky driving, having been fined for speeding and having crashed. Univariate General Linear Model was employed for risky driving, with dichotomised risk propensity and gender as fixed factors, and social desirability scores as covariate where appropriate (based on the social desirability analysis). Chi-squared was employed for the (dichotomized) speed fine and crash variables.

1.4 Results

1.4.1 Factor analysis and internal consistency of RMQ

Speeding

Table 3 presents highest and second highest factor loadings for all speeding RMQ items, with the corresponding factor emboldened, for each sample.

Item groupings were generally consistent with Rohrmann's [4] a priori groupings.

Although some subscales corresponded to the same factor as other subscales in a particular sample, these collinearities were not consistent across samples. For example, whilst the "Excitement" and "Sensation-seeking" subscales loaded on the same factor in both the student and younger registry samples, this was not the case for the older registry sample. Thus, no subscales were combined.

In a few cases, an item was included in a subscale when only its third highest loading was on the corresponding factor [marked with "a" in Table 3]. In all but one case all items included in a subscale had a loading of at least .2 on the corresponding factor. In the older registry sample "my health and safety are not all that important" only had a loading of .056 on the intended factor, and so was closely examined in internal consistency analysis for this sample.

Internal consistency analysis, considering Cronbach's alpha with each item deleted separately, showed an improvement in the "Prestige-seeking" subscale when "rebelling a little against authority figures and society" was deleted, in the student and older registry samples. In the younger registry sample, Cronbach's alpha for the subscale dropped from .874 to .870 with "rebelling…" deleted. Thus the item was omitted from the subscale. Cronbach's alpha for the "Underestimation of risk" subscale increased when "spur of the moment decision" was deleted, in the student and younger registry samples. In the older registry sample, Cronbach's alpha for the subscale dropped from .854 to .836 with "spur…" deleted. Thus the item was omitted from the subscale. In three other cases deletion of an item improved internal consistency, but only in one sample, so these items were included in the final subscales. Similarly, addition of "spur of the moment decision" improved the internal consistency of the "Irrelevance of risk" subscale only in the older registry sample, and so this item was not included in the subscale.

Chronbach's alpha was moderate to high for all subscales in all samples, with the exception of the "Irrelevance of risk" subscale in the older registry sample, for which the alpha of .656 was acceptable.

Drink-driving

Table 4 presents highest and second highest factor loadings for all drink-driving RMQ items, with corresponding factor emboldened, for each sample.

Again, item groupings were generally consistent with Rohrmann's [4] a priori groupings.

Although some subscales corresponded to the same factor as others in a particular sample, these collinearities were not consistent across samples. For example, whilst the "Experience-seeking" and "Sensation-seeking" subscales loaded on the same factor in both the student and older registry samples, this was not the case for the younger registry sample. Thus, no subscales were combined.

In a few cases, an item was included in a subscale when only its third highest loading was on the corresponding factor [marked with "a" in Table 3]. In all but 1 case all items included in a subscale had a loading of at least .2 on the corresponding factor. In the older registry sample "feeling of freedom" only had a loading of .057 on the intended factor, and so was closely examined in internal consistency analysis for this sample.

Table 3: First and second highest factor loading (<.29) for all speeding RMQ items, and Cronbach's alpha for final subscales, for the student (n=188), younger registry (n=89) and older (n=110) registry samples.

Subscale	Items	Student			Younger registry			Older registry		
		Highest loading factor	2nd Highest loading factor	Alpha	Highest loading factor	2nd Highest loading factor	Alpha	Highest loading factor	2nd Highest loading factor	Alpha
Experience-seeking				.899			.943			.958
	Satisfaction of new experiences	4	**3**		**2**	1		**1**	7	
	For fun/amusement	4	1 [a]		**2**	1		**1**	7	
	Curiosity about what the activity is like	4	**3**		**2**	1		**1**	7	
	To increase self-confidence	**3**	-		4	**2**		**1**	3	
	Feeling of having control over something	**3**	1		4	**2**		**1**	2	
	Feeling of freedom (REGISTRY SAMPLES ONLY)	N/A	N/A		1	**2**		**1**	-	
	Wanting to overcome my inner fears	**3**	-		4	1 [b]		**1**	3	
	Enhancing my view of myself (e.g. as brave, adventurous, skilled)	**3**	-		4	1 [a]		**1**	3	
	Personal challenge (opportunity to test my own limits)	**3**	1		4	**2**		**1**	3	
	Relief from the monotony of everyday life	1	4 [a]		1	**2**		2	**1**	

- = No further factor loading greater than .3; N/A = item was not employed in this sample

[a] Third-highest factor loading corresponded to assigned factor; [b] Factor loading on assigned factor greater than .2; [c] Second-highest factor loading corresponded to assigned factor, but was less than .3

Subscale	Items	Student			Younger registry			Older registry		
		Highest loading factor	2nd Highest loading factor	Alpha	Highest loading factor	2nd Highest loading factor	Alpha	Highest loading factor	2nd Highest loading factor	Alpha
Excitement				.907			.945			.922
	For excitement and thrill	1	4		1	2		2	7	
	Enjoyment of the 'adrenalin rush'	1	4		1	3		2	1	
	Tendency to live 'on the edge'	1	-		1	5		2	1	
	To enjoy being 'at risk'	1	3		1			2	1	
Sensation-seeking				.845			.910			.933
	For physical pleasure, such as pleasant body feelings	4	1		1	5		2		
	To experience unique sensations (sound, touch, taste, smell)	4	1		1	5		2		
Prestige seeking				.851			.870			.899
	To prove myself to others	2	-		4	1		1	3	
	To attract admiration	2	1		3	2 [a]		3	2 [a]	
	Rebelling a little against authority figures or society OMITTED FROM FINAL SUBSCALE	1	- [c]		1	2		4	2 [a]	
Social influences				.801			.910			.892
	To take part in something with others and to be sociable	2	-		2	3		3	4	
	Pressure from others to take part in the activity (STUDENT SAMPLE ONLY)	2	-		N/A	N/3A		N/A	N/A	
	Pressure from friends to take part in the activity (REGISTRY SAMPLES ONLY)	N/A	N/A		2	3		3	1	

Subscale	Items	Student			Younger registry			Older registry		
		Highest loading factor	2nd Highest loading factor	Alpha	Highest loading factor	2nd Highest loading factor	Alpha	Highest loading factor	2nd Highest loading factor	Alpha
	Pressure from other drivers to take part in the activity (REGISTRY SAMPLES ONLY)	N/A	N/A		3	**2**		4	**3**	
	To not look like a coward	**2**	-		**2**	3		1	**3**	
	Everyone else was doing this activity so I trusted it's okay	**2**	5		**2**	3		**3**	-	

- = No further factor loading greater than .3; N/A = item was not employed in this sample

[a] Third-highest factor loading corresponded to assigned factor; [b] Factor loading on assigned factor greater than .2; [c] Second-highest factor loading corresponded to assigned factor, but was less than .3

Subscale	Items	Student			Younger registry			Older registry		
		Highest loading factor	2nd Highest loading factor	Alpha	Highest loading factor	2nd Highest loading factor	Alpha	Highest loading factor	2nd Highest loading factor	Alpha
Confidence & familiarity				.724			.862			.868
	Activity is familiar (much experience with it)	**7**	-		**5**	1		**3**	-	
	Relying on the effectiveness of my equipment/tools	**7**	-		**5**	2		**3**	2	
Underestimation of risk				.875			.842			.836
	Don't see the potential risk	**5**	-		**5**	1		**3**	5	
	Activity not dangerous	**5**	-		**5**	-		**3**	5	
	Severity of consequences not serious	**5**	-		**5**	3		2	**3**	
	Spur of the moment decision (no thoughts about the risk)	1	4 [a]		6	- [c]		6	**3**	
	OMITTED FROM FINAL SUBSCALE									
Irrelevance of risk				.739			.884			.656
	Because my safety and health are not that important	**6**	-		**3**	4		**5**	3	
	Because of addiction to the activity	**6**	1		5	**3**		4	2 [b]	
	Alcohol consumption beforehand	**6**	2		**3**	-		**5**	-	
	The future is too bleak to worry that much about my life	**6**	-		**3**	-		3	**5**	
Added				N/A			N/A			N/A
	To let off steam (REGISTRY SAMPLES ONLY)	N/A	N/A		6	4		4	-	
	To get to my destination more quickly (REGISTRY SAMPLES ONLY)	N/A	N/A		6	4		6	-	

- = No further factor loading greater than .3; N/A = item was not employed in this sample

[a] Third-highest factor loading corresponded to assigned factor; [b] Factor loading on assigned factor greater than .2; [c] Second-highest factor loading corresponded to assigned factor, but was less than .3

Table 4: First and second highest factor loading (<.29) for all drink-driving RMQ items, and Cronbach's alpha for final subscale, for the student (n=188), younger registry (n=89) and older (n=110) registry samples.

Subscale	Items	Student			Younger registry			Older registry		
		Highest loading factor	2nd Highest loading factor	Alpha	Highest loading factor	2nd Highest loading factor	Alpha	Highest loading factor	2nd Highest loading factor	Alpha
Experience-seeking				.910			.961			.935
	Satisfaction of new experiences	3	-		1	4		3	1	
	For fun/amusement	1	3		1	4		3	1	
	Curiosity about what the activity is like	3	1		1	4		1	5	
	To increase self-confidence	3	2		1	2		1	-	
	Feeling of having control over something	3	1		1	5		3	1	
	Feeling of freedom (REGISTRY SAMPLES ONLY)	N/A	N/A		2	1		3	-	
	Wanting to overcome my inner fears	3	1		1	3		6	1	
	Enhancing my view of myself (e.g. as brave, adventurous, skilled)	3	2		1	2		1	6	
	Personal challenge (opportunity to test my own limits)	3	1		1	3		1	7	
	Relief from the monotony of everyday life	1	- [a]		3	1		1	6	

- = No further factor loading greater than .3; N/A = item was not employed in this sample

[a] Third-highest factor loading corresponded to assigned factor; [b] Factor loading on assigned factor greater than .2; [c] Second-highest factor loading corresponded to assigned factor, but was less than .3

Subscale	Items	Student			Younger registry			Older registry		
		Highest loading factor	2nd Highest loading factor	Alpha	Highest loading factor	2nd Highest loading factor	Alpha	Highest loading factor	2nd Highest loading factor	Alpha
Excitement				.943			.925			.904
	For excitement and thrill	1	3		3	5		1	5	
	Enjoyment of the 'adrenalin rush'	1	3		3	-		3	1	
	Tendency to live 'on the edge'	1	-		3	2		5	-[c]	
	To enjoy being 'at risk'	1	3		3	2		5	-[c]	
Sensation-seeking				.854			.847			.912
	For physical pleasure, such as pleasant body feelings	3	2		3	4		1	3	
	To experience unique sensations (sound, touch, taste, smell)	3	1		1	3		1	5	
Prestige seeking				.905			.865			.886
	To prove myself to others	2	3		1	4		1	2	
	To attract admiration	2	3		1	4		1	5[a]	
	Rebelling a little against authority figures or society OMITTED FROM FINAL SUBSCALE	2	1		4	5[b]		5	2	
Social pressure				.849			.903			.920
	To take part in something with others and to be sociable	2	-		4	3		2	1	
	Pressure from others to take part in the activity	2	-		4	1		2	1	
	To not look like a coward	2	3		1	4		2	1	
	Everyone else was doing this activity so I trusted it's okay	2	4		1	3[a]		2	4	

- = No further factor loading greater than .3; N/A = item was not employed in this sample
[a] Third-highest factor loading corresponded to assigned factor; [b] Factor loading on assigned factor greater than .2; [c] Second-highest factor loading corresponded to assigned factor, but was less than .3

Subscale	Items	Student			Younger registry			Older registry		
		Highest loading factor	2nd Highest loading factor	Alpha	Highest loading factor	2nd Highest loading factor	Alpha	Highest loading factor	2nd Highest loading factor	Alpha
Confidence & familiarity				.714			.827			.804
	Activity is familiar (much experience with it)	**3**	4		**1**	2		**2**	5	
	Relying on the effectiveness of my equipment/tools	**3**	4		**1**	5		**2**	-	
Underestimation of risk				.806			.895			.833
	Don't see the potential risk	**4**	2		**2**	3		**4**	-	
	Activity not dangerous	**4**	-		**2**	1		**4**	-	
	Severity of consequences not serious	**4**	-		**2**	-		**4**	-	
	Spur of the moment decision (no thoughts about the risk) OMITTED FROM FINAL SUBSCALE	1	2 [a]		**2**	3		7	**4**	
Irrelevance of risk				.800			.841			.848
	Because my safety and health are not that important	**5**	-		**2**	1		**4**	1	
	Because of addiction to the activity	3	**5**		4	1 [a]		**4**	1	
	The future is too bleak to worry that much about my life	**5**	-		**2**	1		6	1 [b]	
Added				N/A			N/A			N/A
	To let off steam (REGISTRY SAMPLES ONLY)	N/A	N/A		2	7		6	1	
	To get to my destination more quickly (REGISTRY SAMPLES ONLY)	N/A	N/A		1	-		2	-	

- = No further factor loading greater than .3; N/A = item was not employed in this sample

[a] Third-highest factor loading corresponded to assigned factor; [b] Factor loading on assigned factor greater than .2; [c] Second-highest factor loading corresponded to assigned factor, but was less than .3

Internal consistency analysis, considering Cronbach's alpha with each item deleted separately, showed an improvement in the "Prestige-seeking" subscale when "rebelling a little against authority figures and society" was deleted, in all three samples, and so the item was omitted from the subscale. Cronbach's alpha for the "Underestimation of risk" subscale increased when "spur of the moment decision" was deleted, in all three samples, and so the item was omitted from the subscale. In two other cases deletion of an item improved internal consistency, but only in one sample, so these items were included in the final subscales. Similarly, addition of "spur of the moment decision" improved the internal consistency of the "Irrelevance of risk" subscale only in the older registry sample, and so this item was not included in the subscale.

Cronbach's alpha was moderate to high for all subscales in all samples.

Internal consistency of remaining scales

Table 5 presents Cronbach's alpha for all remaining final scales.

Table 5: Cronbach's alpha for each remaining scale.

Variable	Scale	Items	Student	Younger Registry	Older Registry
Risk propensity	ROQ Risk aversion	All	.553	.545	.582
	ROQ Risk propensity	2,4,6,10,12	.565	.657	.691
Behaviour frequency	Speeding	All	.849	.844	.770
	Drink driving	All	.587	.668	.703
	Illness	All	.681	.720	.684
	Financial	All	.647	.857	.693
	Social	All	.681	.732	.782
Social desirability		1,2,3,4,5,6,9,10,12,13	.587	.514	.596

Item 8 was omitted from the ROQ Risk propensity scale because doing so substantially increased internal consistency in both the student and older registry samples, and only marginally reduced internal consistency in the younger registry sample. Omission of further items from either ROQ scale did not improve internal consistency overall. Cronbach's alpha was low for the ROQ Caution scale for all three samples. Cronbach's alpha was low for the ROQ Risk propensity scale for the student sample, and acceptable in the other two samples.

For the behaviour frequency scales, omission of no item improved internal consistency over all samples. Cronbach's alpha was generally moderate to high in all samples, with the exception of the drink-driving scale in the student sample.

Items 7 and 8 were omitted from the social desirability scale because doing so substantially increased internal consistency in all three samples. Omission of further items from either ROQ scale did not improve internal consistency overall. Cronbach's alpha was quite low in all three samples.

Associations of all cognitive and behavioural variables with social desirability scores

The association of scores on the Social Desirability questionnaire with all cognitive and behavioural self-report variables was evaluated, in order to determine whether to include social desirability as a covariate in subsequent analyses [see Table 6]. Correlations were employed for all continuous variables, whereas t-tests were employed for dichotomous variables (penalties and crashes).

Treating each group of variables within each sample as a family of tests, the number of significant correlations with social desirability exceeds the number to be expected by chance only for risk propensity and risk motivation in the older registry sample, perceived risk in all three samples, and behaviour frequency only in the student sample. Social desirability will be employed as a covariate where appropriate for these variables (by scale or item).

Table 6: Correlations (with p-values) of social desirability with each variable, in the student (n=186-8), younger registry (n=87-9) and older (n=108-10) registry samples. * p<.05; ** p<.001

Variable	Scale	Student	Younger registry	Older registry
Risk propensity	ROQ Risk aversion	-.092 (.207)	.091 (.396)	.174 (.069)
	ROQ Risk propensity	.042 (.570)	-.074 (.490)	-.137 (.154)
	RPQ Accident risk propensity	-.017 (.813)	.024 (.826)	-.186 (.051)
	RPQ Illness risk propensity	-.177 (.015*)	-.031 (.770)	-.152 (.114)
	RPQ Financial risk propensity	-.079 (.281)	-.015 (.891)	-.177 (.064)
	RPQ Social risk propensity	-.065 (.376)	.082 (.443)	-.241 (.011*)
	RPQ Relative risk propensity	-.051 (.491)	.186 (.081)	-.217 (.023*)
Risk motivation Speeding RMQ	Experience-seeking	-.044 (.550)	.072 (.503)	-.034 (.721)
	Excitement	-.144 (.049*)	-.055 (.608)	-.106 (.272)
	Sensation-seeking	-.038 (.605)	.037 (.729)	-.108 (.260)
	Prestige-seeking	-.045 (.544)	.032 (.769)	-.157 (.102)
	Social influence	-.064 (.384)	.080 (.455)	-.110 (.253)
	Confidence & familiarity	-.095 (.194)	.030 (.781)	-.187 (.051)

Variable	Scale	Student	Younger registry	Older registry
Drink-driving RMQ	Underestimation of risk	-.083 (.256)	.129 (.230)	-.153 (.110)
	Irrelevance of risk	-.084 (.250)	.052 (.629)	.056 (.563)
	"let off steam"	N/A	-.090 (.403)	-.145 (.129)
	"get somewhere quicker"	N/A	-.214 (.044*)	-.210 (.028*)
	Experience-seeking	.027 (.718)	.049 (.650)	.197 (.039*)
	Excitement	.079 (.284)	-.076 (.477)	.169 (.078)
	Sensation-seeking	.101 (.169)	-.022 (.835)	.174 (.070)
	Prestige-seeking	.025 (.733)	.000 (.998)	.198 (.038*)
	Social influence	-.014 (.844)	.071 (.509)	.142 (.138)
	Confidence and familiarity	.036 (.621)	.086 (.423)	.031 (.749)
	Underestimation of risk	.020 (.789)	-.036 (.741)	.167 (.081)
	Irrelevance of risk	.089 (.226)	.011 (.922)	.160 (.095)
	"let off steam"	N/A	-.051 (.633)	.125 (.195)
	"get somewhere quicker"	N/A	-.199 (.062)	-.126 (.190)
Perceived risk	Fined for speeding	-.172 (.018*)	-.139 (.193)	-.326 (.001*)
	Crash due to speeding	-.173 (.017*)	-.092 (.391)	-.371 (<.001**)
	Fined for drink-driving	-.046 (.528)	-.105 (.328)	-.153 (.112)
	Crash due to drink-driving	-.071 (.336)	-.043 (.686)	-.108 (.260)

Variable	Scale	Student	Younger registry	Older registry
	Injured or killed in a crash	-.061 (.407)	-.181 (.092)	-.259 (.006*)
	Not be hospitalised [a]	.032 (.661)	.091 (.395)	.315 (.001*)
	Lung cancer	.052 (.483)	.003 (.981)	-.004 (.969)
	Skin cancer	-.160 (.028*)	-.183 (.086)	-.265 (.005*)
	Gambling debt	-.026 (.722)	-.181 (.090)	.037 (.704)
	Investment loss	.030 (.682)	-.139 (.194)	-.278 (.003*)
	Borrow money	-.049 (.506)	-.139 (.200)	-.088 (.360)
	Be rejected	-.011 (.879)	-.297 (.005*)	-.155 (.105)
	Be made to feel socially awkward or embarrassed	-.239 (.001*)	-.325 (.002*)	-.376 (<.001**)
Illusory invulnerability	Fined for speeding	.087 (.233)	.127 (.235)	-.006 (.950)
	Crash due to speeding	.124 (.091)	.141 (.189)	.004 (.963)
	Fined for drink-driving	.044 (.548)	.030 (.781)	-.177 (.066)
	Crash due to drink-driving	.059 (.425)	-.001 (.996)	-.089 (.359)
	Injured or killed in a crash	.084 (.251)	.265 (.012*)	-.034 (.724)
	Not be hospitalised [a]	-.033 (.657)	-.023 (.828)	-.099 (.306)
	Lung cancer	.049 (.500)	.037 (.733)	-.149 (.121)
	Skin cancer	.178 (.015*)	.001 (.992)	.150 (.117)
	Gambling debt	.005 (.951)	.099 (.357)	-.095 (.326)

Variable	Scale	Student	Younger registry	Older registry
	Investment loss	.018 (.811)	.160 (.133)	.108 (.261)
	Borrow money	.055 (.451)	.004 (.971)	-.064 (.508)
	Be rejected	-.061 (.410)	.114 (.287)	-.018 (.851)
	Be made to feel socially awkward or embarrassed	.069 (.344)	.133 (.216)	.065 (.500)
Behaviour frequency	RMQ speeding frequency	-.196 (.008*) [d]	.008 (.945) [f]	-.161 (.100) [h]
	RMQ drink-driving frequency	-.019 (.815) [e]	.008 (.946) [g]	-.048 (.632) [i]
	Speeding average	-.157 (.031*)	-.020 (.856)	-.078 (.415)
	Drink-driving average	-.284 (<.001**)	.013 (.906)	-.179 (.062)
	Illness average	-.100 (.172)	-.094 (.381)	.058 (.547)
	Financial average	-.119 (.104)	-.045 (.677)	-.120 (.211)
	Social average	-.065 (.375)	.006 (.957)	-.021 (.830)
Penalties	Speeding fines [b]	$t_{186}=-.579$ (.564)	$t_{86}=.693$ (.490)	$t_{108}=.436$ (.664)
Crashes [c]		$t_{184}=-.820$ (.413)	$t_{86}=-.379$ (.706)	$t_{108}=1.090$ (.278)

a This item was reverse-scored.

b There were insufficient participants who had received a fine for drink-driving to warrant analysis;

c There were insufficient participants who had crashed specifically due to speeding or drink-driving to warrant separate analysis;

d n=179;

e n=162; f

n=82;

g n=77;

h n=106;

i n=100.

