

Factors Associated with Speeding, Drink-Driving, Driving while Fatigued and Seat Belt Use in a Sample of Metropolitan Sydney Drivers

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ABSTRACT

Road trauma is recognized as a serious problem both in Australia and internationally, particularly for younger drivers. Risky driving has been identified as an important contributor to road crashes, although it may be debated whether all risky behaviours are sufficiently similar to be explained by similar factors. The present study examined a range of demographic factors, personality factors, attitudes and beliefs (based in part on the Health Belief Model) in the prediction of speeding, drink-driving, driving while fatigued, and not wearing seat belts, for young drivers. Results illustrated that different risky driving behaviours were predicted by different factors. Speeding was predicted by gender, sensation seeking, driver anger, road-unrelated illusory invulnerability, general perceived susceptibility, and specific perceived susceptibility. Drink-driving was predicted by peer influence. Driving while fatigued was predicted by specific perceived susceptibility, as well as the perceived costs and perceived benefits associated with not driving while fatigued. Not wearing a seat belt was predicted by general perceived susceptibility. Overall, results suggest that future research should focus on a multi-factor framework for *specific* risky driving behaviours. Results may guide future young driver road safety messages and countermeasures for individual risky driving behaviours.

Road trauma is recognized as a serious problem both in Australia and internationally. According to the Roads and Traffic Authority of NSW (2005), in 2004 there were more than 47,000 road crashes on NSW roads, with 510 persons killed and over 26,000 injured. Younger drivers are over-represented in crashes among all classes of road user (Jonah, 1986; Prabhakar, Lee & Job, 1996; Job, 1999).

Risky driving has been identified as an important contributor to road crashes (see Jonah, 1986). Thus, reducing levels of risky driving should reduce the incidence of crashes and injury on the roads. Successful manipulation of risky driving requires a good understanding of contributing factors. For the present research, the Health Belief Model (HBM; Janz & Becker, 1984) is used a basic framework because it has been effectively applied to a range of health contexts (see Conner & Norman, 1996) including risky driving (Yagil, 2000). Additional factors are also considered, as they have been demonstrated to relate to risky driving. The HBM proposes that a person's decision to engage in safe behaviour is determined by four dimensions: the *perceived susceptibility* to, and *perceived severity* of, the consequences of a risky behaviour, as well as the *perceived benefits*, and *perceived costs*, of the alternative safety behaviour (Janz & Becker, 1984).

Perceived risk – Perceived risk has received considerable attention as a determinant of risky driving. Perceived risk may be understood to include the *perceived susceptibility* to, and *perceived severity* of, the consequences of performing a risky behaviour. Absolute perceived risk has been shown to correlate significantly with risky driving (Ryb, Dischinger, Kufera & Read, 2006). Illusory invulnerability, people's tendency to expect a better future than their peers (DeJoy, 1989), is an aspect of risk perception that may also be relevant to risky driving. It has been shown that most people see themselves as less likely than average to be injured or killed in a car crash (Job, 1990), or be fined for drink-driving (Prabhakar et al., 1996), and such relative judgements influence behavioural intentions (Klein, 1997).

Perceived benefits and costs – People may engage in risky driving because it has a value to them (Jonah, 1986). For example, time urgency relates to a substantial benefit of speeding. Sensation seeking, the tendency to seek new and varied experiences (Zuckerman, 1980), and may also relate to benefits of risky driving (Jonah, Thiessen & Au-Yeung, 2001).

Further, driver anger reflects a predisposition to experience anger across a range of driving situations (Deffenbacher, Oetting & Lynch, 1994), and has been shown to be the only mood state related to increased risky driving (Arnett, Offer & Fine, 1997). Also, rebellion against authority figures such as parents and police officers may contribute to a positive attitude toward breaking traffic laws, and has not yet been sufficiently examined in relation to risky driving.