Descriptive statistics for all cognitive and behavioural variables

Descriptive statistics were computed for all variables, in each sample, for males and females separately [see Tables 7 and 8].

Table 7: Descriptive statistics for each variable, in the student, younger registry and older registry samples, for males only.

Variable	Scale	Student	Younger registry	Older registry
Risk propensity	ROQ Risk aversion	4.18 (.76)	3.97 (.78)	4.40 (.87)
	ROQ Risk propensity	4.79 (.88)	4.58 (1.00)	4.48 (1.20)
	RPQ Accident risk propensity	6.57 (2.15)	6.02 (2.42)	5.44 (2.84)
	RPQ Illness risk propensity	4.64 (2.87)	5.28 (2.22)	5.12 (2.70)
	RPQ Financial risk propensity	4.86 (2.48)	5.15 (2.33)	5.46 (2.71)
	RPQ Social risk propensity	5.48 (2.44)	5.19 (2.03)	4.82 (2.59)
	RPQ Relative risk propensity	6.07 (1.93)	6.22 (2.18)	5.60 (2.21)
Risk motivation: Speeding RMQ	Experience-seeking	2.36 (.92)	2.42 (1.15)	2.05 (1.11)
	Excitement	2.50 (1.00)	2.58 (1.36)	1.84 (.92)
	Sensation-seeking	2.01 (.95)	2.44 (1.42)	1.95 (1.17)
	Prestige-seeking	1.77 (1.00)	2.00 (1.27)	1.79 (1.12)
	Social influence	1.69 (.80)	2.21 (1.13)	1.76 (.96)
	Confidence & familiarity	2.41 (1.00)	2.37 (1.10)	2.45 (1.15)
	Underestimation of risk	2.05 (1.06)	2.41 (1.13)	2.09 (1.01)
	Irrelevance of risk	1.39 (.62)	1.90 (1.08)	1.44 (.62)
	"let off steam"	N/A	2.20 (1.29)	1.96 (1.01)

Variable	Scale	Student	Younger registry	Older registry
Drink-driving RMQ	"get somewhere quicker"	N/A	3.46 (1.24)	3.00 (1.31)
	Experience-seeking	1.69 (.77)	2.14 (1.20)	1.41 (.65)
	Excitement	1.78 (1.09)	2.05 (1.22)	1.20 (.55)
	Sensation-seeking	1.78 (1.12)	1.83 (1.19)	1.30 (.71)
	Prestige-seeking	1.79 (1.05)	1.91 (1.27)	1.34 (.85)
	Social influence	1.86 (.92)	2.02 (1.20)	1.40 (.74)
	Confidence & familiarity	1.68 (.84)	2.00 (1.26)	1.51 (.85)
	Underestimation of risk	1.58 (.92)	2.07 (1.25)	1.46 (.70)
	Irrelevance of risk	1.32 (.59)	1.22 (.72)	1.03 (.57)
	"let off steam"	N/A	1.76 (1.23)	1.34 (.82)
	"get somewhere quicker"	N/A	2.57 (1.51)	1.92 (1.14)
Perceived risk	Fined for speeding	3.64 (1.68)	3.56 (1.84)	3.22 (1.89)
	Crash due to speeding	2.68 (1.27)	3.07 (1.71)	2.80 (1.65)
	Fined for drink-driving	1.71 (1.26)	2.07 (1.50)	1.58 (1.16)
	Crash due to drink-driving	1.57 (1.06)	2.17 (1.55)	1.48 (1.07)
	Injured or killed in a crash	2.36 (1.34)	2.67 (1.49)	2.28 (1.37)
	Not be hospitalised [a]	4.04 (1.87)	4.31 (1.55)	4.42 (1.73)
	Lung cancer	1.70 (1.24)	2.11 (1.35)	2.42 (1.66)
	Skin cancer	2.43 (1.33)	2.70 (1.59)	3.00 (1.70)

Variable	Scale	Student	Younger registry	Older registry
	Gambling debt	1.52 (.81)	2.35 (1.53)	1.65 (1.33)
	Investment loss	2.38 (1.82)	2.98 (1.93)	2.46 (1.45)
	Borrow money	1.98 (1.27)	2.58 (1.70)	1.80 (1.26)
	Be rejected	4.41 (1.79)	3.83 (1.86)	2.54 (1.89)
	Be made to feel socially awkward or embarrassed	4.29 (1.62)	3.70 (1.51)	3.52 (1.81)
Illusory invulnerability	Fined for speeding	1.45 (1.43)	1.07 (1.98)	.64 (1.32)
	Crash due to speeding	2.04 (1.49)	1.26 (2.13)	.84 (1.30)
	Fined for drink-driving	2.71 (1.81)	2.06 (1.84)	1.76 (1.62)
	Crash due to drink-driving	2.75 (1.72)	1.70 (1.93)	1.66 (1.45)
	Injured or killed in a crash	1.77 (1.77)	1.43 (1.88)	1.10 (1.33)
	Not be hospitalised [a]	.31 (2.25)	-.06 (1.97)	-.28 (1.65)
	Lung cancer	1.21 (1.51)	1.02 (1.54)	1.36 (1.80)
	Skin cancer	.80 (1.37)	.76 (1.73)	.86 (1.68)
	Gambling debt	1.82 (1.24)	1.63 (1.70)	1.69 (1.54)
	Investment loss	.38 (1.73)	.37 (2.16)	.96 (1.51)
	Borrow money	1.61 (1.59)	1.58 (1.89)	1.68 (1.94)
	Be rejected	.79 (1.64)	1.00 (1.74)	1.00 (1.85)
	Be made to feel socially awkward or embarrassed	.91 (1.42)	.61 (2.01)	.26 (1.43)

[a] This item was reverse-scored.

Variable	Scale	Student	Younger registry	Older registry
Behaviour frequency	RMQ speeding frequency	2.04 (1.47)	1.83 (1.26)	1.67 (.75)
	RMQ drink-driving frequency	.27 (.64)	.62 (1.15)	.31 (.55)
	Speeding average	1.82 (1.23)	2.00 (1.35)	1.38 (.91)
	Drink-driving average	1.62 (1.11)	1.28 (1.35)	.87 (.91)
	Illness average	.93 (.92)	1.46 (1.22)	.97 (.95)
	Financial average	1.16 (.74)	1.32 (1.16)	1.07 (.85)
	Social average	2.88 (.88)	2.42 (1.04)	1.68 (.81)
Penalties	Speeding fines [b]	14.3%	18.9%	16.0%
Crashes [c]		27.3%	15.1%	8.0%

[b] There were insufficient participants who had received a fine for drink-driving to warrant analysis;

[c] There were insufficient participants who had crashed specifically due to speeding or drink-driving to warrant separate analysis.

Table 8: Descriptive statistics for each variable, in the student, younger registry and older registry samples, for females only.

Variable	Scale	Student	Younger registry	Older registry
Risk propensity	ROQ Risk aversion	4.24 (.84)	4.18 (.89)	4.28 (.88)
	ROQ Risk propensity	4.36 (.83)	4.63 (.96)	4.59 (.97)
	RPQ Accident risk propensity	4.91 (2.72)	5.71 (2.50)	3.43 (2.53)
	RPQ Illness risk propensity	4.86 (2.58)	5.83 (2.55)	4.12 (3.18)
	RPQ Financial risk propensity	3.77 (2.23)	3.89 (2.40)	3.83 (2.54)
	RPQ Social risk propensity	4.85 (2.56)	6.40 (2.21)	3.97 (2.97)

Variable	Scale	Student	Younger registry	Older registry
	RPQ Relative risk propensity	5.52 (2.01)	6.63 (2.09)	4.35 (2.31)
Risk motivation: Speeding RMQ	Experience-seeking	2.15 (.84)	2.30 (1.12)	1.68 (.81)
	Excitement	2.20 (1.08)	2.46 (1.32)	1.52 (.79)
	Sensation-seeking	1.68 (.96)	2.13 (1.30)	1.47 (.79)
	Prestige-seeking	1.68 (.90)	1.73 (1.04)	1.32 (.55)
	Social influence	1.73 (.79)	1.81 (.91)	1.34 (.46)
	Confidence & familiarity	2.21 (1.03)	2.30 (1.34)	1.87 (1.05)
	Underestimation of risk	1.86 (1.00)	1.90 (1.02)	1.72 (.94)
	Irrelevance of risk	1.32 (.58)	1.41 (.77)	1.23 (.39)
	"let off steam"	N/A	2.11 (1.28)	1.70 (1.00)
	"get somewhere quicker"	N/A	3.09 (1.46)	2.98 (1.46)
Drink-driving RMQ	Experience-seeking	1.75 (.75)	1.50 (.72)	1.60 (.76)
	Excitement	2.09 (1.16)	1.80 (1.10)	1.50 (.86)
	Sensation-seeking	1.61 (.93)	1.63 (.91)	1.49 (.99)
	Prestige-seeking	1.69 (1.04)	1.26 (.63)	1.50 (.97)
	Social influence	1.81 (.94)	1.56 (.87)	1.46 (.81)
	Confidence & familiarity	1.66 (.91)	1.34 (.55)	1.60 (.93)
	Underestimation of risk	1.62 (.86)	1.32 (.60)	1.53 (1.00)
	Irrelevance of risk	1.30 (.60)	.87 (.27)	1.14 (.67)

Variable	Scale	Student	Younger registry	Older registry
	"let off steam"	N/A	1.26 (.66)	1.38 (.89)
	"get somewhere quicker"	N/A	2.00 (1.11)	2.22 (1.29)
Perceived risk	Fined for speeding	3.67 (1.88)	3.63 (1.83)	2.87 (1.50)
	Crash due to speeding	2.90 (1.55)	3.23 (1.52)	2.10 (1.05)
	Fined for drink-driving	1.66 (1.17)	1.89 (1.28)	1.37 (.74)
	Crash due to drink-driving	1.55 (1.08)	1.86 (1.22)	1.33 (.73)
	Injured or killed in a crash	2.36 (1.31)	3.15 (1.40)	2.30 (1.27)
	Not be hospitalised [a]	4.18 (1.61)	3.94 (1.51)	4.09 (1.76)
	Lung cancer	2.24 (1.45)	2.54 (1.60)	2.28 (1.49)
	Skin cancer	3.18 (1.76)	3.17 (1.71)	2.95 (1.51)
	Gambling debt	1.47 (1.10)	1.86 (1.03)	1.42 (.79)
	Investment loss	2.20 (1.56)	2.23 (1.40)	1.87 (1.08)
	Borrow money	2.31 (1.46)	2.31 (1.68)	1.68 (1.11)
	Be rejected	3.61 (1.54)	4.49 (1.74)	2.55 (1.61)
	Be made to feel socially awkward or embarrassed	4.32 (1.58)	4.00 (1.80)	3.25 (1.66)
Illusory invulnerability	Fined for speeding	1.58 (1.93)	1.49 (1.77)	.93 (1.59)
	Crash due to speeding	2.21 (1.80)	1.66 (1.86)	1.28 (1.29)
	Fined for drink-driving	3.28 (2.03)	2.83 (2.67)	2.03 (1.51)

Variable	Scale	Student	Younger registry	Older registry
	Crash due to drink-driving	3.21 (2.02)	2.63 (1.90)	2.02 (1.47)
	Injured or killed in a crash	2.16 (1.75)	1.21 (2.24)	.82 (1.37)
	Not be hospitalised [a]	-.39 (2.11)	-.71 (1.60)	.09 (1.72)
	Lung cancer	1.46 (1.88)	1.03 (1.56)	1.15 (1.96)
	Skin cancer	.82 (1.76)	1.06 (1.97)	.75 (1.55)
	Gambling debt	2.35 (1.69)	1.80 (1.98)	1.73 (1.56)
	Investment loss	.85 (1.71)	1.34 (1.78)	1.72 (1.68)
	Borrow money	1.93 (2.07)	2.34 (1.92)	1.80 (1.31)
	Be rejected	1.55 (1.74)	.26 (1.67)	1.07 (2.14)
	Be made to feel socially awkward or embarrassed	.87 (1.68)	1.34 (1.97)	.13 (1.59)
Behaviour frequency	RMQ speeding frequency	1.99 (1.18)	2.03 (1.19)	1.56 (1.05)
	RMQ drink-driving frequency	.17 (.48)	.38 (.61)	.29 (.61)
	Speeding average	1.67 (1.12)	1.79 (1.43)	1.18 (.86)
	Drink-driving average	1.09 (.97)	.94 (1.00)	.78 (1.05)
	Illness average	1.32 (1.01)	1.41 (1.11)	1.03 (1.06)
	Financial average	.76 (.68)	.67 (.80)	.70 (.70)
	Social average	2.32 (.87)	2.49 (1.05)	1.80 (.91)
Penalties	Speeding fines [b]	6.8%	8.6%	13.3%
Crashes [c]		27.5%	28.6%	13.3%

[a] This item was reverse-scored.

[b] There were insufficient participants who had received a fine for drink-driving to warrant analysis;

[c] There were insufficient participants who had crashed specifically due to speeding or drink-driving to warrant separate analysis.

Comparison of younger and older registry samples for all cognitive and behavioural variables

Younger driver and older driver registry samples were compared in terms of risk aversion, risk-propensity, motives for positive attitudes toward risky driving behaviours, risk-perception, self-reported risky driving, penalties and crashes, considering interactions with gender [see Table 9]. Where an interaction with gender was observed, the effect of sample was computed for males and females separately employing t-tests, or Univariate General Linear Model when the social desirability score was required as a covariate [see Table 9]. 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).

Table 9: Statistics for comparison of younger registry sample (n=89) with older registry sample (n=110), showing interaction with and main effect of gender (M: n=104; F: n=95) * p<.05; ** p<.001

Variable	Scale	Sample x Gender interaction	Gender main effect	Sample main effect
Risk propensity	ROQ Risk aversion	1.823 (.178)	.133 (.715)	4.575 (.034*)
	ROQ Risk propensity	.026 (.872)	.263 (.609)	.234 (.629)
	RPQ Accident risk propensity	5.194 (.024*)	9.570 (.002*)	M: 1.119 (.266) F: 4.251 (<.001**) [c]
	RPQ Illness risk propensity	3.918 (.049*)	.332 (.565)	M: .327 (.745) F: 2.715 (.008*) [c]
	RPQ Financial risk propensity	.253 (.616)	15.888 (<.001**)	.128 (.721)
	RPQ Social risk propensity [b]	7.960 (.005*)	.280 (.597)	M: .298 (.568) F: 15.419 (<001**) [c]
	RPQ Relative risk propensity [b]	6.597 (.011*)	1.697 (.194)	M: 1.452 (.231) F: 22.405 (<.001**) [c]
Risk motivation: Speeding RMQ	Experience-seeking	.761 (.384)	2.661 (.104)	10.692 (.001*)
	Excitement	.399 (.528)	1.930 (.166)	28.321 (<.001**)
	Sensation-seeking	.243 (.623)	5.537 (.020*)	M: 1.941 (.055) F: 2.731 (.009*) [d]
	Prestige-seeking	.472 (.493)	6.418 (.012*)	M: .893 (.374) F: 2.174 (.035*) [d]

Variable	Scale	Sample x Gender interaction	Gender main effect	Sample main effect
Drink-driving RMQ	Social influence	.009 (.923)	10.073 (.002*)	M: 2.192 (.031*) F: 2.886 (.006*) [d]
	Confidence & familiarity	2.409 (.122)	3.913 (.049*)	1.146 (.286)
	Underestimation of risk	.246 (.621)	8.971 (.003*)	2.759 (.098)
	Irrelevance of risk	1.646 (.201)	10.054 (.002*)	M: 2.676 (.009*) F: 1.290 (.204) [d]
	"let off steam"	.268 (.605)	1.124 (.290)	3.987 (.047*)
	"get somewhere quicker"	.981 (.323)	.931 (.336)	.773 (.380)
	Experience-seeking	10.694 (.001*)	3.246 (.073)	M: 15.590 (<.001**) F: .129 (.720) [c]
	Excitement	3.879 (.050)	.037 (.847)	17.080 (<.001**)
	Sensation-seeking	1.973 (.162)	.002 (.963)	5.641 (.019*)
	Prestige-seeking	7.910 (.005*)	3.045 (.083)	M: 7.260 (.008*) F: .928 (.338) [c]
	Social influence	3.719 (.055)	2.122 (.147)	7.388 (.007*)
	Confidence & familiarity	7.14 (.008*)	4.114 (.044*)	M: 2.333 (.022*) F: -1.687 (.095) [c]
	Underestimation of risk	8.809 (.003*)	6.059 (.015*)	M: 3.104 (.003*) F: -1.276 (.205) [c]
	Irrelevance of risk	6.767 (.010*)	1.907 (.169)	M: 1.519 (.132) F: -2.710 (.008*) [c]
	"let off steam"	3.982 (.047*)	2.817 (.095)	M: 2.059 (.042*) F: -.733 (.465) [c]
	"get somewhere quicker"	5.430 (.021*)	.551 (.459)	M: 2.502 (.014*) F: -.863 (.391) [c]
Perceived risk	Fined for speeding [b]	.633 (.427)	.256 (.613)	2.387 (.124)
	Crash due to speeding [b]	3.923 (.049*)	1.534 (.217)	M: .115 (.735) F: 15.082 (<.001**) [c]
	Fined for drink-driving	.003 (.957)	1.321 (.252)	8.566 (.004*)
	Crash due to drink-driving	.232 (.630)	1.824 (.178)	12.844 (<.001**)
	Injured or killed in a crash [b e]	1.174 (.280)	1.698 (.194)	6.136 (.014*)
	Not be hospitalised [a b]	.000 (.990)	2.539 (.113)	.013 (.908)
	Lung cancer	1.657 (.200)	.444 (.506)	.012 (.915)
	Skin cancer [b]	1.147 (.286)	.947 (.332)	.587 (.445)
	Gambling debt	.545 (.461)	4.365 (.038*)	M: 2.460 (.016*) F: 2.340 (.021*) [d]
	Investment loss [b]	.187 (.666)	9.759 (.002*)	2.286 (.132)

Variable	Scale	Sample x Gender interaction	Gender main effect	Sample main effect
	Borrow money	.124 (.725)	.836 (.362)	11.517 (.001*)
	Be rejected [b]	1.485 (.224)	1.885 (.171)	33.034 (<.001**)
	Be made to feel socially awkward or embarrassed [b]	1.288 (.258)	.023 (.881)	1.068 (.303)
Illusory invulnerability	Fined for speeding	.059 (.808)	2.105 (.148)	4.121 (.044*)
	Crash due to speeding	.009 (.925)	3.056 (.082)	2.716 (.101)
	Fined for drink-driving	.935 (.335)	4.115 (.044*)	M: .867 (.388) F: 1.845 (.071) [d]
	Crash due to drink-driving	1.360 (.245)	6.926 (.009*)	1.810 (.180)
	Injured or killed in a crash	.017 (.897)	1.056 (.305)	2.131 (.146)
	Not be hospitalised [a]	4.011 (.047*)	.325 (.569)	M: .620 (.536) F: -2.231 (.028*) [c]
	Lung cancer	.188 (.665)	.156 (.693)	.832 (.363)
	Skin cancer	.681 (.410)	.144 (.704)	.174 (.677)
	Gambling debt	.073 (.788)	.186 (.666)	.000 (.996)
	Investment loss	.171 (.679)	11.004 (.001*)	3.416 (.066)
	Borrow money	1.602 (.207)	3.014 (.084)	.743 (.390)
	Be rejected	2.203 (.139)	1.537 (.216)	2.203 (.139)
	Be made to feel socially awkward or embarrassed	2.882 (.091)	1.432 (.233)	9.526 (.002*)
Behaviour frequency	RMQ speeding frequency	.941 (.333)	.070 (.792)	3.908 (.050)
	RMQ drink-driving frequency	.894 (.346)	1.320 (.252)	2.818 (.095)
	Speeding average	.001 (.977)	1.642 (.202)	14.143 (<.001**)
	Drink-driving average	.608 (.436)	1.755 (.187)	3.178 (.076)
	Illness average	.098 (.754)	.001 (.972)	7.717 (.006*)
	Financial average	1.189 (.277)	15.455 (<.001**)	.815 (.368)
	Social average	.031 (.861)	.445 (.506)	26.972 (<.001**)

[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 x 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.

A large number of tests suggest that younger drivers demonstrate risk-propensity, motives for positive attitudes toward risky driving behaviours, and risk-perception, that are more consistent with risky driving than do older drivers. Nonetheless, many variables demonstrated a significant gender x sample interaction, such that the age group difference was observed for only one gender.

Compared to older drivers, younger drivers demonstrated lower general risk aversion. Younger drivers demonstrated greater propensity for physical accident risks, as well as health risks, and social risks, and greater relative risk propensity (all amongst females only).

Compared to older drivers, younger drivers reported stronger motives for speeding in relation to experience-seeking, excitement, social influence, and "letting off steam", as well as sensation-seeking (females only, but for males p=.055), prestige-seeking (females only), and irrelevance of risk (males only).

Compared to older drivers, younger drivers reported stronger motives for drink-driving in relation to excitement, sensation-seeking, and social influence. Amongst males only, younger drivers reported stronger motives for drink-driving in relation to experience-seeking, prestige-seeking, confidence/familiarity (but for females p=.095), underestimation of risk, "letting off steam", and "getting somewhere". Amongst females only, younger drivers reported lower motives for drink-driving in relation to irrelevance of risk.

Younger drivers perceived higher risks of outcomes related to risky driving, as well as other risky behaviours. Compared to older drivers, younger drivers perceived higher risks of crashing due to speeding (females only), being fined for drink-driving, crashing due to drink-driving, or being injured or killed in a car crash. Younger drivers also perceived higher risks of having gambling debts, having to borrow money, or being rejected by a potential partner.

Some evidence was observed for higher illusory invulnerability amongst younger drivers, compared to older drivers. 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 demonstrated higher illusory invulnerability than older drivers regarding feeling socially awkward or embarrassed, but lower illusory invulnerability regarding being hospitalized (for females only).

Younger drivers also reported speeding more frequently than older drivers, as well as more frequently engaging in behaviours posing health and social risks.

Younger and older drivers did not differ significantly in terms speeding fines for either males (p=.702) or females (p=.484). Similarly, no effect of age group on crashes was observed for either males (p=.262) or females (p=.068).

Within the comparison of the younger and older registry samples there was considerable evidence that males demonstrate risk-propensity, motives for positive attitudes toward risky driving behaviours, and risk-perception, that are more consistent with risky driving than do females (see Discussion for further detail).

Comparison of student sample and younger registry sample for all cognitive and behavioural variables

The student sample and younger registry sample were compared in terms of risk-perception, risk-propensity, risk aversion, motives for positive attitudes toward risky driving behaviours, self-reported risky driving, penalties and crashes, considering interactions with gender [see Table 10].

Where an interaction with gender was observed the effect of sample was computed for males and females separately employing t-tests, or Univariate General Linear Model when the social desirability score was required as a covariate [see Table 10]. 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).

Table 10: Statistics for comparison of student sample (n=188) with younger registry sample (n=89), showing interaction with and main effect of gender (M: n=110; F: n=167) * p<.05; ** p<.001

Variable	Scale	Sample x Gender interaction	Gender main effect	Sample main effect
Risk propensity	ROQ Risk aversion	.470 (.493)	1.53 (.217)	1.53 (.217)
	ROQ Risk propensity	4.084 (.044*)	2.50 (.115)	M: 1.175 (.242) F: -1.682 (.094) [c]
	RPQ Accident risk propensity	3.984 (.047*)	8.351 (.004*)	M: 1.268 (.208) F: -1.584 (.115) [c]
	RPQ Illness risk propensity	.227 (.634)	1.241 (.266)	5.334 (.022*)
	RPQ Financial risk propensity	.074 (.785)	14.167 (<.001**)	.433 (.511)
	RPQ Social risk propensity	8.216 (.004*)	.812 (.368)	M: .696 (.488) F: -3.280 (.001*) [c]
	RPQ Relative risk propensity	3.076 (.081)	.075 (.785)	5.304 (.022*)
Risk motivation: Speeding RMQ	Experience-seeking	.140 (.709)	1.588 (.209)	.625 (.430)
	Excitement	.312 (.577)	1.777 (.184)	1.282 (.259)
	Sensation-seeking	.003 (.960)	4.710 (.031*)	M: -1.883 (.063) F: -.914 (.062) [d]
	Prestige-seeking	.456 (.500)	1.695 (.194)	1.032 (.311)
	Social influence	3.310 (.070)	2.268 (.133)	6.375 (.012*)
	Confidence & familiarity	.194 (.660)	.854 (.356)	.027 (.870)
	Underestimation of risk	1.356 (.245)	6.398 (.012*)	2.084 (.150)
	Irrelevance of risk	4.407 (.037*)	7.937 (.005*)	M: -2.973 (.004*) F: -.741 (.460) [c]
	"let off steam"	N/A	N/A	N/A
	"get somewhere quicker"	N/A	N/A	N/A
Drink-driving RMQ	Experience-seeking	9.077 (.003*)	6.322 (.013*)	M: -2.332 (.022*) F: 1.730 (.086) [c]
	Excitement	3.221 (.074)	.043 (.837)	.003 (.955)

Variable	Scale	Sample x Gender interaction	Gender main effect	Sample main effect
	Sensation-seeking	.023 (.880)	1.795 (.181)	.068 (.795)
	Prestige-seeking	3.660 (.057)	7.203 (.008*)	1.245 (.265)
	Social influence	2.351 (.126)	3.629 (.058)	.119 (.730)
	Confidence & familiarity	6.292 (.013*)	7.085 (.008*)	M: -1.567 (.121) F: 2.576 (.012*) [c]
	Underestimation of risk	9.805 (.002*)	8.011 (.005*)	M: -2.335 (.022*) F: 2.356 (.021*) [c]
	Irrelevance of risk	4.171 (.042*)	5.612 (.019*)	M: .796 (.428) F: 6.099 (<.001**) [c]
	"let off steam"	N/A	N/A	N/A
	"get somewhere quicker"	N/A	N/A	N/A
Perceived risk	Fined for speeding [b]	.001 (.974)	.069 (.793)	.059 (.809)
	Crash due to speeding [b]	.046 (.829)	.941 (.333)	4.868 (.028*)
	Fined for drink-driving	.151 (.698)	.505 (.478)	2.926 (.088)
	Crash due to drink-driving	.772 (.380)	1.080 (.300)	7.894 (.005*)
	Injured or killed in a crash	1.674 (.197)	1.697 (.194)	8.804 (.003*)
	Not be hospitalised [a]	1.356 (.245)	.262 (.609)	.008 (.930)
	Lung cancer	.094 (.760)	6.578 (.011*)	3.555 (.060)
	Skin cancer [b]	.508 (.477)	8.156 (.005*)	1.329 (.250)
	Gambling debt	2.112 (.147)	3.121 (.078)	15.799 (<.001**)
	Investment loss	1.672 (.197)	4.202 (.041*)	1.959 (.163)
	Borrow money	2.076 (.151)	.022 (.882)	2.205 (.139)
	Be rejected [b]	10.128 (.002*)	.087 (.768)	M: 1.316 (.254) F: 8.840 (.003*) [c]
	Be made to feel socially awkward or embarrassed [b]	.296 (.587)	.756 (.385)	1.581 (.210)
Illusory invulnerability	Fined for speeding	.310 (.578)	1.236 (.267)	.907 (.342)
	Crash due to speeding	.204 (.652)	1.370 (.243)	7.363 (.007*)
	Fined for drink-driving	.142 (.706)	6.703 (.013*)	M: 1.870 (.064) F: 1.143 (.255) [d]
	Crash due to drink-driving	.813 (.368)	7.053 (.008*)	M: 3.006 (.003*) F: 1.520 (.130) [d]
	Injured or killed in a crash	1.498 (.222)	.119 (.731)	6.710 (.010*)
	Not be hospitalised [a]	.008 (.927)	6.008 (.015*)	1.540 (.216)
	Lung cancer	.266 (.607)	.311 (.578)	1.855 (.174)
	Skin cancer	.377 (.539)	.459 (.498)	.178 (.673)

Variable	Scale	Sample x Gender interaction	Gender main effect	Sample main effect
	Gambling debt	.645 (.423)	2.466 (.117)	2.779 (.097)
	Investment loss	1.063 (.303)	8.608 (.004*)	.969 (.326)
	Borrow money	.714 (.399)	4.350 (.038*)	.532 (.466)
	Be rejected	10.681 (.001*)	.002 (.964)	M: -.666 (.507) F: 3.933 (<.001**) [c]
	Be made to feel socially awkward or embarrassed	2.711 (.101)	2.184 (.141)	.135 (.714)
Behaviour frequency	RMQ speeding frequency [b]	.457 (.500)	.221 (.639)	.011 (.917)
	RMQ drink-driving frequency	.511 (.475)	3.033 (.083)	7.508 (.007**)
	Speeding average [b]	.051 (.821)	1.156 (.283)	1.459 (.228)
	Drink-driving average [b]	.363 (.547)	8.591 (.004*)	1.210 (.272)
	Illness average	2.318 (.129)	1.467 (.227)	4.787 (.030*)
	Financial average	1.305 (.254)	22.78 (<.001**)	.115 (.735)
	Social average	6.352 (.012*)	3.925 (.049*)	M: 2.514 (.013*) F: -.983 (.327) [c]

[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 x gender interaction;

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

We expected that the student sample and the younger registry sample would not differ substantially, so that we could combine them for subsequent analysis. However, the number of differences observed between the two young driver samples for each variable exceeded that which could be expected by chance, so we did not combine them.

Generally, the young registry sample demonstrated risk-propensity and motives for positive attitudes toward risky driving behaviours (though not risk-perception), that are more consistent with risky driving than did the student sample. Nonetheless, many variables demonstrated a significant gender x sample interaction, such that the sample difference was observed for only one gender.

Compared to the student sample, the younger registry sample demonstrated greater propensity for health risks and social risks (females only), as well as greater relative risk propensity.

Compared to the student sample, the younger registry sample reported stronger motives for speeding in relation to social influence and irrelevance of risk (males only). Regarding sensation-seeking, when tests were conducted separately for males and females, due to both gender and sample effects being significant, neither gender demonstrated a sample effect (although for males p=.063, and for females p=.062).

Compared to the student sample, the younger registry sample reported stronger motives for drink-driving in relation to experience-seeking (males only) and underestimation of risk (males only). However, for females only, the student sample reported stronger motives than the younger registry sample in relation to confidence/familiarity, underestimation of risk, and irrelevance of risk (for experience-seeking p=.086).

The younger registry sample perceived higher risks of outcomes related to risky driving, as well as other risky behaviours. Compared to the student sample, the younger registry sample perceived higher risks of crashing due to speeding, crashing due to drink-driving, or being injured or killed in a crash. The younger registry sample also perceived higher risks of having gambling debts, and being rejected by a potential partner (females only).

Illusory invulnerability was lower amongst the younger registry sample, compared to the student sample. The younger registry sample demonstrated lower illusory invulnerability than the student sample regarding crashing due to speeding, crashing due to drink-driving (males only), and being injured or killed in a crash. 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 a sample effect (although for males p=.064). The younger registry sample also demonstrated lower illusory invulnerability than the student sample regarding being rejected by a potential partner (for females only).

The younger registry sample reported drink-driving more frequently than the student sample, as well as more frequently engaging in behaviours posing health risks. For males only, the student sample reported more frequently engaging in socially risky behaviours, compared to the younger registry sample.

The student and younger registry samples did not differ significantly in terms of speeding fines for either males (p=.520) or females (p=.721). Similarly, no effect of sample on crashes was observed for either males (p=.122) or females (p=.898).

Within the younger samples there was considerable evidence that males demonstrate risk-propensity, motives for positive attitudes toward risky driving behaviours, and risk-perception, that are more consistent with risky driving than do females. Specifically, males reported stronger motives for speeding than females in relation to sensation-seeking, underestimation of risk, and irrelevance of risk. Males reported stronger motives for drink-driving in relation to experience-seeking, prestige-seeking, confidence/familiarity, underestimation of risk, and irrelevance of risk. Illusory invulnerability regarding being fined for drink-driving, and crashing due to drink-driving was lower for males than females. Males reported drink-driving more frequently than females. In addition, males reported more frequently engaging in financially and socially risky behaviours, as well as lower illusory invulnerability regarding investment losses and borrowing money (though higher illusory invulnerability regarding being hospitalized), and greater perceived risks of investment losses (though lower perceived risks of lung cancer and skin cancer).

Association of risk aversion, risk-propensity, motives for positive attitudes toward speeding, and risk-perception, with self-reported speeding, penalties and crashes

The association of risk aversion, risk-propensity, motives for positive attitudes toward speeding, and risk-perception, with self-reported speeding, fines for speeding and crashes was assessed in each sample, for males and females separately. Measures of risk aversion and propensity were the two scales from the ROQ, and accident risk propensity and relative risk propensity from the RPQ. Sub-scales and items from the RMQ were the measures of motives for speeding. Measures of perceived risk and illusory invulnerability were items specifically relevant to speeding [see Table 2 in methods]. Multiplicative indices of perceived risk (for speeding) by risk aversion, general risk propensity, accident risk propensity, and excitement and sensation-seeking motives for speeding

were also considered to assess moderation effects. Pearson's correlations were employed for associations between continuous variables, with social desirability scores entered as a covariate where appropriate (based on the social desirability analysis). For associations with the (dichotomized) speed fine and crash variables, these variables were employed as fixed factors in Univariate General Linear Models.

For the student sample, results should be interpreted in the context of there being more females than males (so more significant relationships could be expected for females), and there being relatively few participants who reported ever having been fined for speeding (so relevant analyses may be unreliable).

Amongst males, speeding behaviour demonstrated no correlations with any directly relevant measure of risk propensity, but positive correlations with 4 of 8 motivations for speeding: specifically those relating to experience-seeking, sensation-seeking, confidence/familiarity, and irrelevance of risk. Positive correlations were also demonstrated for perceived risk of being fined for speeding, crashing due to speeding, and being injured or killed in a crash, whereas correlations for illusory invulnerability regarding the first two of these outcomes were negative. Associations between speeding and all five multiplicative indices were positive, but none remained significant when mathematically dependent significant predictors were entered first in linear regression equations.

Table 11: Associations of a) RMQ speeding frequency [b]; b) speeding [b], c) fines due to speeding, and d) crashes, with potential predictors, in the student sample, for males and females separately. * p<.05; ** p<.001

Variable	Scale	Males				Females			
		a n=49	b n=51	c 8 vs 48	d 15 vs 40	a n=120	b n=127	c 9 vs 122-3	d 36 vs 94-5
Risk propensity	ROQ Risk aversion	-.228 (.107)	.025 (.860)	.525 (.472)	1.320 (.256)	-.268 (.003*)	-.169 (.056)	.003 (.954)	2.666 (.105)
	ROQ Risk propensity	.056 (.696)	.027 (.848)	1.559 (.217)	2.382 (.129)	-.018 (.847)	.122 (.167)	.055 (.815)	.055 (.815)
	RPQ Accident risk propensity	-.017 (.903)	.158 (.259)	2.908 (.094)	.064 (.801)	.187 (.039*)	.123 (.163)	4.709 (.032*)	.059 (.808)
	RPQ Relative risk propensity	.167 (.243)	.130 (.354)	1.630 (.207)	5.000 (.030*)	.210 (.020*)	.284 (.001*)	1.198 (.276)	.665 (.416)
Risk motivation: Speeding RMQ:	Experience-seeking	.133 (.353)	.323 (.018*)	.002 (.964)	.796 (.376)	-.120 (.189)	.228 (.009*)	.755 (.387)	.010 (.919)
	Excitement	.171 (.231)	.196 (.160)	.012 (.914)	.000 (.984)	.003 (.974)	.278 (.001*)	2.262 (.135)	.412 (.522)
	Sensation-seeking	.166 (.243)	.303 (.027*)	.184 (.669)	.059 (.809)	.024 (.795)	.268 (.002*)	.020 (.887)	.296 (.587)
	Prestige-seeking	-.019 (.892)	.156 (.264)	1.439 (.235)	4.334 (.042*)	-.248 (.006*)	.053 (.553)	.271 (.604)	.752 (.387)
	Social influence	-.029 (.839)	.188 (.178)	2.515 (.119)	2.111 (.152)	-.307 (.001*)	.021 (.817)	.168 (.682)	.817 (.368)
	Confidence & familiarity	.578 (<.001**)	.462 (<.001**)	.073 (.788)	1.181 (.282)	.228 (.011*)	.423 (<.001**)	2.955 (.088)	8.158 (.005*)
	Underestimation of risk	.243 (.086)	.175 (.210)	.139 (.711)	.035 (.852)	.278 (.002*)	.287 (.001*)	.010 (.919)	8.248 (.005*)
	Irrelevance of risk	.210 (.138)	.296 (.031*)	1.334 (.253)	.236 (.629)	-.081 (.373)	.084 (.344)	6.296 (.013*)	2.952 (.088)
Perceived risk	Fined for speeding [b]	.801 (<.001**)	.614 (<.001**)	8.491 (.005*)	5.978 (.018*)	.538 (<.001**)	.491 (<.001**)	13.465 (<.001**)	7.724 (.006*)
	Crash due to speeding [b]	.596 (<.001**)	.409 (.002**)	.175 (.677)	.862 (.357)	.435 (<.001**)	.417 (<.001**)	14.142 (<.001**)	12.167 (.001*)

	Injured or killed in a crash	.308 (.028*)	.428 (.001*)	.368 (.546)	1.430 (.237)	.253 (.005*)	.173 (.050)	6.907 (.010*)	4.971 (.028*)
	Not be hospitalised [a]	.015 (.919)	.138 (.323)	.119 (.731)	.764 (.386)	.025 (.785)	.011 (.902)	.880 (.350)	.526 (.470)
Illusory invulnerability	Fined for speeding	-.657 (<.001**)	-.558 (<.001**)	5.721 (.020*)	10.542 (.002*)	-.320 (<.001**)	-.297 (.001*)	6.757 (.010*)	5.807 (.017*)
	Crash due to speeding	-.282 (.045*)	-.279 (.043*)	.706 (.404)	.836 (.365)	-.168 (.064)	-.193 (.028*)	4.479 (.036*)	8.515 (.004*)
	Injured or killed in a crash	-.231 (.103)	-.291 (.035*)	.158 (.692)	2.517 (.119)	-.044 (.631)	.051 (.563)	2.805 (.096)	2.575 (.111)
	Not be hospitalised [a]	.071 (.618)	-.045 (.749)	.008 (.931)	.259 (.613)	-.049 (.593)	-.136 (.125)	1.927 (.167)	.403 (.527)
Multiplicative indices: x speeding perceived risk	ROQ Risk aversion [b]	.676 (<.001**)	.551 (<.001**)	2.062 (.157)	1.504 (.226)	.404 (<.001**)	.409 (<.001**)	15.844 (<.001**)	5.455 (.021*)
	ROQ Risk propensity [b]	.720 (<.001**)	.561 (<.001**)	5.403 (.024*)	5.515 (.023*)	.491 (<.001**)	.514 (<.001**)	12.746 (.001*)	9.737 (.002*)
	RPQ Accident risk propensity [b]	.602 (<.001**)	.557 (<.001**)	9.435 (.003*)	1.943 (.169)	.440 (<.001**)	.353 (<.001**)	23.960 (<.001**)	2.740 (.100)
	RMQ Excitement [b]	.617 (<.001**)	.481 (<.001**)	2.059 (.157)	1.160 (.286)	.335 (<.001**)	.476 (<.001**)	9.362 (.003*)	7.212 (.008*)
	RMQ Sensation-seeking [b]	.600 (<.001**)	.559 (<.001**)	1.118 (.295)	.929 (.339)	.391 (<.001**)	.509 (<.001**)	3.643 (.059)	5.471 (.021*)

[a] This item was reverse-scored;

[b] Tests included social desirability as a covariate.

Amongst females, speeding behaviour correlated negatively with risk aversion and positively with accident risk propensity, and with relative risk propensity. Positive correlations were also observed for 5 of 8 motivations for speeding. Interestingly, negative correlations were observed with prestige-seeking and social influence motives for speeding. Speeding correlated positively with perceived risk of being fined for speeding, crashing due to speeding, and being injured or killed in a crash, and negatively with illusory invulnerability regarding the first two of these outcomes. Associations between speeding and all five multiplicative indices were positive, but only those with multiplicative indices involving general risk propensity and sensation-seeking motives remained significant (p=.031 and p=.013, respectively) when mathematically dependent significant predictors were entered first in linear regression equations.

For males, having been fined (at least once) for speeding was associated with higher perceived risk of being fined for speeding [5.13 (s.d.=1.13) vs 3.40 (s.d.=1.63)], and lower illusory invulnerability regarding being fined for speeding [0.38 (s.d.=1.77) vs 1.63 (s.d.=1.30)]. Having been fined for speeding was also associated with higher scores for the multiplicative indices involving general risk propensity and accident risk propensity, but neither association remained significant when mathematically dependent significant predictors were entered first in logistic regression equations.

For females, having been fined for speeding was associated with higher accident risk propensity [6.78 (s.d.=1.99) vs 4.77 (s.d.=2.72)], higher irrelevance of risk motivations for speeding [1.78 (s.d.=0.69) vs 1.29 (s.d.=0.56)], higher perceived risk of being fined for speeding [5.78 (s.d.=1.56) vs 3.52 (s.d.=1.81)], crashing due to speeding [4.67 (s.d.=1.50) vs 2.77 (s.d.=1.48)] and being injured or killed in a crash [3.44 (s.d.=1.42) vs 2.28 (s.d.=1.27)], and lower illusory invulnerability regarding being fined for speeding [0.00 (s.d.=1.41) vs 1.70 (s.d.=1.92)] and crashing due to speeding [1.00 (s.d.=1.12) vs 2.30 (s.d.=1.81)]. Having been fined for speeding was associated with higher scores for the multiplicative indices involving risk aversion, general risk propensity, accident risk propensity and excitement motives for speeding, but none of these associations remained significant when mathematically dependent significant predictors were entered first in logistic regression equations.

For males, having had at least one crash was associated with higher relative risk propensity [7.00 (s.d.=1.77) vs 5.73 (s.d.=1.92)] and perceived risk of being fined for speeding [4.53 (s.d.=1.46) vs 3.33 (s.d.=1.67)], and (oddly) with lower prestige-seeking motive for speeding [1.33 (s.d.=0.59) vs 1.95 (s.d.=1.08)] and lower illusory invulnerability regarding being fined for speeding [0.53 (s.d.=1.41) vs 1.83 (s.d.=1.28)]. The observed association of having had at least one crash with a higher score for the multiplicative index involving general risk propensity remained significant (p=.033) when mathematically dependent significant predictors were entered first in logistic regression equations.

For females, having had at least one crash was associated with higher confidence/familiarity motives [2.63 (s.d.=1.10) vs 2.06 (s.d.=0.97)] and underestimation of risk motives [2.26 (s.d.=1.24) vs 1.71 (s.d.=0.85)] for speeding, as well as higher perceived risk of being fined for speeding [4.44 (s.d.=2.08) vs 3.41 (s.d.=1.72)], crashing due to speeding [3.67 (s.d.=1.67) vs 2.62 (s.d.=1.41)], and being injured or killed in a crash [2.78 (s.d.=1.29) vs 2.21 (s.d.=1.29)]. Having had at least one crash was associated with lower illusory invulnerability regarding being fined for speeding [0.92 (s.d.=1.52) vs 1.81 (s.d.=2.02)] and crashing due to speeding [1.47 (s.d.=1.50) vs 2.47 (s.d.=1.84)]. None of the significant associations of having had at least one crash with higher scores for the multiplicative indices involving risk aversion, general risk propensity, and excitement and sensation-seeking motives for speeding, remained significant when mathematically dependent significant predictors were entered first in logistic regression equations.

Table 12: Correlations of a) RMQ speeding frequency; b) speeding, c) fines due to speeding, and d) crashes, with potential predictors, in the younger registry sample, for males and females separately. * p<.05; ** p<.001

Variable	Scale	Males a n=47-8	Males b n=54	Males c 10 vs 43	Males d 8 vs 45	Females a n=34	Females b n=34-5	Females c 3 vs 31-2	Females d 10 vs 24-5
Risk propensity	ROQ Risk aversion	-.186 (.206)	-.253 (.065)	.000 (.999)	.502 (.482)	-.066 (.711)	-.071 (.685)	8.457 (.006*)	.165 (.687)
	ROQ Risk propensity	.110 (.459)	.027 (.848)	.196 (.659)	.259 (.613)	.181 (.307)	.264 (.125)	3.549 (.068)	.313 (.580)
	RPQ Accident risk propensity	.552 (<.001**)	.272 (.047*)	.649 (.424)	4.320 (.045*)	.166 (.349)	.110 (.529)	.862 (.360)	3.357 (.076)
	RPQ Relative risk propensity	.247 (.091)	.052 (.711)	.329 (.569)	.248 (.620)	.372 (.030*)	.407 (.015*)	.101 (.752)	1.051 (.313)
Risk motivation: Speeding RMQ	Experience-seeking	.130 (.380)	.097 (.485)	.004 (.952)	.001 (.974)	-.088 (.620)	.138 (.430)	1.576 (.218)	.028 (.868)
	Excitement	.220 (.133)	.302 (.026*)	.001 (.979)	.017 (.898)	.048 (.787)	.148 (.396)	1.791 (.190)	.102 (.751)
	Sensation-seeking	.177 (.228)	.187 (.175)	.162 (.689)	.274 (.603)	.084 (.637)	.229 (.186)	2.578 (.118)	.041 (.841)
	Prestige-seeking	.225 (.124)	.354 (.009*)	.214 (.645)	2.010 (.162)	.019 (.916)	.257 (.135)	1.646 (.209)	.078 (.782)
	Social influence	.254 (.081)	.221 (.108)	.351 (.556)	.083 (.774)	-.046 (.797)	.138 (.431)	2.753 (.107)	.622 (.436)
	Confidence & familiarity	.384 (.007*)	.249 (.070)	.365 (.549)	1.183 (.282)	.409 (.016*)	.386 (.022*)	1.185 (.284)	2.994 (.093)
	Underestimation of risk	.278 (.056)	.249 (.069)	.016 (.899)	.332 (.567)	.458 (.006*)	.426 (.011*)	1.451 (.237)	.019 (.891)
	Irrelevance of risk	.249 (.087)	.300 (.027*)	.116 (.735)	.209 (.650)	.317 (.067)	.175 (.316)	.137 (.714)	.457 (.504)
	"let off steam"	.315 (.029*)	.168 (.225)	1.778 (.188)	.468 (.497)	.354 (.040*)	.046 (.793)	.094 (.761)	6.081 (.019*)
	"get somewhere quicker"	.433 (.002*)	.396 (.003*)	.001 (.978)	.001 (.981)	.227 (.197)	.080 (.650)	2.492 (.124)	.639 (.430)
Perceived risk	Fined for speeding	.624 (<.001**)	.572 (<.001**)	1.965 (.167)	1.713 (.196)	.763 (<.001**)	.683 (<.001**)	1.886 (.179)	9.892 (.004*)

	Crash due to speeding	.156 (.289)	.139 (.316)	.045 (.833)	.873 (.355)	.654 (<.001**)	.690 (<.001**)	.015 (.903)	5.195 (.029*)
	Injured or killed in a crash	.097 (.512)	.249 (.069)	.003 (.958)	.263 (.610)	.527 (.002*)	.474 (.005*)	.449 (.508)	3.319 (.078)
	Not be hospitalised[a]	-.169 (.250)	-.208 (.132)	.269 (.606)	2.448 (.124)	-.232 (.186)	-.067 (.701)	.005 (.947)	.397 (.533)
Illusory invulnerability	Fined for speeding	-.135 (.360)	-.301 (.027*)	1.996 (.164)	1.715 (.196)	-.493 (.003*)	-.464 (.005*)	.695 (.411)	.657 (.424)
	Crash due to speeding	.188 (.201)	.207 (.132)	.283 (.597)	.067 (.796)	-.214 (.225)	-.339 (.047*)	.108 (.744)	.467 (.499)
	Injured or killed in a crash	.091 (.538)	-.052 (.708)	.093 (.762)	.011 (.916)	-.121 (.503)	-.114 (.520)	.010 (.920)	.024 (.877)
	Not be hospitalised[a]	-.221 (.136)	.007 (.960)	.178 (.675)	.483 (.490)	-.067 (.707)	-.224 (.197)	.646 (.427)	2.697 (.110)
Multiplicative indices: x speeding perceived risk	ROQ Risk aversion	.407 (.004*)	.292 (.032*)	.949 (.335)	1.393 (.243)	.619 (<.001**)	.583 (<.001**)	.389 (.537)	3.251 (.081)
	ROQ Risk propensity	.491 (<.001**)	.415 (.002*)	.715 (.402)	1.011 (.319)	.694 (<.001**)	.727 (<.001**)	.006 (.941)	7.485 (.010*)
	RPQ Accident risk propensity	.641 (<.001**)	.465 (<.001**)	.531 (.469)	5.561 (.021*)	.502 (.002*)	.493 (.003*)	1.899 (.177)	7.758 (.009*)
	RMQ Excitement	.354 (.014*)	.410 (.002*)	.089 (.766)	.855 (.359)	.658 (<.001**)	.704 (<.001**)	.147 (.704)	5.235 (.029*)
	RMQ Sensation-seeking	.326 (.024*)	.326 (.016*)	.271 (.605)	.187 (.668)	.577 (<.001**)	.657 (<.001**)	.622 (.436)	5.247 (.029*)

[a] This item was reverse-scored.

For the younger registry sample, results should be interpreted in the context of there being relatively few participants who reported ever having been fined for speeding, or ever having crashed (so relevant analyses may be unreliable). Analyses of females having been fined are particularly likely to be unreliable.

Amongst males, speeding behaviour demonstrated positive correlations with accident risk propensity, and with 6 of 10 motivations for speeding: specifically those relating to excitement, prestige-seeking, confidence/familiarity, irrelevance of risk, "letting off steam" and "getting somewhere". Speeding correlated positively with perceived risk of being fined for speeding, and negatively with illusory invulnerability regarding being fined for speeding. Associations between speeding and all five multiplicative indices were positive, but none remained significant when mathematically dependent significant predictors were entered first in linear regression equations.

Amongst females, speeding behaviour correlated positively with relative risk propensity, and with 3 of 10 motivations for speeding; specifically, confidence/familiarity, underestimation of risk, and "letting off steam". Speeding correlated positively with perceived risk of being fined for speeding, crashing due to speeding, and being injured or killed in a crash, and negatively with illusory invulnerability regarding the first two of these outcomes. Associations between speeding and all five multiplicative indices were positive, but only those with multiplicative indices involving

excitement and sensation-seeking motives remained significant (p=.014 and p=.021, respectively) when mathematically dependent significant predictors were entered first in linear regression equations.

For males, having been fined (at least once) for speeding demonstrated no significant correlation with risk-related variables.

For females, having been fined for speeding was associated only with lower risk aversion [2.89 (s.d.=0.38) vs 4.30 (s.d.=0.82)].

For males, having had at least one crash was associated with higher accident risk propensity [7.63 (s.d.=1.77) vs 5.76 (s.d.=2.45)], and with a higher score for the multiplicative index involving accident risk propensity- which did not remain significant when mathematically dependent significant predictors were entered first in logistic regression equations (p=.403).

For females, having had at least one crash was associated with a higher motive to speed to "let off steam" [2.90 (s.d.=1.52) vs 1.80 (s.d.=1.04)], as well as higher perceived risk of being fined for speeding [5.00 (s.d.=1.49) vs 3.08 (s.d.=1.68)] and crashing due to speeding [4.10 (s.d.=1.85) vs 2.88 (s.d.=1.24)]. None of the significant associations of having had at least one crash with higher scores for the multiplicative indices involving general risk propensity, accident risk propensity, and excitement and sensation-seeking motives for speeding, remained significant when mathematically dependent significant predictors were entered first in logistic regression equations.

Table 13: Correlations of a) RMQ speeding frequency; b) speeding, c) fines due to speeding, and d) crashes, with potential predictors, in the older registry sample, for males and females separately. * p<.05; ** p<.001

Variable	Scale	Males				Females			
		a n=46-9	b n=47-50	c 8 vs 42	d 4 vs 46	a n=53-7	b n=55-60	c 8 vs 50-2	d 8 vs 50-2
Risk propensity	ROQ Risk aversion	-.428 (.002*)	-.524 (<.001**)	.247 (.621)	.567 (.455)	-.201 (.133)	-.170 (.194)	8.774 (.004*)	.035 (.851)
	ROQ Risk propensity	.025 (.867)	-.007 (.960)	1.836 (.182)	2.089 (.155)	.191 (.154)	.100 (.446)	.938 (.337)	3.210 (.078)
	RPQ Accident risk propensity	.257 (.075)	.182 (.206)	.547 (.463)	.102 (.751)	.297 (.025*)	.081 (.536)	.444 (.508)	1.654 (.203)
	RPQ Relative risk propensity [b]	.167 (.256)	.127 (.384)	.238 (.628)	.526 (.472)	.340 (.011)	-.067 (.622)	2.667 (.108)	.197 (.659)
Risk motivation:	Experience-seeking	-.320 (.025*)	-.251 (.078)	2.019 (.162)	2.681 (.108)	-.069 (.610)	.125 (.339)	1.150 (.288)	.003 (.957)
Speeding RMQ	Excitement	-.132 (.367)	-.059 (.684)	1.645 (.206)	1.807 (.185)	.138 (.308)	.195 (.136)	2.673 (.107)	.086 (.771)
	Sensation-seeking	-.125 (.391)	-.149 (.301)	.730 (.397)	1.573 (.216)	.101 (.457)	.122 (.353)	1.204 (.277)	.016 (.899)

Variable	Scale	Males				Females			
		a n=46-9	b n=47-50	c 8 vs 42	d 4 vs 46	a n=53-7	b n=55-60	c 8 vs 50-2	d 8 vs 50-2
	Prestige-seeking	-.195 (.179)	-.230 (.108)	1.756 (.191)	1.548 (.219)	.367 (.005*)	.078 (.554)	.501 (.482)	.133 (.717)
	Social influence	-.161 (.269)	-.205 (.154)	1.142 (.291)	2.812 (.100)	.453 (<.001**)	.311 (.016*)	2.519 (.118)	.162 (.689)
	Confidence & familiarity	.176 (.226)	.014 (.925)	.133 (.717)	.658 (.421)	.492 (<.001**)	.414 (.001*)	2.230 (.141)	.268 (.607)
	Underestimation of risk	.060 (.681)	.016 (.911)	.854 (.360)	.779 (.382)	.264 (.047*)	.233 (.074)	1.367 (.247)	.008 (.929)
	Irrelevance of risk	-.166 (.254)	-.081 (.575)	.833 (.366)	.679 (.414)	.370 (.005*)	.144 (.274)	.161 (.690)	1.694 (.198)
	"let off steam"	-.045 (.758)	.039 (.788)	.066 (.798)	2.204 (.144)	-.144 (.287)	.043 (.746)	.023 (.880)	6.503 (.013*)
	"get somewhere quicker"	.215 (.143)	.416 (.003*)	2.224 (.142)	.055 (.815)	.241 (.076)	.235 (.079)	.665 (.418)	.985 (.325)
Perceived risk	Fined for speeding [b]	.434 (.002*)	.539 (<.001**)	.016 (.900)	.130 (.720)	.362 (.007*)	.386 (.003*)	9.981 (.003*)	8.048 (.006*)
	Crash due to speeding [b]	.378 (.008*)	.274 (.057)	.071 (.791)	.362 (.550)	.328 (.014*)	.488 (<.001**)	.840 (.363)	6.603 (.013*)
	Injured or killed in a crash [b]	.065 (.659)	-.007 (.960)	.085 (.771)	.065 (.800)	-.100 (.470)	-.136 (.312)	.066 (.798)	5.815 (.019*)
	Not be hospitalised [a b]	-.249 (.088)	-.184 (.207)	2.236 (.142)	2.401 (.128)	.028 (.842)	-.095 (.484)	6.050 (.017*)	.386 (.537)
Illusory invulnerability	Fined for speeding	-.186 (.202)	-.341 (.015*)	.378 (.541)	.374 (.544)	-.325 (.014*)	-.103 (.434)	.679 (.413)	2.434 (.124)
	Crash due to speeding	-.141 (.336)	-.094 (.516)	.257 (.615)	.895 (.349)	-.006 (.967)	-.038 (.744)	.644 (.426)	1.594 (.212)
	Injured or killed in a crash	.083 (.571)	.052 (.719)	4.148 (.047*)	3.108 (.084)	.363 (.005*)	.222 (.088)	.163 (.688)	2.403 (.127)

Variable	Scale	Males				Females			
		a n=46-9	b n=47-50	c 8 vs 42	d 4 vs 46	a n=53-7	b n=55-60	c 8 vs 50-2	d 8 vs 50-2
	Not be hospitalised [a]	.157 (.280)	.194 (.178)	1.509 (.225)	.346 (.559)	.070 (.606)	.006 (.967)	8.394 (.005*)	.533 (.468)
Multiplicative indices:	ROQ Risk aversion [b]	.281 (.053)	.190 (.191)	.000 (.998)	.019 (.892)	.231 (.087)	.351 (.006*)	.427 (.516)	10.341 (.002*)
x speeding perceived risk	ROQ Risk propensity [b]	.319 (.027*)	.333 (.020*)	.692 (.410)	.275 (.602)	.392 (.003*)	.403 (.002*)	2.315 (.134)	11.501 (.001*)
	RPQ Accident risk propensity [b]	.451 (.001*)	.453 (.001*)	.192 (.663)	.881 (.353)	.398 (.002*)	.272 (.037*)	.117 (.733)	3.202 (.079)
	RMQ Excitement [b]	.090 (.543)	.129 (.278)	.392 (.534)	.156 (.695)	.381 (.004*)	.474 (<.001**)	10.102 (.002*)	4.816 (.032*)
	RMQ Sensation-seeking [b]	.070 (.638)	.057 (.698)	.161 (.690)	.144 (.706)	.365 (.006*)	.431 (.001*)	5.990 (.017*)	3.697 (.060)

[a] This item was reverse-scored;

[b] Tests included social desirability as a covariate.

For the older registry sample, results should be interpreted in the context of there being relatively few participants who reported ever having been fined for speeding, or ever having crashed (so relevant analyses may be unreliable). Analyses of males having crashed are particularly likely to be unreliable.

Amongst males, speeding behaviour demonstrated a negative correlation with risk aversion, and (oddly) with experience-seeking motivations for speeding, but a positive correlation with a motive to speed to "get somewhere". Speeding correlated positively with perceived risk of being fined for speeding and crashing due to speeding, and negatively with illusory invulnerability regarding being fined for speeding. Positive associations were observed between speeding and multiplicative indices involving general risk propensity and accident risk propensity, but neither association remained significant when mathematically dependent significant predictors were entered first in linear regression equations.

Amongst females, speeding behaviour correlated positively with accident risk propensity, and with 5 of 10 motivations for speeding; specifically, prestige-seeking, social influence, confidence/familiarity, underestimation of risk, and irrelevance of risk. Speeding correlated positively with perceived risk of being fined for speeding and crashing due to speeding, and negatively with illusory invulnerability regarding being fined for speeding. Oddly, a positive correlation was observed between speeding and illusory invulnerability regarding being injured or killed in a crash. Associations between speeding and all five multiplicative indices were positive,

but none remained significant when mathematically dependent significant predictors were entered first in linear regression equations.

For males, having been fined (at least once) for speeding was associated only with lower illusory invulnerability regarding being injured or killed in a crash [0.25 (s.d.=0.89) vs 1.26 (s.d.=1.34)].

For females, having been fined for speeding was associated with lower risk aversion [3.47 (s.d.=0.43) vs 4.40 (s.d.=0.87)] and higher perceived risk of being fined for speeding [4.38(s.d.=1.51) vs 2.63 (s.d.=1.37)]. Oddly, speeding was associated with lower perceived risk of being hospitalized [2.63 (s.d.=1.69) vs 4.32 (s.d.=1.67)], and higher illusory invulnerability regarding being hospitalized [1.63 (s.d.=1.19) vs -0.16 (s.d.=1.67)]. Observed associations of having been fined for speeding with higher scores for the multiplicative indices involving excitement and sensation-seeking motives for speeding did not remain significant when mathematically dependent significant predictors were entered first in logistic regression equations.

For males, having had at least one crash demonstrated no significant correlation with risk-related variables.

For females, having had at least one crash was associated with higher motivation to speed to "let off steam" [2.50 (s.d.=1.69) vs 1.58 (s.d.=0.80)], and higher perceived risk of being fined for speeding [4.13 (s.d.=1.13) vs 2.67 (s.d.=1.47)], crashing due to speeding [2.88 (s.d.=1.13) vs 1.98 (s.d.=1.00)], or being injured or killed in a crash [3.25 (s.d.=0.89) vs 2.15 (s.d.=1.26)]. Having had at least one crash was associated with higher scores for the multiplicative indices involving risk aversion, general risk propensity, and excitement motives for speeding, but none of these associations remained significant when mathematically dependent significant predictors were entered first in logistic regression equations.

Association of risk aversion, risk-propensity, motives for positive attitudes toward drink-driving, and risk-perception, with self-reported drink-driving and crashes

The association of risk aversion, risk-propensity, motives for positive attitudes toward drink-driving, and risk-perception, with self-reported drink-driving and crashes (too few participants had been fined for drink-driving for this variable to be analysed) was assessed in each sample, for males and females separately. Measures of risk aversion and propensity were the two scales from the ROQ, and accident risk propensity and relative risk propensity from the RPQ. Sub-scales and items from the RMQ were the measures of motives for speeding. Measures of perceived risk and illusory invulnerability were items specifically relevant to drink-driving [see Table 2 in methods]. Multiplicative indices of perceived risk (for drink-driving) by risk aversion, general risk propensity, accident risk propensity, and excitement and sensation-seeking motives for drink-driving were also considered to assess moderation effects. Pearson's correlations were employed for associations between continuous variables, with social desirability scores entered as a covariate where appropriate (based on the social desirability analysis). For associations with the (dichotomized) crash variable, this variable was employed as a fixed factor in Univariate General Linear Model.

Table 14: Correlations of a) RMQ drink-driving frequency; b) drink-driving [b], and c) crashes, with potential predictors, in the student sample, for males and females separately. * p<.05; ** p<.001

Variable	Scale	Males			Females		
		a	b	c	a	b	c
		n=49-51	n=51	15 vs 38-40	n=110-11	n=126	35-6 vs 94-5
Risk propensity	ROQ Risk aversion	-.177 (.214)	.102 (.468)	1.320 (.256)	-.009 (.928)	-.151 (.088)	2.666 (.105)
	ROQ Risk propensity	.170 (.232)	.031 (.828)	2.382 (.129)	-.004 (.968)	.153 (.084)	.055 (.815)
	RPQ Accident risk propensity	.275 (.051)	.091 (.517)	.064 (.801)	.043 (.656)	.126 (.158)	.059 (.808)
	RPQ Relative risk propensity	.217 (.125)	.052 (.712)	5.000 (.030*)	.122 (.203)	.250 (.004*)	.665 (.416)
Risk motivation: Drink-driving RMQ	Experience-seeking	-.002 (.990)	.192 (.169)	.472 (.495)	-.055 (.563)	-.007 (.936)	.254 (.615)
	Excitement	.077 (.590)	.149 (.285)	.963 (.331)	-.096 (.317)	.028 (.750)	1.474 (.227)
	Sensation-seeking	-.088 (.537)	.074 (.596)	.004 (.952)	-.084 (.382)	-.005 (.953)	1.481 (.226)
	Prestige-seeking	-.217 (.126)	-.113 (.419)	.669 (.417)	-.061 (.524)	.019 (.830)	.288 (.593)
	Social influence	-.204 (.151)	-.035 (.803)	.185 (.669)	-.075 (.437)	.039 (.660)	.094 (.760)
	Confidence & familiarity	.484 (<.001**)	.319 (.020*)	1.280 (.263)	.102 (.286)	.043 (.626)	.434 (.511)
	Underestimation of risk	-.037 (.799)	-.051 (.718)	3.833 (.056)	.024 (.804)	.074 (.408)	1.965 (.163)
	Irrelevance of risk	.277 (.049*)	.261 (.059)	.009 (.927)	-.026 (.783)	.014 (.877)	1.229 (.270)
Perceived risk	Fined for drink-driving	.598 (<.001**)	.543 (<.001**)	2.158 (.148)	.384 (<.001**)	.185 (.036*)	1.402 (.239)
	Crash due to drink-driving	.416 (.002*)	.459 (.001*)	.412 (.524)	.377 (<.001**)	.184 (.037*)	1.264 (.263)
	Injured or killed in a crash	.385 (.005*)	.215 (.123)	1.430 (.237)	.181 (.058)	.063 (.478)	4.971 (.028*)
	Not be hospitalised [a]	.037 (.799)	.175 (.211)	.764 (.386)	.037 (.701)	-.129 (.146)	.526 (.470)

		Males			Females		
Variable	**Scale**	**a**	**b**	**c**	**a**	**b**	**c**
		n=49-51	**n=51**	**15 vs 38-40**	**n=110-11**	**n=126**	**35-6 vs 94-5**
Illusory invulnerability	Fined for drink-driving	-.403 (.004*)	-.471 (<.001**)	1.404 (.241)	-.239 (.012*)	-.086 (.333)	1.486 (.225)
	Crash due to drink-driving	-.316 (.024*)	-.463 (<.001**)	.672 (.416)	-.200 (.036*)	-.061 (.493)	.431 (.513)
	Injured or killed in a crash	-.301 (.032*)	-.146 (.297)	2.517 (.119)	-.177 (.064)	-.031 (.727)	2.575 (.111)
	Not be hospitalised [a]	-.090 (.539)	-.030 (.833)	.259 (.613)	-.105 (.271)	-.023 (.794)	.403 (.527)
Multiplicative indices: x drink-driving perceived risk	ROQ Risk aversion	.425 (.002*)	.506 (<.001**)	.441 (.510)	.375 (<.001**)	.161 (.069)	.431 (.513)
	ROQ Risk propensity	.554 (<.001**)	.505 (<.001**)	1.803 (.185)	.355 (<.001**)	.208 (.019*)	1.611 (.207)
	RPQ Accident risk propensity	.652 (<.001**)	.512 (<.001**)	2.560 (.116)	.318 (.001*)	.191 (.031*)	.176 (.675)
	RMQ Excitement	.450 (.001*)	.425 (.001*)	.058 (.810)	.188 (.049*)	.120 (.178)	.403 (.527)
	RMQ Sensation-seeking	.419 (.002*)	.449 (.001*)	.287 (.594)	.184 (.054)	.137 (.122)	.567 (.453)

[a] This item was reverse-scored;

[b] Tests included social desirability as a covariate.

For the student sample, results should be interpreted in the context of there being more females than males (so more significant relationships could be expected for females).

Amongst males, drink-driving behaviour demonstrated no correlation with relevant measures of risk propensity, but 2 of 8 positive correlations with motives for drink-driving; specifically, those relating to confidence/familiarity and irrelevance of risk. Drink-driving correlated positively with perceived risk of being fined for drink-driving, crashing due to drink-driving, and being injured or killed in a crash, and negatively with illusory invulnerability regarding each of these outcomes. Associations with all five multiplicative indices were positive, but only that involving accident risk propensity remained significant when mathematically dependent significant predictors were entered first in linear regression equations.

Amongst females, drink-driving behaviour correlated positively with relative risk propensity, but with no motivations for drink-driving. Drink-driving correlated positively with perceived risk of being fined for drink-driving and crashing due to drink-driving, and negatively with illusory invulnerability regarding both of these outcomes. Drink-driving demonstrated positive associations with multiplicative indices involving risk aversion, general risk propensity, accident risk propensity,

and excitement motives for drink-driving, but only the latter remained significant when mathematically dependent significant predictors were entered first in linear regression equations.

For males, having had at least one crash was associated only with higher relative risk propensity [7.00 (s.d.=1.77) vs 5.73 (s.d.=1.92)] (as before).

For females, having had at least one crash was associated with higher perceived risk of being injured or killed in a crash [2.78 (s.d.=1.29) vs 2.21 (s.d.=1.29)] (as before).

Table 15: Correlations of a) RMQ drink-driving frequency; b) drink-driving, and c) crashes, with potential predictors, in the younger registry sample, for males and females separately. * p<.05; ** p<.001

Variable	Scale	Males			Females		
		a	b	c	a	b	c
		n=44-5	n=53-4	8 vs 44-5	n=31-2	n=34-5	10 vs 24-5
Risk propensity	ROQ Risk aversion	.097 (.527)	.068 (.623)	.502 (.482)	-.305 (.089)	-.433 (.009*)	.165 (.687)
	ROQ Risk propensity	.085 (.577)	-.092 (.507)	.259 (.613)	.129 (.482)	.121 (.488)	.313 (.580)
	RPQ Accident risk propensity	.010 (.951)	.149 (.284)	4.230 (.045*)	.103 (.574)	.040 (.818)	3.357 (.076)
	RPQ Relative risk propensity	.184 (.227)	.175 (.207)	.248 (.620)	.308 (.086)	.272 (.114)	1.051 (.313)
Risk motivation: Drink-driving RMQ	Experience-seeking	.556 (<.001**)	.587 (<.001**)	.091 (.764)	.511 (.003*)	-.068 (.697)	.064 (.802)
	Excitement	.425 (.004*)	.382 (.004**)	.000 (.985)	.437 (.012*)	.089 (.610)	.175 (.678)
	Sensation-seeking	.634 (<.001**)	.466 (<.001**)	.418 (.521)	.498 (.004*)	.081 (.643)	1.324 (.258)
	Prestige-seeking	.575 (<.001**)	.537 (<.001**)	.567 (.455)	.572 (.001*)	-.023 (.898)	.392 (.535)
	Social influence	.571 (<.001**)	.627 (<.001**)	.077 (.783)	.327 (.068)	.102 (.560)	.028 (.868)
	Confidence & familiarity	.615 (<.001**)	.576 (<.001**)	.305 (.583)	.653 (<.001**)	.303 (.077)	.082 (.777)
	Underestimation of risk	.414 (.005*)	.392 (.003*)	.194 (.662)	.518 (.002*)	.056 (.749)	1.418 (.242)
	Irrelevance of risk	.762 (<.001**)	.667 (<.001**)	.001 (.979)	.449 (.010*)	-.189 (.276)	.396 (.534)
	"let off steam"	.636 (<.001**)	.452 (.001*)	.161 (.690)	.359 (.044*)	-.111 (.524)	.058 (.811)

Variable	Scale	Males			Females		
		a n=44-5	**b** n=53-4	**c** 8 vs 44-5	**a** n=31-2	**b** n=34-5	**c** 10 vs 24-5
	"get somewhere quicker"	.168 (.269)	.411 (.002*)	1.821 (.183)	.292 (.105)	.358 (.035*)	1.021 (.320)
Perceived risk	Fined for drink-driving	.603 (<.001**)	.423 (.001*)	.901 (.347)	.625 (<.001**)	.410 (.015*)	2.357 (.134)
	Crash due to drink-driving	.744 (<.001**)	.501 (<.001**)	1.439 (.236)	.566 (.001*)	.441 (.008*)	2.949 (.095)
	Injured or killed in a crash	.350 (.019*)	.113 (.418)	.263 (.610)	.292 (.111)	.091 (.610)	3.319 (.078)
	Not be hospitalised [a]	-.085 (.578)	-.106 (.447)	2.448 (.124)	-.085 (.644)	-.246 (.155)	.397 (.533)
Illusory invulnerability	Fined for drink-driving	-.358 (.016*)	-.284 (.037*)	.109 (.743)	-.385 (.030*)	-.082 (.638)	.139 (.712)
	Crash due to drink-driving	-.454 (.002*)	-.243 (.076)	.484 (.490)	-.319 (.075)	-.050 (.774)	.199 (.659)
	Injured or killed in a crash	-.083 (.588)	.075 (.588)	.011 (.916)	-.110 (.557)	.172 (.332)	.024 (.877)
	Not be hospitalised [a]	-.177 (.251)	-.102 (.468)	.483 (.490)	.083 (.653)	.103 (.558)	2.697 (.110)
Multiplicative indices: x drink-driving perceived risk	ROQ Risk aversion	.712 (<.001**)	.469 (<.001**)	.440 (.510)	.486 (.005*)	.231 (.182)	.943 (.339)
	ROQ Risk propensity	.602 (<.001**)	.386 (.004*)	.230 (.633)	.572 (.001*)	.426 (.011*)	2.857 (.100)
	RPQ Accident risk propensity	.541 (<.001**)	.452 (.001*)	4.453 (.040*)	.652 (<.001**)	.486 (.003*)	3.603 (.066)
	RMQ Excitement	.737 (<.001**)	.538 (<.001**)	2.354 (.131)	.559 (.001*)	.309 (.071)	1.994 (.167)
	RMQ Sensation-seeking	.785 (<.001**)	.542 (<.001**)	3.302 (.075)	.641 (<.001**)	.322 (.059)	.837 (.367)

[a] This item was reverse-scored.

For the younger registry sample, results should be interpreted in the context of there being relatively few participants who reported ever having crashed (so relevant analyses may be unreliable).

Amongst males, drink-driving behaviour demonstrated no correlation with relevant measures of risk propensity, but 10 of 10 positive correlations with motives for drink-driving. Drink-driving correlated positively with perceived risk of being fined for drink-driving, crashing due to drink-

driving, and being injured or killed in a crash, and negatively with illusory invulnerability regarding the first two of these outcomes. Associations with all five multiplicative indices were positive, but only those involving excitement and sensation-seeking motives for drink-driving remained significant when mathematically dependent significant predictors were entered first in linear regression equations.

Amongst females, drink-driving behaviour correlated negatively with risk aversion, and positively with 9 of 10 motivations for drink-driving; specifically, all but social influence motives. Drink-driving correlated positively with perceived risk of being fined for drink-driving and crashing due to drink-driving, and negatively with illusory invulnerability regarding being fined for drink-driving. Associations with all five multiplicative indices were positive, but only that involving accident risk propensity remained significant when mathematically dependent significant predictors were entered first in linear regression equations.

For males, having had at least one crash was associated with higher accident risk propensity [7.73 (s.d.=1.77) vs 5.76 (s.d.=2.45)] (as before), and with a higher score on the multiplicative index involving accident risk propensity, which did not remain significant when accident risk propensity was entered first in a logistic regression.

For females, having had at least one crash was not significantly associated with any risk-relevant variables (as before).

Table 16: Correlations of a) RMQ drink-driving frequency; b) drink-driving, and c) crashes, with potential predictors, in the older registry sample, for males and females separately. * p<.05; ** p<.001

Variable	Scale	Males			Females		
		a n=45-8	b n=47-50	c 4 vs 46	a n=48-52	b n=55-60	c 8 vs 50-2
Risk propensity	ROQ Risk aversion	.073 (.624)	.013 (.927)	.567 (.455)	-.098 (.490)	-.099 (.453)	.035 (.851)
	ROQ Risk propensity	.265 (.069)	.330 (.019*)	2.089 (.155)	.218 (.120)	.089 (.500)	3.210 (.078)
	RPQ Accident risk propensity	.041 (.782)	.319 (.024*)	.102 (.751)	.415 (.002*)	.427 (.001*)	1.654 (.203)
	RPQ Relative risk propensity [b]	-.078 (.603)	.153 (.293)	.526 (.472)	.045 (.755)	.013 (.921)	.197 (.659)
Risk motivation: Drink-driving RMQ	Experience-seeking	.107 (.476)	-.148 (.310)	1.692 (.200)	-.010 (.943)	-.049 (.715)	.000 (.998)
	Excitement	.173 (.241)	-.193 (.179)	.578 (.451)	.122 (.391)	.188 (.151)	.990 (.324)
	Sensation-seeking	.115 (.437)	-.248 (.083)	.779 (.382)	-.058 (.684)	-.136 (.301)	.620 (.434)
	Prestige-seeking	.104 (.487)	-.089 (.542)	1.123 (.295)	-.057 (.693)	-.138 (.306)	.001 (.973)

Variable	Scale	Males			Females		
		a n=45-8	**b** n=47-50	**c** 4 vs 46	**a** n=48-52	**b** n=55-60	**c** 8 vs 50-2
	Social influence	-.031 (.832)	-.123 (.394)	1.242 (.271)	.099 (.485)	.036 (.783)	.001 (.969)
	Confidence & familiarity	.038 (.800)	-.123 (.394)	.881 (.353)	.206 (.143)	.221 (.090)	.799 (.375)
	Underestimation of risk	.278 (.056)	-.045 (.754)	1.965 (.167)	-.104 (.463)	-.031 (.816)	.001 (.980)
	Irrelevance of risk	.258 (.077)	-.071 (.624)	1.048 (.311)	.225 (.109)	.109 (.407)	.050 (.823)
	"let off steam"	.092 (.532)	-.117 (.418)	.737 (.395)	.067 (.635)	.045 (.731)	.784 (.380)
	"get somewhere quicker"	.098 (.508)	.029 (.841)	.585 (.448)	.240 (.086)	.379 (.003*)	.046 (.831)
Perceived risk	Fined for drink-driving	.371 (.009*)	.576 (<.001**)	.091 (.764)	.807 (<.001**)	.696 (<.001**)	1.038 (.313)
	Crash due to drink-driving	.276 (.058)	.379 (.007*)	.001 (.969)	.670 (<.001**)	.638 (<.001**)	.751 (.390)
	Injured or killed in a crash [b]	-.083 (.577)	-.008 (.959)	.065 (.800)	.006 (.965)	-.076 (.574)	5.815 (.019*)
	Not be hospitalised [a][b]	.168 (.258)	-.012 (.934)	2.401 (.128)	-.225 (.116)	-.237 (.076)	.386 (.537)
Illusory invulnerability	Fined for drink-driving	-.263 (.071)	-.181 (.209)	.952 (.334)	-.237 (.094)	-.060 (.651)	2.127 (.150)
	Crash due to drink-driving	-.186 (.205)	-.181 (.208)	4.387 (.042*)	-.451 (.001*)	-.215 (.102)	2.362 (.130)
	Injured or killed in a crash	.110 (.458)	.239 (.094)	3.108 (.084)	.033 (.818)	.172 (.189)	2.403 (.127)
	Not be hospitalised [a]	-.210 (.153)	-.147 (.308)	.346 (.559)	.119 (.406)	.158 (.235)	.533 (.468)
Multiplicative indices: x drink-driving perceived risk	ROQ Risk aversion	.267 (.067)	.446 (.001*)	.030 (.864)	.662 (<.001**)	.630 (<.001**)	.534 (.468)
	ROQ Risk propensity	.339 (.018*)	.509 (<.001**)	.007 (.932)	.753 (<.001**)	.686 (<.001**)	.118 (.732)

Variable	Scale	Males			Females		
		a n=45-8	b n=47-50	c 4 vs 46	a n=48-52	b n=55-60	c 8 vs 50-2
	RPQ Accident risk propensity	.281 (.053)	.562 (<.001**)	.391 (.535)	.773 (<.001**)	.758 (<.001**)	.011 (.918)
	RMQ Excitement	.374 (.009*)	.283 (.047*)	.113 (.738)	.603 (<.001**)	.663 (<.001**)	.090 (.765)
	RMQ Sensation-seeking	.348 (.015*)	.216 (.131)	.213 (.647)	.430 (.001*)	.239 (.066)	.027 (.870)

[a] This item was reverse-scored;

[b] Tests included social desirability as a covariate.

For the older registry sample, results should be interpreted in the context of there being relatively few participants who reported ever having crashed (so relevant analyses may be unreliable). Analyses of males having crashed are particularly likely to be unreliable.

Amongst males, drink-driving behaviour correlated positively with general risk propensity, accident risk propensity, and perceived risk of being fined for drink-driving and crashing due to drink-driving. Observed positive associations with all five multiplicative indices did not remain significant when mathematically dependent significant predictors were entered first in linear regression equations.

Amongst females, drink-driving behaviour correlated positively with accident risk propensity, motives to speed to "get somewhere", and perceived risk of being fined for drink driving and crashing due to drink driving. A significant negative correlation with illusory invulnerability regarding crashing due to drink-driving was also observed. Of the observed positive associations with all five multiplicative indices, only those involving risk aversion, accident risk propensity, and excitement motives for drink-driving remained significant when mathematically dependent significant predictors were entered first in linear regression equations.

For males, having had at least one crash was associated only with lower invulnerability regarding crashing due to drink-driving [0.25 (s.d.=1.26) vs 1.78 (s.d.=1.41)].

For females, having had at least one crash was associated with higher perceived risk of being injured or killed in a crash [3.25 (s.d.=0.89) vs 2.15 (s.d.=1.26)] (as before).

Comparison of younger drivers with low versus high risk propensity

A tertile split of each younger driver sample (separately) was employed to classify low and high scorers on accident risk propensity (the risk propensity measure which demonstrated the most consistent relationships with risky driving). Within each sample these groups were compared in terms of risky driving, having been fined for speeding and having crashed. Univariate General Linear Model was employed for risky driving, with dichotomised risk propensity and gender as fixed factors, and social desirability scores as covariate where appropriate (based on the social desirability analysis). Chi-squared was employed for the (dichotomized) speed fine and crash variables.

In the student sample no differences were observed between low and high scorers (all ps>.104). In the younger registry sample, high scorers reported being significantly more likely to speed (p=.003). Amongst males only, approximately one third of high scorers reported having had at least one crash, whereas no low scorers did, and this difference was significant (p=.012). No further significant differences were observed (all remaining ps>.072).

Association of risk aversion, risk-propensity, and risk-perception, with corresponding self-reported risky behaviour

Pearson's correlations were employed to test the associations of general risk aversion, general risk propensity, domain-specific risk propensity, relative risk propensity, and relevant perceived risk and illusory invulnerability items [see Table 2 in Methods], with self-reported risky behaviours in health, financial and social domains, in the two younger driver samples, for males and females separately [see Tables 17 and 18].

Table 17: Correlations of other self-reported risky behaviours with potential predictors, in the student sample, for males and females separately. * p<.05; ** p<.001

Variable	Scale	Males n=53-6			Females n=129-32		
		Illness	Financial	Social	Illness	Financial	Social
Risk propensity	ROQ Risk aversion	-.077 (.571)	-.245 (.068)	-.302 (.024*)	-.277 (.001*)	-.096 (.275)	-.148 (.090)
	ROQ Risk propensity	-.137 (.313)	.142 (.295)	.400 (.002*)	.192 (.027*)	.204 (.019*)	.241 (.005*)
	RPQ Illness risk propensity	.288 (.031*)	-	-	.285 (.001*)	-	-
	RPQ Financial risk propensity	-	.344 (.009*)	-	-	.436 (<.001**)	-
	RPQ Social risk propensity	-	-	.452 (<.001**)	-	-	.323 (<.001**)
	RPQ Relative risk propensity	-.005 (.971)	.122 (.371)	.406 (.002*)	.214 (.014*)	.163 (.061)	.332 (<.001**)
Perceived risk	Not be hospitalised [a]	-.102 (.464)	-	-	.005 (.955)	-	-
	Lung cancer	.529 (<.001**)	-	-	.273 (.002*)	-	-
	Skin cancer [b]	.107 (.437)	-	-	.279 (.001*)	-	-
	Gambling debt	-	.124 (.362)	-	-	.240 (.005*)	-

Variable	Scale	Males n=53-6			Females n=129-32		
		Illness	Financial	Social	Illness	Financial	Social
	Investment loss	-	.529 (<.001**)	-	-	.368 (<.001**)	-
	Borrow money	-	-.007 (.962)	-	-	.184 (.036*)	-
	Be rejected	-	-	.257 (.055)	-	-	.222 (.011*)
	Be made to feel socially awkward or embarrassed [b]	-	-	-.064 (.642)	-	-	-.154 (.079)
Illusory invulnerability	Not be hospitalised [a]	.076 (.584)	-	-	-.082 (.347)	-	-
	Lung cancer	-.295 (.027*)	-	-	.026 (.768)	-	-
	Skin cancer	.015 (.914)	-	-	-.074 (.400)	-	-
	Gambling debt	-	.042 (.760)	-	-	.047 (.596)	-
	Investment loss	-	-.317 (.019*)	-	-	-.159 (.068)	-
	Borrow money	-	.270 (.044*)	-	-	-.024 (.788)	-
	Be rejected	-	-	-.040 (.768)	-	-	-.002 (.979)
	Be made to feel socially awkward or embarrassed	-	-	.111 (.414)	-	-	.261 (.003*)

[a] This item was reverse-scored;

[b] Tests included social desirability as a covariate.

For the student sample, results should be interpreted in the context of there being more females than males (so more significant relationships could be expected for females).

Amongst males, behaviours posing risks to health (measured in terms of smoking and sunbathing), and behaviours posing financial risks (measured in terms of gambling and investment), each correlated with behaviour-specific risk propensity (positively), perceived risks (positively), and illusory invulnerability (negatively). Behaviours posing social risks (measured in terms of propositioning a potential partner and arguing with friends) correlated only with behaviour-specific risk propensity (positively), but also with general and relative risk propensity (positively), and with risk aversion (negatively).

Amongst females, behaviours posing risks to health (measured in terms of smoking and sunbathing) correlated with behaviour-specific risk propensity (positively) and perceived risks (positively), but also with general and relative risk propensity (positively), and with risk aversion (negatively). Behaviours posing financial risks (measured in terms of gambling and investment) correlated with behaviour-specific risk propensity (positively) and perceived risks (positively), but also with general risk propensity (positively). Behaviours posing social risks (measured in terms of propositioning a potential partner and arguing with friends) correlated with behaviour-specific risk propensity (positively), perceived risks (positively), and illusory invulnerability (negatively), as well as with general and relative risk propensity (positively).

Table 18: Correlations of other self-reported risky behaviours with potential predictors, in the younger registry sample, for males and females separately. * p<.05; ** p<.001

Variable	Scale	Males n=51-4			Females n=32-5		
		Illness	Financial	Social	Illness	Financial	Social
Risk propensity	ROQ Risk aversion	-.100 (.473)	-.133 (.336)	-.228 (.098)	-.517 (.001*)	-.145 (.407)	-.383 (.023*)
	ROQ Risk propensity	.197 (.153)	.024 (.863)	.242 (.078)	.125 (.473)	.106 (.543)	.309 (.071)
	RPQ Illness risk propensity	.056 (.685)	-	-	.534 (.001*)	-	-
	RPQ Financial risk propensity	-	.120 (.388)	-	-	.393 (.020*)	-
	RPQ Social risk propensity	-	-	.082 (.556)	-	-	-.336 (.049*)
	RPQ Relative risk propensity	-.002 (.990)	-.005 (.973)	-.024 (.865)	.514 (.002*)	-.066 (.0705)	.527 (.001*)
Perceived risk	Not be hospitalised [a]	.134 (.335)	-	-	-.192 (.270)	-	-
	Lung cancer	.556 (<.001**)	-	-	.360 (.034*)	-	-
	Skin cancer	.487 (<.001**)	-	-	.343 (.044*)	-	-
	Gambling debt	-	.657 (<.001**)	-	-	.252 (.143)	-
	Investment loss	-	.403 (.002*)	-	-	.608 (<.001**)	-
	Borrow money	-	.590 (<.001**)	-	-	-.052 (.766)	-
	Be rejected [b]	-	-	.638 (<.001**)	-	-	.372 (.030*)

Variable	Scale	Males n=51-4			Females n=32-5		
		Illness	Financial	Social	Illness	Financial	Social
	Be made to feel socially awkward or embarrassed [b]	-	-	.244 (.079)	-	-	.308 (.077)
Illusory invulnerability	Not be hospitalised [a]	-.132 (.345)	-	-	.160 (.360)	-	-
	Lung cancer	-.137 (.328)	-	-	-.203 (.243)	-	-
	Skin cancer	-.286 (.036*)	-	-	-.126 (.471)	-	-
	Gambling debt	-	-.302 (.026*)	-	-	-.098 (.575)	-
	Investment loss	-	-.170 (.220)	-	-	-.254 (.142)	-
	Borrow money	-	-.361 (.009*)	-	-	.118 (.499)	-
	Be rejected	-	-	-.293 (.031*)	-	-	-.211 (.223)
	Be made to feel socially awkward or embarrassed	-	-	-.035 (.802)	-	-	.052 (.766)

[a] This item was reverse-scored;

[b] Tests included social desirability as a covariate.

Amongst males, behaviours posing risks to health (measured in terms of smoking and sunbathing), behaviours posing financial risks (measured in terms of gambling and investment), and behaviours posing social risks (measured in terms of propositioning a potential partner and arguing with friends), each correlated with behaviour-specific perceived risks (positively) and illusory invulnerability (negatively). No correlation with risk propensity measures was observed.

Amongst females, behaviours posing health risks (measured in terms of smoking and sunbathing), financial risks (measured in terms of gambling and investment), and social risks (measured in terms of propositioning a potential partner and arguing with friends), each correlated with behaviour-specific risk propensity (positively) and perceived risks (positively). Behaviours posing health and social risks also correlated with risk aversion (negatively) and with relative risk propensity (positively).

Consideration of risky behaviour syndrome

Risky behaviour syndrome was considered in the two younger driver samples (for males and females separately) by assessing Pearson's correlations of self-reported risky driving behaviours with self-reported risky behaviours in health, financial and social domains [see Tables 19 and 20]. Correlations of propensity for taking risks in other domains with risky driving were also computed

Table 19: Correlations of self-reported a) speeding; and b) drink-driving, with variables relevant to other risky behaviours, in the student sample, for males and females separately. * p<.05; ** p<.001

Variable	Scale	Males n=53		Females n=129	
		Speeding	Drink-driving	Speeding	Drink-driving
Risky behaviour	Illness	.197 (.149)	.328 (.014*)	.330 (<.001**)	.319 (<.001**)
	Financial	.154 (.263)	.085 (.539)	.143 (.104)	.207 (.018*)
	Social	.178 (.193)	.079 (.568)	.116 (.185)	.145 (.100)
Risk propensity	RPQ Illness risk propensity	.246 (.070)	.262 (.054)	.259 (.003*)	.138 (.116)
	RPQ Financial risk propensity	.339 (.011*)	.260 (.055)	.064 (.470)	.055 (.534)
	RPQ Social risk propensity	.124 (.369)	.043 (.754)	.088 (.316)	.087 (.324)

All tests included social desirability as a covariate

For the student sample, results should be interpreted in the context of there being more females than males (so more significant relationships could be expected for females).

For males, speeding correlated positively with financial risk propensity but no other propensity or risky behaviour measures. Drink-driving correlated positively with behaviours that pose health risks (measured in terms of smoking and sunbathing), but no other risky behaviour or risk propensity measures.

For females, speeding correlated positively with behaviours that pose health risks (measured in terms of smoking and sunbathing) and financial risks (measured in terms of gambling and investment) and with illness risk propensity, but no other propensity or risky behaviour measures. Drink-driving correlated with behaviours that pose health risks, but no risk propensity measures.

Table 20: Correlations of self-reported a) speeding; and b) drink-driving, with variables relevant to other risky behaviours, in the younger registry sample, for males and females separately. * p<.05; ** p<.001

Variable	Scale	Males n=54		Females n=35	
		Speeding	Drink-driving	Speeding	Drink-driving
Risky behaviour	Illness	.263 (.054)	.120 (.387)	.349 (.040*)	.471 (.004*)
	Financial	.396 (.003*)	.513 (<.001**)	.220 (.205)	.233 (.178)
	Social	.151 (.276)	.074 (.594)	.478 (.004*)	.503 (.002*)
Risk propensity	RPQ Illness risk propensity	.265 (.052)	.012 (.934)	.524 (.001*)	.302 (.078)
	RPQ Financial risk propensity	.205 (.137)	.188 (.173)	.229 (.185)	.095 (.585)
	RPQ Social risk propensity	-.131 (.344)	.012 (.932)	-.014 (.936)	-.475 (.004*)

For males, both speeding and drink-driving correlated positively with behaviours that pose financial risks (measured in terms of gambling and investment), but no other risky behaviour or risk propensity measures.

For females, both speeding and drink-driving correlated positively with behaviours that pose financial risks (measured in terms of gambling and investment) and behaviours that pose social risks (measured in terms of propositioning a potential partner and arguing with friends). In addition, speeding correlated positively with illness risk propensity, and drink-driving correlated positively social risk propensity.

2   DISCUSSION

Table 21 presents a summary of the results of the comparison between the older and younger registry samples (Comparison A), the comparison between the student and younger registry samples (Comparison B), and the comparison of males and females conducted within each of these comparisons.

Table 21: Summary of significant effects for comparison between older (OR) and younger (YR) registry samples (Comparison A), and between student (S) and younger driver registry (YR) samples (Comparison B), showing gender that demonstrated the effect where relevant[a] (M/F), and for the comparison between males and females (showing which comparison demonstrated the effect).

Variable	Scale	A: Younger vs older registry	B: Student vs younger registry	Males vs Females (within A and B)
Risk propensity	ROQ Risk aversion	OR>YR		
	ROQ Risk propensity			
	RPQ Accident risk propensity	YR>OR (F)		M>F (A,B)
	RPQ Illness risk propensity	YR>OR (F)	YR>S	
	RPQ Financial risk propensity			M>F (A,B)
	RPQ Social risk propensity	YR>OR (F)	YR>S (F)	
	RPQ Relative risk propensity	YR>OR (F)	YR>S	
Risk motivation: Speeding RMQ	Experience-seeking	YR>OR		
	Excitement	YR>OR		
	Sensation-seeking	YR>OR (F)	YR>S (overall but not M or F)	M>F (A,B)
	Prestige-seeking	YR>OR (F)		M>F (A)
	Social influence	YR>OR (F,M)	YR>S	M>F (A)
	Confidence & familiarity			M>F (A)
	Underestimation of risk			M>F (A,B)
	Irrelevance of risk	YR>OR (M)	YR>S (M)	M>F (A,B)
	"to let off steam"	YR>OR		
	"to get to destination quicker"			
Drink-driving RMQ	Experience-seeking	YR>OR (M)	YR>S (M)	M>F (B)
	Excitement	YR>OR		
	Sensation-seeking	YR>OR		
	Prestige-seeking	YR>OR (M)		M>F (B)
	Social influence	YR>OR		
	Confidence & familiarity	YR>OR (M)	S>YR (F)	M>F (A,B)

Variable	Scale	A: Younger vs older registry	B: Student vs younger registry	Males vs Females (within A and B)
Perceived risk	Underestimation of risk	YR>OR (M)	YR>S (M) S>YR (F)	M>F (A,B)
	Irrelevance of risk	OR>YR (F)	S>YR (F)	M>F (B)
	"to let off steam"	YR>OR (M)		
	"to get to destination quicker"	YR>OR (M)		
	Fined for speeding			
	Crash due to speeding	YR>OR (F)	YR>S	
	Fined for drink-driving	YR>OR		
	Crash due to drink-driving	YR>OR	YR>S	
	Injured or killed in a crash	YR>OR	YR>S	
	Not be hospitalised [a]			
	Lung cancer			F>M (B)
	Skin cancer			F>M (B)
	Gambling debt	YR>OR (M,F)	YR>S	M>F (A)
	Investment loss			M>F (A,B)
	Borrow money	YR>OR		
	Be rejected	YR>OR	YR>S (F)	
	Be made to feel socially awkward or embarrassed			
Illusory invulnerability	Fined for speeding	YR>OR		
	Crash due to speeding		S>YR	
	Fined for drink-driving	(YR>OR overall, but not M or F)	S>YR (overall but not M or F)	F>M (A,B)
	Crash due to drink-driving		S>YR (M)	F>M (A,B)
	Injured or killed in a crash		S>YR	
	Not be hospitalised [a]	OR>YR (F)		M>F (B)
	Lung cancer			
	Skin cancer			
	Gambling debt			
	Investment loss			F>M (A,B)
	Borrow money			F>M (B)
	Be rejected		S>YR (F)	
	Be made to feel socially awkward or embarrassed	YR>OR		
Behaviour frequency	RMQ speeding frequency			

Variable	Scale	A: Younger vs older registry	B: Student vs younger registry	Males vs Females (within A and B)
	RMQ drink-driving frequency		YR>S	
	Speeding average	YR>OR		
	Drink-driving average			M>F (B)
	Illness average	YR>OR	YR>S	
	Financial average			M>F (A,B)
	Social average	YR>OR	S>YR (M)	M>F (B)

[a] Comparisons were conducted separately for males and females when either there was a significant gender x sample interaction, or when both gender and sample main effects were significant.

2.1   Comparison between older and younger registry samples

This research demonstrates for the first time higher risk propensity among younger drivers than older drivers, using appropriate measures of risk propensity. Compared to older drivers, younger drivers demonstrated lower general risk aversion. Younger drivers demonstrated greater propensity for physical accident risks, as well as illness risks, and social risks, and greater relative risk propensity (all amongst females only).

Results also demonstrated stronger motives for risky driving amongst younger than older drivers, again for the first time. Compared to older drivers, younger drivers reported stronger motives for speeding in relation to experience-seeking, excitement, social influence, and "letting off steam", as well as sensation-seeking (females only, but for males p=.055 suggesting the effect may be significant in a larger sample), prestige-seeking (females only), and irrelevance of risk (males only). Younger drivers also reported stronger motives for drink-driving in relation to excitement, sensation-seeking, and social influence. Amongst males only, younger drivers reported stronger motives for drink-driving in relation to experience-seeking, prestige-seeking, confidence/familiarity (but for females p=.095 suggesting the effect may be significant in a larger sample), underestimation of risk, "letting off steam", and "getting somewhere". Amongst females only, younger drivers reported lower motives for drink-driving in relation to irrelevance of risk.

Examination of age differences in personal characteristics has been rare [2], although changes with age in risk propensity and risk motivation are likely. The age differences demonstrated here may contribute to the more risky driving of younger (compared to older) drivers [see 2], and consequently the over-representation of young drivers in crash statistics ("the young driver problem").

Findings indicate higher perceived risk of negative outcomes of risky driving (and of other risky behaviours) amongst younger than older drivers, in the context of further results suggesting an influence of risky behaviour on risk perception (rather than vice versa). Compared to older drivers, younger drivers perceived higher risks of crashing due to speeding (females only), being fined for drink-driving, crashing due to drink-driving, and being injured or killed in a car crash. They also perceived higher risks of having gambling debts, having to borrow money, and being rejected by a potential partner.

Illusory invulnerability was higher amongst younger drivers, compared to older drivers, although several aspects of the present results suggest that lower illusory invulnerability is associated with

risky driving (see later). 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 demonstrated higher illusory invulnerability than older drivers regarding feeling socially awkward or embarrassed, but lower illusory invulnerability regarding being hospitalized (for females only). Thus, the present results support findings that illusory invulnerability is more pronounced in younger drivers [for a review see 2], rather than previous Australian data that suggested the opposite [13].

Consistent with previous literature regarding risky driving [for a review see 2], younger drivers reported speeding more frequently than older drivers, as well as more frequently engaging in behaviours posing illness and social risks. Although, younger drivers did not differ from older drivers in terms speeding fines (for either males or females) or crashes (for either males or females, although p=.068 for females), analyses of speeding fines and crashes had low statistical power, and low reliability, because of the relatively low numbers of participants who had ever been fined for speeding or had a crash. Younger drivers did not differ from older drivers in terms of drink-driving, and drink-driving fines were too rare to be analysed.

2.2 Comparison between student sample and younger registry samples

The comparison between the student sample and the younger registry sample was conducted as a matter of procedure (to determine whether these groups could be combined for subsequent analysis) rather than for theoretical interest. Nonetheless, results demonstrate some interesting parallels with, and divergences from, the results of the comparison between the two registry samples. Generally, for both comparisons, whichever group demonstrated the most risky behaviour, also demonstrated the highest risk propensity, the strongest motives for speeding and drink- driving, and the highest perceived risks of outcomes of risky behaviours. Further, this observation held true for the comparisons of males and females within each sample. Whereas the younger registry sample was more "risky" than the older registry sample and demonstrated higher illusory invulnerability, the younger registry sample was more "risky" than the student sample but demonstrated lower illusory invulnerability. Males, who were generally more "risky" than females, demonstrated lower illusory invulnerability. Moreover, in all three samples correlations observed between risky driving and illusory invulnerability were generally negative [see Tables 22 and 23]. The apparent association of risky behaviour with lower illusory invulnerability is consistent with the apparent influence of risky behaviour on risk perception (rather than vice versa).

2.3 Comparison between males and females, and the effect of gender on the comparison between the younger and older registry samples

Gender was considered within each of the comparisons. Arguably the main effect of gender is of most interest in the younger samples (within Comparison B). Nonetheless, results were largely corroborated within Comparison A, in providing considerable evidence that males demonstrate risk-propensity, motives for positive attitudes toward risky driving behaviours, and risk-perceptions, that are more consistent with risky driving than do females.

In the younger samples, compared to females, males reported higher accident risk propensity and financial risk propensity; stronger motives for speeding in relation to sensation-seeking, underestimation of risk, and irrelevance of risk; and stronger motives for drink-driving in relation to experience-seeking, prestige-seeking, confidence/familiarity, underestimation of risk, and irrelevance of risk. In the context of results suggesting that risky behaviour influences risk-perception (rather than vice versa), illusory invulnerability regarding being fined for drink-driving and crashing due to drink-driving was lower for males than females. Males reported drink-driving more frequently than females. In addition, males reported more frequently engaging in financially and socially risky behaviours, as well as lower illusory invulnerability regarding investment losses and borrowing money (though higher illusory invulnerability regarding being hospitalized), and greater perceived risk of investment losses (though lower perceived risk of lung cancer and skin cancer).

Results were corroborated in the registry samples for accident risk propensity and financial risk propensity; for sensation-seeking, underestimation of risk, and irrelevance of risk motives for speeding; for confidence/familiarity and underestimation of risk motives for drink-driving; and for illusory invulnerability regarding being fined for drink-driving and crashing due to drink-driving; as well as engaging in financially risky behaviours, illusory invulnerability regarding investment losses, and perceived risk of investment loss. In addition, in the registry samples, males demonstrated stronger motives for speeding in terms of prestige-seeking, social influence, and confidence/familiarity, and higher perceived risk of gambling debts.

Within Comparison A, it is interesting to observe the interactions of gender with sample (age group), in terms of understanding how the effect of age is moderated by gender. Interactions relating to accident, illness, social, and relative, risk propensity all reflected that propensity was greater for younger than older drivers for females only, perhaps reflecting a "ceiling effect" for males. 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). Interactions relating to motives for drink-driving of experience-seeking, prestige-seeking, confidence/familiarity, underestimation of risk, "letting of steam", and "getting somewhere", all reflected that motives were stronger for younger than older drivers for males only. The gender x sample interaction relating to irrelevance of risk motives for drink-driving reflected a weaker motive for younger than older drivers for females only.

2.4   Association of risky driving with potential predictors

Tables 22 and 23 summarise relationships of risk propensity, relevant risk motivations, risk perception, and illusory invulnerability, with speeding (and speeding fines and crashes) and drink-driving (and crashes), respectively.

Because of the cross-sectional nature of the present research, direction of causality cannot properly be inferred from significant relationships. Nonetheless, the direction of the relationship is often suggestive of the direction of causality, which may be further examined in future experimental research. In the present report we are most concerned with the relationships observed for younger drivers (in the student and younger registry samples), but relationships observed for older drivers are considered for the sake of comparison.

Risk propensity

The present research demonstrates an association between risky driving and risk propensity, measured appropriately in terms of positive attitudes to risk rather than in terms of behaviour or

related psychological constructs. It also demonstrates the importance of a separate construct of risk aversion [see 4].

Risk aversion was associated with self-reports of less frequent speeding for females in the student sample, and with self-reports of less frequent drink-driving for females in the younger registry sample. Amongst older male drivers, risk aversion was associated with self-reports of speeding less frequently. Females in the younger registry sample, and in the older registry sample, who had ever had a speeding fine demonstrated lower risk aversion than those who had never had a speeding fine.

Table 22: Summary of significant relationships of risk propensity, motivation for speeding, and relevant risk perception and illusory invulnerability, with self reported speeding (Speed), having been fined for speeding (Fine), and having crashed (Crash), in the student (S), younger registry (YR), and older registry (OR) samples

		Speed						Fine						Crash					
		S		YR		OR		S		YR		OR		S		YR		OR	
Variable	**Scale**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Risk propensity	ROQ Risk aversion		_			_					**N>Y**		**N>Y**						
	ROQ Risk propensity																		
	RPQ Accident risk propensity		+	+			+		**Y>N**								**Y>N**		
	RPQ Relative risk propensity		+		+									**Y>N**					
Risk motivation: Speeding RMQ	Experience-seeking	+	+			_													
	Excitement		+	+															
	Sensation-seeking	+	+																
	Prestige-seeking		-	+			+							**N>Y**					
	Social influence		-				+												
	Confidence & familiarity	+	+	+	+		+										**Y>N**		
	Underestimation of risk		+		+		+										**Y>N**		
	Irrelevance of risk	+		+			+		**Y>N**										
	"to let off steam"	N/A	N/A	+	+			N/A	N/A					N/A	N/A		**Y>N**		**Y>N**
	"to get to destination quicker"	N/A	N/A	+		+		N/A	N/A					N/A	N/A				

		Speed						Fine						Crash					
		S		YR		OR		S		YR		OR		S		YR		OR	
Variable	**Scale**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Perceived risk	Fined for speeding	+	+	+	+	+	+	Y>N	Y>N				Y>N	Y>N	Y>N	Y>N			Y>N
	Crash due to speeding	+	+		+	+	+		Y>N							Y>N			Y>N
	Injured or killed in a crash	+	+		+				Y>N							Y>N			Y>N
	Not be hospitalised [a]												N>Y						
Illusory invulnerability	Fined for speeding	−	−	−	−	−	−	N>Y	N>Y					N>Y	N>Y				
	Crash due to speeding	−	−		−				N>Y						N>Y				
	Injured or killed in a crash					+						N>Y							
	Not be hospitalised [a]												Y>N						
Multiplicative indices: x speeding perceived risk	ROQ Risk aversion																		
	ROQ Risk propensity		+											Y>N					
	RPQ Accident risk propensity																		
	RMQ Excitement				+														
	RMQ Sensation-seeking		+		+														

Table 23: Summary of significant relationships of risk propensity, motivation for drink-driving, and relevant risk perception and illusory invulnerability, with self reported drink-driving (Drink-drive) and having crashed (Crash), in the student (S), younger registry (YR), and older registry (OR) samples

		Drink-drive						Crash					
		S		YR		OR		S		YR		OR	
Variable	**Scale**	M	F	M	F	M	F	M	F	M	F	M	F
Risk propensity	ROQ Risk aversion				_								
	ROQ Risk propensity					+							
	RPQ Accident risk propensity					+	+			Y>N			
	RPQ Relative risk propensity		+					Y>N					
Risk motivation: Drink-driving RMQ	Experience-seeking			+	+								
	Excitement			+	+								
	Sensation-seeking			+	+								
	Prestige-seeking			+	+								
	Social influence			+									
	Confidence & familiarity	+		+	+								
	Underestimation of risk			+	+								
	Irrelevance of risk	+		+	+								
	"to let off steam"	N/A	N/A	+	+			N/A	N/A				
	"to get to destination quicker"	N/A	N/A	+	+		+	N/A	N/A				

		Drink-drive						Crash					
		S		YR		OR		S		YR		OR	
Perceived risk	Fined for drink-driving	+	+	+	+	+	+						
	Crash due to drink-driving	+	+	+	+	+	+						
	Injured or killed in a crash	+		+					Y>N				Y>N
	Not be hospitalised [a]												
Illusory invulnerability	Fined for drink-driving	_	_	_	_								
	Crash due to drink-driving	_	_	_		_						N>Y	
	Injured or killed in a crash	_											
	Not be hospitalised [a]												
Multiplicative indices: x drink-driving perceived risk	ROQ Risk aversion						+						
	ROQ Risk propensity												
	RPQ Accident risk propensity	+			+		+						
	RMQ Excitement		+	+			+						
	RMQ Sensation-seeking			+									

Although general risk propensity only demonstrated one significant relationship with risky-driving-related measures (with more frequent drink-driving amongst males in the older registry sample), accident risk propensity demonstrated numerous relationships. Specifically, higher accident risk propensity was associated with more frequent speeding in the student sample (females only), the younger registry sample (males only), and the older registry sample (females only), and with more frequent drink-driving in the older registry sample (for both males and females). Further, females in the student sample who had ever had a fine for speeding, and males in the younger driver sample who had ever had a crash, (compared to peers who had not) demonstrated higher accident risk propensity.

The perception of having higher general risk propensity than average (included as a measure for the first time) was also positively correlated with self-reported frequency of speeding (amongst females in the student and younger registry samples) and self-reported frequency of drink-driving (amongst females in the student sample). Further, males in the student sample who had ever had a crash, demonstrated higher relative risk propensity than those who had not.

In the younger samples, risk aversion appears to be more relevant to risky driving for females than for males, demonstrating negative relationships with frequency of speeding, frequency of drink-driving, and fines for speeding, amongst females, and no relationship for males. Similarly, relative risk propensity was related to frequency of speeding and frequency of drink-driving only for females, although it was related to having crashed for males. Accident risk propensity was related to speeding for both males and females (although it was related to drink-driving only for older drivers), and to speeding fines for females only, but to having crashed for males. There were no glaring differences between age groups- except perhaps that risk propensity is more relevant to drink-driving for older than younger drivers. Relationships were more prevalent for speeding than for drink-driving.

Motivations for risky driving

Various risk-related motives for risky driving appeared to be strongly associated with risky driving.

Experience-seeking motives (such as "satisfaction of new experiences" and "to increase self-confidence") were positively associated with frequency of speeding in the student sample (for both males and females), and with frequency of drink-driving in the younger registry sample (for both males and females). Interestingly, a negative association was observed with speeding for older male drivers, who perhaps no longer employ speeding as a means of broadening their horizons.

Excitement motives (such as "for excitement and thrill" and "to enjoy being at risk") were positively associated with frequency of speeding for females in the student sample and males in the younger registry sample, and with drink-driving for both males and females in the younger registry sample.

Sensation-seeking motives (such as "for physical pleasure" and "to experience unique sensations") were positively associated with frequency of speeding for both males and females in the student sample, and with drink-driving for both males and females in the younger registry sample. These findings support previous research employing more typical (and general) measures of sensation-seeking [for a review see 14].

Prestige-seeking motives (such as "to prove myself to others" and "to attract admiration") were positively associated with frequency of speeding for males in the younger registry sample (as well as in the older registry sample), and with drink-driving for both males and females in the younger registry sample. In the student sample, females demonstrated a *negative* association between prestige-seeking motives and frequency of speeding, suggesting that amongst this group of females *not* speeding is most admirable.

Similarly, males in the student sample who had ever crashed demonstrated *lower* prestige-seeking motives for speeding than those show had not.

Social influence motives (such as "to take part in something with others and to be sociable" and "pressure from others") were positively associated with frequency of drink-driving for males in the younger registry sample (as well as with frequency of speeding for females in the older registry sample). For females in the student sample, a *negative* association was observed between social influence motives and frequency of speeding, again suggesting that there is social pressure *against* speeding in this group of females.

Confidence/familiarity motives (such as "activity is familiar" and "relying on the effectiveness of my equipment") were positively associated with frequency of speeding for all sub-samples except for males in the older registry sample. Positive associations were observed with frequency of drink-driving in the student sample (males only) and the younger registry sample (males and females). In addition, females in the student sample who had ever had a crash demonstrated stronger confidence/familiarity motives for speeding than those who had not.

Underestimation of risk motives (such as "don't see the potential risk" and "severity of consequences not serious") were positively associated with frequency of speeding for females (but not males) in all three samples, and with frequency of drink-driving in the registry sample (for males and females). In addition, females in the student sample who had ever had a crash demonstrated stronger underestimation of risk motives for speeding than those who had not.

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 frequency of speeding for males in the student and younger registry sample, as well as females in the older registry sample. Irrelevance of risk motives were positively associated with frequency of drink-driving for males in the student and younger registry samples, and for females in the younger registry sample. In addition, females in the student sample who had ever had a fine for speeding demonstrated stronger irrelevance of risk motives for speeding than those who had not.

"To let off steam" motives were positively associated with frequency of both speeding and drink-driving for males and females in the younger registry sample (and were not tested in the student sample). In addition, females in the younger and older registry samples who had ever had a crash demonstrated stronger "to let off steam" motives for speeding.

"To get somewhere" motives were positively associated with frequency of speeding for females in the younger and older registry samples (and were not tested in the student sample), and with frequency of drink-driving for males and females in the younger registry sample, as well as females in the older registry sample.

In the younger samples, the influence of motives for risky driving were fairly similar for males and females, with the major exception that, for females, prestige-seeking and social influence motives for speeding were *negatively* associated with frequency of speeding, whereas for males, the associations were positive. This is consistent with the idea that for the females in the student sample, *not speeding* is more admirable than speeding. Interestingly, for younger females, drink-driving was *positively* associated with prestige-seeking motives (but not associated with social influence motives). Underestimation of risk appeared to be relevant to speeding for females but not males, whereas irrelevance of risk appeared to be relevant to speeding for males but not females. (Although "to get somewhere" was related to speeding for males but not females, this relationship was not tested in the student sample). All motives were relevant to drink-driving for both genders. A major difference between the younger and older samples was the lack of relevance of all motives except "to get somewhere" to drink-driving for older drivers. For speeding, only

excitement and sensation-seeking motives were relevant to younger but not older drivers, although for older drivers "to let off steam" motives for speeding were related to crashing (but not behaviour) and the relationship with experience-seeking was *negative* (for males only). Further, for older drivers, most motives were relevant to females only (except experience-seeking and "to get somewhere", which were relevant to males only).

Risk perception

Frequency of both speeding and drink-driving were positively associated with the perceived risk of corresponding outcomes, suggesting that risky driving influences risk perception, rather than vice versa. That is, more risky driving relates to higher perceptions of risk, rather than low estimation of risk producing risky driving (although underestimation of risk *was* identified as a motive for both speeding and drink-driving). Perceived risk of outcomes due to a specific behaviour (i.e. being fined due to speeding or drink-driving) were more consistently related to the corresponding behaviour than was the more general perceived risk of being killed or injured in a crash. Further, the even more general perceived risk of being hospitalized was not related to risky behaviour at all.

For both males and females in all three samples, perceived risk of being fined for speeding was positively associated with frequency of speeding, and perceived risk of being fined for drink-driving was positively associated with drink-driving. In addition, males and females in the student sample who had ever been fined for speeding perceived the risks of being fined for speeding as being higher than did those who had not. (The same relationship was also observed for females in the older registry sample). Males and females in the student sample, and females in the younger registry sample (and older registry sample), who had ever crashed perceived the risks of being fined for speeding as being higher than did those who had not.

The perceived risk of crashing due to speeding was positively associated with frequency of speeding for females in all three samples, and for males in the student sample and older registry sample. Perceived risk of crashing due to drink-driving was positively associated with drink-driving for males and females in all three samples. Females in the student sample who had ever been fined for speeding perceived the risks of crashing due to speeding as being higher than did those who had not. Females in all three samples who had ever crashed perceived the risks of crashing due to speeding as being higher than did those who had not.

The perceived risk of being injured or killed in a crash was positively associated with frequency of speeding for males and females in the student sample and for females in the younger registry sample, and with drink-driving for males in the student sample and in the younger registry sample. Females in the student sample who had ever had a fine for speeding, or who had ever crashed, perceived the risk of being injured or killed in a crash as being higher than did those who had not. (The same relationship with crashing was observed for females in the older registry sample.)

Having ever had a fine due to speeding demonstrated the only relationship with perceived risk of being hospitalized (for females in the older registry sample), and this relationship was in the opposite direction to all others observed between having been fined and perceived risk, possibly because asking the perceived risk question in terms of *not being hospitalized* (and recoding responses) confused respondents.

The pattern of results between perceived risks and behaviour was generally similar for male and female drivers, and for older and younger drivers.

Illusory invulnerability

Illusory invulnerability produced a similar pattern of results to risk perception; its *negative* relationships with risky driving suggest that risky driving reduces illusory invulnerability, and more for behaviour-specific than general outcomes.

Illusory invulnerability regarding being fined for speeding was negatively associated with frequency of speeding for both males and females in all three samples. Illusory invulnerability regarding being fined for drink-driving was negatively associated with drink-driving for males and females in the student sample, and in the younger registry sample. In addition, males and females in the student sample who had ever been fined for speeding, or who had ever crashed, demonstrated lower illusory invulnerability regarding being fined for speeding than those who had not.

Illusory invulnerability regarding crashing due to speeding was negatively associated with frequency of speeding for males and females in the student sample, and for females in the younger registry sample. Illusory invulnerability regarding crashing due to drink-driving was negatively associated with frequency of drink-driving for males and females in the student sample, and for males in the younger registry sample (as well as for females in the older registry sample). Females in the student sample who had ever been fined for speeding, or ever crashed, demonstrated lower illusory invulnerability regarding crashing due to speeding than those who had not. (Similarly, males in the older registry sample who had ever crashed demonstrated lower illusory invulnerability regarding crashing due to drink-driving than those who had not).

Illusory invulnerability regarding being injured or killed in a crash was negatively associated with drink-driving for males in the student sample (and, oddly, *positively* associated with speeding for females in the older registry sample). Males in the older registry sample who had ever been fined for speeding demonstrated lower illusory invulnerability regarding being injured or killed in a crash than those who had not.

Having ever had a fine due to speeding demonstrated the only relationship with illusory invulnerability regarding being hospitalized (for females in the older registry sample), and this relationship was in the opposite direction to all others between having been fined and illusory invulnerability, possibly because asking the illusory invulnerability questions in terms of *not being hospitalized* (and recoding responses) confused respondents.

The pattern of results between perceived risks and behaviour was generally similar for male and female drivers, and for older and younger drivers.

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 behaviour. Thus, it is exciting that the present results provide some support for this possibility.

We proposed that the implications of perceiving that a behaviour has a high risk of producing a negative outcome will differ markedly for an individual with high risk propensity compared to an individual with low risk propensity. The former may be encouraged to engage in the behaviour, the other may be deterred. Relatedly, a low-risk behaviour may be attractive to an individual with low risk propensity, but unattractive to a person with high risk propensity. Thus, the relationship between perceived risk and behaviour may be moderated by risk propensity, or indeed sensation-seeking or excitement-seeking.

We multiplied scores for perceived risk of being fined or crashing due to speeding (averaged) by scores for risk aversion, general risk propensity, accident risk propensity, excitement motives for speeding, and sensation-seeking motives for speeding, separately. We assessed the relationships of each multiplicative index with the outcome measures of self-reported speeding, having been fined for speeding and having crashed. Similar analysis was conducted for drink-driving measures. When positive correlations were observed, we regressed the multiplicative index on the outcome measure after controlling for social desirability (where required) and components of the multiplicative index that had also correlated significantly with the outcome (e.g. perceived risk or risk propensity measures).

In these regressions, frequency of speeding was significantly predicted by the multiplicative indices involving general risk propensity (for females in the student sample), excitement motives for speeding (for females in the younger registry sample) and sensation-seeking (for females in both young driver samples). Drink-driving was predicted by the multiplicative indices involving accident risk propensity (for males in the student sample, and females in the younger and older registry samples), excitement motives for drink-driving (for females in the student and older registry samples, and males in the younger registry sample) and sensation-seeking (for females in the younger registry sample). The multiplicative index involving general risk propensity (and perceived risks of speeding) was also related to having ever crashed; with higher scores for those who had versus hadn't crashed.

For speeding, moderation of risk perception by risk propensity (and related variables) was evident mainly for younger females (although younger males demonstrated a moderation for crashing). For drink-driving moderation was evident for male and female younger drivers, as well as female older drivers.

Differences between individuals with low versus high accident risk propensity in terms of risky behaviour, speeding fines, and crashes

Classification into low and high scorers for accident risk propensity allowed prediction of speeding and crash history in the younger registry sample. In the student sample no differences were observed between low and high scorers.

2.5　Association of other risky behaviours with potential predictors (younger drivers only)

These analyses were conducted mostly to examine whether risky behaviours in other domains demonstrated relationships with risk propensity and risk perception variables that were roughly similar to the relationships demonstrated by risky driving. The confirmatory findings increase confidence in the results for risky driving, and indicate that they generalize to other domains.

We focused on the relationships observed for younger drivers (in the student and younger registry samples) only.

Risk propensity

Just as accident risk propensity was positively associated with frequency of speeding (though not drink-driving), health risk propensity was positively associated with frequency of behaviours posing health risks (measured in terms of smoking and sunbathing), financial risk propensity was positively associated with frequency of behaviours posing financial risks (measured in terms of gambling and investment), and social

risk propensity was positively associated with frequency of behaviours posing social risks (measured in terms of propositioning a potential partner and arguing with friends), all for both males and females in the student sample and females in the young registry sample.

In addition, risk aversion was negatively associated with socially risky behaviours (for males in the student sample and females in the younger driver sample) and with health risky behaviours (for females in the both younger driver samples), as it was with speeding (for females in the student sample) and drink-driving (for females in the younger registry sample). Relative risk propensity was associated with socially risky behaviours for males in the student sample, and with health risky and socially risky behaviours for females in both younger driver samples, as it was with speeding for females in both younger driver samples and with drink-driving for females in the student sample. Although it was not associated with risky driving, general risk propensity was associated with socially risky behaviours for males in the student sample, and with risky behaviours in all three domains for females in the student sample.

Risk perception

Just as speeding and drink-driving demonstrated consistent positive associations with perceived risk of directly relevant outcomes (being fined and crashing due to speeding and drink-driving, respectively), each risky behaviour demonstrated at least one positive association with perceived risk of outcomes directly relevant to it. Specifically, frequency of behaviours posing health risks (measured in terms of smoking and sunbathing) were positively associated with perceived risk of lung cancer (for males and females in both younger driver samples), and with perceived risk of skin cancer (for females in the student sample, and for males and females in the younger registry sample). Frequency of behaviours posing financial risks (measured in terms of gambling and investment) were positively associated with perceived risk of gambling debt and perceived risk of borrowing money (both for females in the student sample and males in the younger registry sample), and with perceived risk of investment loss (for both males and females in both younger driver samples). Frequency of behaviours posing social risks (measured in terms of propositioning a potential partner and arguing with friends) were positively associated with perceived risk of rejection (for females in the student sample, and males and females in the younger registry sample).

Illusory invulnerability

Just as speeding and drink-driving demonstrated consistent negative associations with illusory invulnerability regarding directly relevant outcomes (being fined and crashing due to speeding and drink-driving, respectively), each risky behaviour demonstrated at least one negative association with illusory invulnerability regarding outcomes directly relevant to it. Specifically, frequency of behaviours posing health risks (measured in terms of smoking and sunbathing) were negatively associated with illusory invulnerability regarding lung cancer (for males in the student sample). Frequency of behaviours posing financial risks (measured in terms of gambling and investment) were negatively associated with illusory invulnerability regarding gambling debt (for males in the younger registry sample), with illusory invulnerability regarding investment loss (for males in the student sample), and with illusory invulnerability regarding borrowing money (for males in both younger driver samples). Frequency of behaviours posing social risks (measured in terms of propositioning a potential partner and arguing with friends) were negatively associated with illusory invulnerability regarding rejection (for males in the younger registry sample), but positively associated with illusory invulnerability regarding being made to feel awkward or embarrassed (for females in the student sample).

2.6 Consideration of "risky behaviour syndrome" (younger drivers only)

In order to consider the existence of "risky behaviour syndrome", relationships of speeding and drink-driving with risky behaviours in the health, financial and social domains, and with risk propensity in each of these domains, we assessed in the younger driver samples only. There was some evidence for risky behaviour syndrome.

Frequency of speeding was positively associated with frequency of behaviours posing health risks (for females in both younger driver samples), with frequency of behaviours posing financial risks (for males in the younger registry sample), and with frequency of behaviours posing social risks (for females in the younger registry sample). Frequency of speeding was also positively associated with propensity for health risks (for females in both younger driver samples) and propensity for financial risks (for males in the student sample).

Frequency of drink-driving was positively associated with frequency of behaviours posing health risks (for males and females in the student sample, and females in the younger registry sample), with frequency of behaviours posing financial risks (for females in the student sample and males in the younger registry sample), and with frequency of behaviours posing social risks (for females in the younger registry sample). However, frequency of drink-driving was negatively associated with propensity for social risks (for females in the younger registry sample).

2.7 Validation of risk propensity and risk motivation scales

Risk propensity

The ROQ risk aversion and risk propensity scales demonstrated low but acceptable internal consistency. Nonetheless, risk aversion demonstrated significant relationships with self-reported speeding behaviour, having been fined for speeding, and drink-driving behaviour. ROQ risk propensity demonstrated only one significant relationship with self-reported drink driving, perhaps because of its relatively low reliability.

Motives for risky driving

The RMQ risk motivation subscales for speeding and drink-driving demonstrated good consistency with Rohrmann's [4] *a priori* groupings. As a result of internal consistency analyses, "rebelling a little against authority figures and society" was omitted from the "Prestige-seeking" subscale, and "spur of the moment decision" was omitted from the "Underestimation of risk" subscale, for both speeding and drink-driving.

Internal consistency was high for most subscales, and acceptable for all of them.

Consistent observed associations of motives for speeding with self-reported speeding, and of motives for drink-driving with self-reported motives for drink-driving, provide some support for the predictive validity of the RMQ subscales. Further, females in the student sample who reported ever having a speeding fine reported stronger "irrelevance" of risk motives that did those who had not. Validation against objective measures, such as observed behaviour or driving records, is desirable.

2.8   Methodological concerns

All of the data for the present study was collected via self-report, of necessity in the case of the psychological variables- risk aversion, risk propensity, motives for risky driving, and risk perception-, and for convenience in the case of risky behaviour, fines, and crashes. Response biases were controlled 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.

We have already identified the limitations of cross-sectional data with regard to establishing causal direction. Interpretations of the present findings should be further examined employing longitudinal and experimental methodologies.

2.9   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

(with this correspondence occurring within gender). Further, useful variables must be amenable to change.

Table 24 summarises variables that demonstrated a difference between younger and older drivers, as well significant relationships with speeding, drink-driving or crashing, amongst younger male and/or female drivers.

Table 24: Summary of variables that demonstrated a difference between older (OR) and younger (YR) registry samples, and their significant relationships with risky driving and crashing in the younger samples (showing gender that demonstrated the effect where relevant; M/F).

Variable	Scale	Younger vs older registry	Relationship with speeding (or fines)	Relationship with drink-driving	Relationship with crashing
Risk propensity	ROQ Risk aversion	OR>YR	Neg (F)	Neg (F)	-
	RPQ Accident risk propensity	YR>OR (F)	Pos (M,F)	-	Pos (M)
	RPQ Illness risk propensity	YR>OR (F)	Pos (F)	Pos (M,F)	N/A
	RPQ Social risk propensity	YR>OR (F)	Pos (F)	Pos (F)	N/A
	RPQ Relative risk propensity	YR>OR (F)	Pos (F)	Pos (F)	Pos (M)
Risk motivation: Speeding RMQ	Experience-seeking	YR>OR	Pos (M,F)	N/A	-
	Excitement	YR>OR	Pos (M,F)	N/A	-
	Sensation-seeking	YR>OR (F)	Pos (M,F)	N/A	-
	Prestige-seeking	YR>OR (F)	Pos (M) Neg (F)	N/A	Neg (M)
	Social influence	YR>OR (F,M)	Neg (F)	N/A	-
	Irrelevance of risk	YR>OR (M)	Pos (M,F)	N/A	-
	"to let off steam"	YR>OR	Pos (M,F)	N/A	Pos (F)
Drink-driving RMQ	Experience-seeking	YR>OR (M)	N/A	Pos (M,F)	-
	Excitement	YR>OR	N/A	Pos (M,F)	-
	Sensation-seeking	YR>OR	N/A	Pos (M,F)	-
	Prestige-seeking	YR>OR (M)	N/A	Pos (M,F)	-
	Social influence	YR>OR	N/A	Pos (M)	-
	Confidence and familiarity	YR>OR (M)	N/A	Pos (M,F)	-
	Underestimation of risk	YR>OR (M)	N/A	Pos (M,F)	-
	Irrelevance of risk	OR>YR (F)	N/A	Pos (M,F)	-
	"to let off steam"	YR>OR (M)	N/A	Pos (M,F)	-
	"to get to destination quicker"	YR>OR (M)	N/A	Pos (M,F)	-
Perceived risk	Crash due to speeding	YR>OR (F)	Pos (M,F)	N/A	Pos (F)
	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 (M,F)	Pos (M)	Pos (F)
Illusory invulnerability	Fined for speeding	YR>OR	Neg (M,F)	N/A	Neg (M,F)
	Fined for drink-driving	(YR>OR overall, but not M or F)	N/A	Neg (M,F)	-

In addition, among younger drivers, there was evidence of moderation of speeding by excitement motives for speeding and sensation-seeking motives for speeding for females (both of which differed between younger and older drivers). Amongst younger drivers, there was evidence of moderation of drink-driving by accident risk propensity (males and females), excitement motives for drink-driving (males and females), and sensation seeking motives for drink-driving (males) (all of which differed between younger and older drivers).

Differences between younger and older drivers might also arise from differential relationships between risky driving and risk-relevant factors. Variables that were associated with speeding (or having ever had a speeding fine) for younger but not older drivers were: relative risk propensity (females), excitement, sensation-seeking, and "letting off steam" motives for speeding (all males and females), perceived risk of being injured or killed in a crash (males and females), and illusory invulnerability regarding crashing due to speeding (males and females). In addition, experience-seeking motives for speeding were positively related to frequency of speeding for younger drivers (males and females) but negatively related for older male drivers.

Variables that were associated with drink-driving for younger but not older drivers were: risk aversion (females), relative risk propensity (females), all motives for drink-driving except "getting somewhere" (all for males, all but social influence for females), perceived risk of being injured or killed in a crash (males), and illusory invulnerability regarding being fined for drink-driving (males and females).

These considerations suggest that it might be worth targeting the "young driver problem" via the risk propensity variables: risk aversion, accident risk propensity, and relative risk propensity (as well as perhaps illness risk propensity and social risk propensity). However, most of these variables appear to be most relevant to females, who are not as crash-involved as young males. Further, because risk propensity variables are considered to be trait variables they may be difficult to change. It is perhaps more feasible to promote the possibility of expressing risk propensity in "safer" ways than risky driving. Risk propensity variables might also be used to identify risky drivers, as was done in the present report employing accident risk propensity, if it was ever considered politically or ethically acceptable to do so.

Risk motivation variables may be more amenable to change, and the present study suggests aiming to reduce experience-seeking, excitement, sensation-seeking, and "letting off steam" motives for speeding for both males and females, and irrelevance of risk motives for speeding for males. It is critical to note that, for females, the relationships of prestige-seeking and social influence with speeding was negative, so increasing these motives may be beneficial for young females. Nonetheless, care should be taken not to increase prestige-seeking motives for speeding for young males or older females, or experience-seeking motives for speeding for older drivers (which demonstrated positive associations with speeding).

The present study suggests aiming to reduce all motives for drink-driving except "getting somewhere" for males, and all motives for drink-driving except "social influence" and "getting somewhere" for females.

Generally relationships of risk-perception and illusory invulnerability with risky driving appeared to indicate an influence of risky behaviour on risk-perception, rather than vice versa. Thus, the present research does not highlight the importance of addressing risk-perception in campaigns targeting the "young driver problem". Nonetheless, previous theory and research indicate that risk perception variables should not be dismissed too lightly.

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 confidence and familiarity (males and females), underestimation of risk (females only), and "getting somewhere", (males only) motives for speeding.

These cross-sectional results provide a foundation for future experimental research in which risk attitudes are manipulated and risky behaviour is measured (perhaps without reliance on self-report), in order to provide more compelling evidence for causality.

3   SUMMARY AND CONCLUSIONS

The present research has indicated that younger drivers demonstrate greater risk propensity than older drivers, using appropriate measures of risk propensity for the first time. Younger drivers also demonstrated stronger motives for speeding and drink-driving than older drivers. Results suggest targeting the "young driver problem" by aiming to reduce experience-seeking, excitement, sensation-seeking, confidence/familiarity, underestimation or risk, irrelevance of risk, and "letting of steam" motives for drink-driving, and experience-seeking, excitement, sensation-seeking, and "letting off steam" motives for speeding, for both males and females, as well as irrelevance of risk motives for speeding, and social influence motives for drink-driving for males only. For young females only, *increasing* prestige-seeking and social influence motives in relation to speeding may be beneficial.

4   REFERENCES

[1] Williamson, A. (2003). www.maa.nsw.gov.au/roadsafety36reports.html

[2] Jonah, B.A. (1986). Accident Analysis and Prevention, 18, 255-271.

[3] Job, R.F.S. (1995). In D. Kenny & R.F.S. Job (Eds.). Australia's Adolescents: A Health Psychology Perspective. (pp. 128-138) Armidale: New England U. Press.

[4] Rohrmann, B. (in preparation) Risk attitude scales: Concepts and questionnaires.

[5] Beirness, D.J. (1993). Alcohol, Drugs & Driving, 9, 129-143.

[6] Zuckerman, M. (1994) Behavioral Expressions and Biological bases of Sensation Seeking. Cambridge: U. Cambridge Press.

[7] Weinstein, N.D. (1989). Psychological Bulletin, 105, 31-50.

[8] Job, R.F.S. et al. (1995). In D. Kenny & R.F.S. Job (Eds.). Australia's Adolescents: A Health Psychology Perspective. (pp. 151-156) Armidale: New England U. Press.

[9] Janz, N.K. & Becker, M.H. (1984). Health Education Quarterly, 11, 1-47.

[9] Weinstein, N.D. (1980). Journal of Personality and Social Psychology, 39, 806-820.

[11] Klein, W.M. (1997). Journal of Personality and Social Psychology, 72, 763-774.

[12] Morgan, G.A. & Job, R.F.S. (1995). In D. Kenny & R.F.S. Job (Eds.). Australia's Adolescents: A Health Psychology Perspective. (pp 144-150) Armidale: New England U. Press.

[13] Lee, S.H.V. et al. (1993). Optimism bias, risk utility and risk taking on the road. Report to the Federal Office of Road Safety, Canberra.

[14] Jonah, B.A. (1997). In T. Rothengatter & E. Carbonell Vaya (Eds.). Traffic and Transport Psychology. Theory and Application. (pp. 255-271) Amsterdam: Pergamon.

[15] Fernandes R. et al. (2004) Proceedings of the 17th International Conference on Alcohol, Drugs and Traffic Safety, Glasgow

[16] Jessor, R. (1987) Alcohol, Drugs, and Driving, 3, 1-12.

[17] Diefenbach, M.A. et al. (1993). Health Education Research: Theory and Practice, 8, 181-192.

[18] Reynolds, W.M. (1982). Journal of Clinical Psychology, 38, 119-125.

5 APPENDIX A: QUESTIONNAIRE PACKAGE EMPLOYED WITH STUDENT SAMPLE

NSW Injury Risk Management Research Centre

The University of New South Wales

Thank you for consenting to participate in this survey. The survey is anonymous, and will take approximately 10 minutes to complete. Please do not write your name on the questionnaire. For all questions, please answer as accurately and honestly as possible.

SECTION ONE

People deal with risky situations in different ways. We would like to understand how you think about these risks. Please read each sentence and then rate to what extent that statement is true for you using the scale:

Not at all   ------>   Extremely

1 - 2 - 3 - 4 - 5 - 6 - 7

Please circle the number which best reflects your view.

I'm quite cautious when I make plans and when I act on them.	**1 2 3 4 5 6 7**
I follow the motto, 'nothing ventured, nothing gained'.	**1 2 3 4 5 6 7**
I don't have much sympathy for adventurous decisions.	**1 2 3 4 5 6 7**
If a task seems interesting I'll choose to do it even if I'm not sure whether I'll manage it.	**1 2 3 4 5 6 7**
I don't like to put something at stake, I would rather be on the safe side.	**1 2 3 4 5 6 7**
Even when I know that my chances are limited I try my luck.	**1 2 3 4 5 6 7**
In my work I only set small goals so that I can achieve them without difficulty.	**1 2 3 4 5 6 7**

I express my opinion even if most people have opposite views.	**1 2 3 4 5 6 7**
My decisions are always made carefully and accurately.	**1 2 3 4 5 6 7**
I would like to act in my boss's job some time so as to demonstrate my competence, despite the risk of making mistakes.	**1 2 3 4 5 6 7**
I tend to imagine the unfavourable outcomes of my actions.	**1 2 3 4 5 6 7**
Success makes me take higher risks.	**1 2 3 4 5 6 7**

SECTION TWO

Now we would like to ask some questions about your risk propensity. "Risk propensity" describes how willing you are, generally, to accept a risk or not.

Extremely   Extremely

Low$\rightarrow$---------------$\rightarrow$High

1) 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 risk of injury or death.

In general, my propensity for accepting **physical** *risks is...*   **0 1 2 3 4 5 6 7 8 9 10**

2) Some activities involve a "financial" risk, such as starting a business, investing (e.g. buying shares), or gambling (e.g. in casinos) and betting (e.g. on horses) – that is, there is a risk of losing money or other assets.

In general, my propensity for accepting **financial** *risks is...*   **0 1 2 3 4 5 6 7 8 9 10**

3) Some activities involve a "health" risk, such as travelling overseas (e.g. in countries of low hygienic standards) or particular "lifestyle" behaviours (e.g. long sunbathing, unsafe sex, drugs for pleasure) or smoking – that is, there is

a risk of catching a harmful disease.

In general, my propensity for accepting **health** *risks is...*   *0 1 2 3 4 5 6 7 8 9 10*

*4) Some activities involve a "*social*" risk, such as being very outspoken or behaving in an unusual manner (e.g. deviating sexually or violating social norms) or accepting public roles (e.g. giving a controversial speech) – that is, there is a risk of losing the respect and acceptance of others and harming one's social status.*

In general, my propensity for accepting **social** *risks is...*   *0 1 2 3 4 5 6 7 8 9 10*

E) Lastly, how would you rate your general willingness to take risks in comparison to other people*, such as friends, peers, colleagues?*

I'm much less willing   I'm much more willing

       to accept risks   *0   1   2   3   4   5   6   7   8   9   10*   to accept risks

SECTION THREE

1. How often do you engage in **SPEEDING WHILE DRIVING**:

| | Never | Rarely | Sometimes | Often | Most of the time | Always |

/_____/_____/_____/_____/_____/_____/

| 0 | 1 | 2 | 3 | 4 | 5 |

2. Using the following scale, please rate how relevant each of the following factors are in your decision to engage in **SPEEDING WHILE DRIVING**:

(If you never engage in SPEEDING WHILE DRIVING, please estimate how relevant each of the factors would be, if you were to do so)

This factor influences my decision to take part in the above activity...

1--------------2--------------3--------------4--------------5

Not at all   A little   Moderately   Quite a bit   Very much

Satisfaction of new experiences	1	2	3	4	5
For fun/amusement	1	2	3	4	5
Curiosity about what the activity is like	1	2	3	4	5
To increase self-confidence	1	2	3	4	5
Feeling of having control over something	1	2	3	4	5
Wanting to overcome my inner fears	1	2	3	4	5
Enhancing my view of myself (e.g. as brave, adventurous, skilled)	1	2	3	4	5
Personal challenge (opportunity to test my own limits)	1	2	3	4	5
Relief from the monotony of everyday life	1	2	3	4	5

For excitement and thrill	**1**	**2**	**3**	**4**	**5**
Enjoyment of the 'adrenalin rush'	**1**	**2**	**3**	**4**	**5**
Tendency to live 'on the edge'	**1**	**2**	**3**	**4**	**5**
To enjoy being 'at risk'	**1**	**2**	**3**	**4**	**5**
For physical pleasure, such as pleasant body feelings	**1**	**2**	**3**	**4**	**5**
To experience unique sensations (sound, touch, taste, smell)	**1**	**2**	**3**	**4**	**5**
To prove myself to others	**1**	**2**	**3**	**4**	**5**
To attract admiration	**1**	**2**	**3**	**4**	**5**
Rebelling a little against authority figures or society	**1**	**2**	**3**	**4**	**5**
To take part in something with others and to be sociable	**1**	**2**	**3**	**4**	**5**
Pressure from others to take part in the activity	**1**	**2**	**3**	**4**	**5**

This factor influences my decision to take part in the above activity...

1--------------2--------------3-------------4-------------5

Not at all   A little   Moderately   Quite a bit   Very much

To not look like a coward	1	2	3	4	5
Everyone else was doing this activity so I trusted it's okay	1	2	3	4	5
Activity is familiar (much experience with it)	1	2	3	4	5
Relying on the effectiveness of my equipment/tools	1	2	3	4	5
Don't see the potential risk	1	2	3	4	5
Activity not dangerous	1	2	3	4	5
Severity of consequences not serious	1	2	3	4	5
Spur of the moment decision (no thoughts about the risk)	1	2	3	4	5
Because my safety and health are not that important	1	2	3	4	5
Because of addiction to the activity	1	2	3	4	5
Alcohol consumption beforehand	1	2	3	4	5
The future is too bleak to worry that much about my life	1	2	3	4	5

Other factor(s) – Please specify:

1. _____   1   2   3   4   5

2. _____   1   2   3   4   5

3. _____   **1   2   3   4   5**

1. How often do you engage in **DRINK-DRIVING**:

Never   Rarely   Sometimes   Often   Most of the time   Always

|_____|_____|_____|_____|_____|

0   1   2   3   4   5

2. Using the following scale, please rate how relevant each of the following factors are in your decision to engage in **DRINK-DRIVING**:

(<u>If you never engage in DRINK-DRIVING</u>, please estimate how relevant each of the factors would be, if you were to do so)

This factor influences my decision to take part in the above activity...

1--------------2--------------3--------------4--------------5

Not at all   A little   Moderately   Quite a bit   Very much

Satisfaction of new experiences	**1 2 3 4 5**
For fun/amusement	**1 2 3 4 5**
Curiosity about what the activity is like	**1 2 3 4 5**
To increase self-confidence	**1 2 3 4 5**
Feeling of having control over something	**1 2 3 4 5**
Wanting to overcome my inner fears	**1 2 3 4 5**
Enhancing my view of myself (e.g. as brave, adventurous, skilled)	**1 2 3 4 5**
Personal challenge (opportunity to test my own limits)	**1 2 3 4 5**

Relief from the monotony of everyday life	**1**	**2**	**3**	**4**	**5**
For excitement and thrill	**1**	**2**	**3**	**4**	**5**
Enjoyment of the 'adrenalin rush'	**1**	**2**	**3**	**4**	**5**
Tendency to live 'on the edge'	**1**	**2**	**3**	**4**	**5**
To enjoy being 'at risk'	**1**	**2**	**3**	**4**	**5**
For physical pleasure, such as pleasant body feelings	**1**	**2**	**3**	**4**	**5**
To experience unique sensations (sound, touch, taste, smell)	**1**	**2**	**3**	**4**	**5**
To prove myself to others	**1**	**2**	**3**	**4**	**5**
To attract admiration	**1**	**2**	**3**	**4**	**5**
Rebelling a little against authority figures or society	**1**	**2**	**3**	**4**	**5**
To take part in something with others and to be sociable	**1**	**2**	**3**	**4**	**5**
Pressure from others to take part in the activity	**1**	**2**	**3**	**4**	**5**
To not look like a coward	**1**	**2**	**3**	**4**	**5**

This factor influences my decision to take part in the above activity...

1--------------2--------------3--------------4--------------5

Not at all   A little   Moderately   Quite a bit   Very much

Everyone else was doing this activity so I trusted it's okay	**1**	**2**	**3**	**4**	**5**
Activity is familiar (much experience with it)	**1**	**2**	**3**	**4**	**5**
Relying on the effectiveness of my equipment/tools	**1**	**2**	**3**	**4**	**5**
Don't see the potential risk	**1**	**2**	**3**	**4**	**5**
Activity not dangerous	**1**	**2**	**3**	**4**	**5**
Severity of consequences not serious	**1**	**2**	**3**	**4**	**5**
Spur of the moment decision (no thoughts about the risk)	**1**	**2**	**3**	**4**	**5**
Because my safety and health are not that important	**1**	**2**	**3**	**4**	**5**
Because of addiction to the activity	**1**	**2**	**3**	**4**	**5**
The future is too bleak to worry that much about my life	**1**	**2**	**3**	**4**	**5**

Other factor(s) – Please specify:

1. _____ **1** **2** **3** **4** **5**

2. _____ **1** **2** **3** **4** **5**

3. _____ **1** **2** **3** **4** **5**

SECTION FOUR

For each of the following statements, please indicate whether they are true or false. Please circle either "T" (for true) or "F" (for false) for each of the statements.

It is sometimes hard for me to go on with my work if I am not encouraged.	**T**	**F**
I sometimes feel resentful when I don't get my way.	**T**	**F**
On a few occasions, I have given up doing something because I thought too little of my ability.	**T**	**F**
There have been times when I felt like rebelling against people in authority even though I knew they were right.	**T**	**F**
No matter whom I'm talking to, I'm always a good listener.	**T**	**F**
There have been occasions when I took advantage of someone.	**T**	**F**
I'm always willing to admit it when I make a mistake.	**T**	**F**
I sometimes try to get even rather than forgive and forget.	**T**	**F**
I am always courteous, even to people who are disagreeable.	**T**	**F**
I have never been annoyed when people expressed ideas very different from my own.	**T**	**F**
There have been times when I was quite jealous of the good fortune of others.	**T**	**F**
I am sometimes irritated by people who ask favours of me.	**T**	**F**
I have never deliberately said something that hurt someone's feelings.	**T**	**F**

SECTION FIVE

Please estimate the likelihood that the following events will happen <u>to you</u> in the future, by circling a number from 1 to 7, where the numbers mean:

1= Extremely unlikely to happen to you

2= Very unlikely to happen to you

3= Unlikely to happen to you

4= Neither likely nor unlikely to happen to you

5= Likely to happen to you

6= Very likely to happen to you

7= Extremely likely to happen to you

Be fined for speeding	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Have a crash due to speeding	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Not be hospitalised in the next 5 years for illness or injury	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Be made to feel socially awkward or embarrassed	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Be injured or killed in a car crash, as a driver at fault	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Be significantly in debt, due to gambling at the casino/on poker machines	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Borrow money to cover financial loses	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Have lung cancer	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Be fined for drink-driving	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Have a crash due to drink-driving	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Lose money/investments, due to fluctuations in the stock market	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Be rejected by a person when asking them out on a date	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Have skin cancer	**1**	**2**	**3**	**4**	**5**	**6**	**7**

Using the same scale as above, please estimate the likelihood that the following events will happen to the average person of your age and gender, by circling a number from 1 to 7.

Be fined for speeding	1	2	3	4	5	6	7
Have a crash due to speeding	1	2	3	4	5	6	7
Not be hospitalised in the next 5 years for illness or injury	1	2	3	4	5	6	7
Be made to feel socially awkward or embarrassed	1	2	3	4	5	6	7
Be injured or killed in a car crash, as a driver at fault	1	2	3	4	5	6	7
Be significantly in debt, due to gambling at the casino/on poker machines	1	2	3	4	5	6	7
Borrow money to cover financial loses	1	2	3	4	5	6	7
Have lung cancer	1	2	3	4	5	6	7
Be fined for drink-driving	1	2	3	4	5	6	7
Have a crash due to drink-driving	1	2	3	4	5	6	7
Lose money/investments, due to fluctuations in the stock market	1	2	3	4	5	6	7
Be rejected by a person when asking them out on a date	1	2	3	4	5	6	7
Have skin cancer	1	2	3	4	5	6	7

SECTION SIX

For each of the following questions, you are asked to rate how often you would perform a particular behaviour *in a particular circumstance*. Please consider the proportion of times you are in that circumstance, when making your responses. Please use the following scale:

0----------------1----------------2----------------3-----------------4--------------------5

Never   *Rarely*   *Sometimes*   *Often*   *Most of the time*   *Almost all the time*

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?	**0 1 2 3 4 5**
When it would be desirable to drive, but you are above the legal limit for alcohol, how often would you drive?	**0 1 2 3 4 5**
How often would you drive at 66-75km/hr in a 60km/hr speed zone?	**0 1 2 3 4 5**
How often would you drive at more than 75km/hr in a 60km/hr speed limit zone?	**0 1 2 3 4 5**
When out with friends, how often would you smoke cigarettes?	**0 1 2 3 4 5**
When on a break from work or during lunchtime, how often would you smoke?	**0 1 2 3 4 5**
When you are at a club or pub, how often would you gamble on a poker machine?	**0 1 2 3 4 5**
How often would you gamble?	**0 1 2 3 4 5**

When you are out with friends, and you see a guy/girl that you like, how often would you ask them out or ask for their phone number?	**0**	**1**	**2**	**3**	**4**	**5**

If there is a guy/girl that you like, and you've gotten to know them considerably, how often would you ask them out or ask for their phone number?	**0**	**1**	**2**	**3**	**4**	**5**

When you have some extra money to invest, how often would you speculate on the stock market?	**0**	**1**	**2**	**3**	**4**	**5**

When you need to make some extra money, how often would you speculate on the stock market?	**0**	**1**	**2**	**3**	**4**	**5**

During summer, how often would you sunbathe?	**0**	**1**	**2**	**3**	**4**	**5**

When at the beach, how often would you sunbathe for more than 2 hours?	**0**	**1**	**2**	**3**	**4**	**5**

When having a discussion with your friends, and you disagree with the majority of your friends' point of view, how often would you say so?	**0**	**1**	**2**	**3**	**4**	**5**

When discussing with your friends what social activities to do or where to go, and you disagree with the majority of your friends' point of view, how often would you say so?	**0**	**1**	**2**	**3**	**4**	**5**

SECTION SEVEN

1. Are you male or female (please circle)?   Male   /   Female

2. How old were you at your last birthday (in years)?   _____

3. What is the main language spoken at your home? _____

4. What is your postcode?   _____

5. Approximately how many hours do you spend driving each week? _____hrs/p week

6. What is the status of you driver's licence (please circle)?

    (1) Learners   (2) Red P   (3) Green P   (4) Ordinary   (5) Silver   (6) Gold

7. How long have you held a driver's licence (including L-plates)? ___yrs, ___mths

8. In the past 2 years, how many times have you been involved in a crash of any type (including collisions with pedestrians and stationary objects, etc.) while driving?

NEVER / ___times   *(If 'NEVER', go to Question 11)*

9. Of these crashes, how many would be a result of speeding? _____

10. Of these crashes, how many would be a result of drink-driving? _____

11. In the past 2 years, how many times have you been fined for speeding?

NEVER / ___times

12. In the past 2 years, how many times have you been fined for drink-driving?

NEVER / ___times