Social norms – Social norms refer to a person's beliefs about whether significant others think they should engage in a particular behaviour (Connor & Norman, 1996). Teens are an important source of social influence on adolescent risk behaviors (Donovan, 2004), and peer influence may be an important factor in risky driving (Simons-Morton, Lerner & Singer, 2005).

Gender – Males consistently exhibit greater risky driving, and road trauma involvement, compared with females (e.g. Job, 1999; Prabhakar et al., 1996).

Age – Young drivers are more likely to engage in risky driving compared with older drivers (e.g. Job, 1999; Jonah, 1986).

Given the range of factors implicated in the prediction of risky driving, these factors must be examined together, in order to tease apart the roles of different factors and identify which factors best predict which *individual* risky driving behaviour. Few studies have directly examined the differences between risky driving behaviours, in terms of precipitating factors. Our preliminary research (Fernandes & Job, 2003) examined a range of possible predictors of risky driving in relation to a range of risky driving behaviours, in order to investigate whether predictive factors for these behaviours differed from behaviour to behaviour. Results indicated that *different* factors predict *different* risky driving behaviours.

The present study examined a range of demographic factors, personality factors, attitudes and beliefs in the prediction of speeding, drink-driving, driving while fatigued and not wearing seat belts, for young drivers aged 16-25 years, by the use of a Risky Driving Questionnaire, and examined whether there are different predictors for different risky driving behaviours.

## METHOD

### *Design*

Four questionnaire versions (corresponding with the four behaviours) were employed in order to minimise the effects of fatigue on performance. For every four people agreeing to participate, researchers administered a 'speeding' questionnaire, followed by a 'drink-driving' questionnaire, then a 'not wearing seat belts' questionnaire, and then a 'driving while fatigued' questionnaire.

### *Participants and Sampling*

Questionnaire versions were distributed to 587 drivers from metropolitan Sydney who agreed to participate in a study of "drivers' attitudes toward various risky driving behaviours". Participants were recruited outside six RTA Motor Registries across the Sydney metropolitan area. Registries were selected to represent a broad range of socioeconomic areas. Participants were required to have held a current NSW drivers license for at least one year, and to be 25 years or less. Of the 587 participants, 118 were immediately excluded from further analysis due to the return of a substantially incomplete questionnaire (less than half completed). The sample sizes for the four behaviours were 127 for speeding (49.6% females; mean age = 21.0; SD age = 2.64), 112 for drink-driving (48.2% females; mean age = 21.3; SD age = 2.44), 116 for driving while fatigued (53.4% females; mean age = 21.1; SD age = 2.51), and 114 for not wearing seat belts (49.1% females; mean age = 21.3; SD age = 2.65).

## MATERIALS

### RISKY DRIVING QUESTIONNAIRE

For each of the four risky driving behaviours examined, questions were presented in seven sections (in the order of administration):

Section One: Illusory Invulnerability. Participants rated the chances that each of six events would happen to them, compared with peers of the same age and gender. Two *specific road-related illusory invulnerability* questions related to being fined and having a crash due to one of the risky driving behaviours (depending on the questionnaire version). Two *general road-related illusory invulnerability* questions related to general driving issues that were not specific to the individual behaviours, and two *road-unrelated illusory invulnerability* questions related to events other than driving. Responses were made on a 5-point scale, ranging from “Much lower than average” to “Much higher than average”.

Section Two: Perceived Susceptibility, General Perceived Severity, Perceived Benefits, Perceived Costs, and Peer influence. Five *general perceived severity* questions related to the seriousness of consequences of risky driving in general. Four *general perceived susceptibility* questions related to participants’ vulnerability to being caught or fined by police, incurring demerit points, and having a crash, in general. Three *specific perceived susceptibility* questions referred to participants’ vulnerability to being caught or fined by police, incurring demerit points, and having a crash, related specifically to one of the risky driving behaviours (depending on the questionnaire version). Five *specific perceived costs* questions related to the costs associated with not performing one of the risky driving behaviours. Five *specific perceived benefits* questions (eight for the ‘driving while fatigued’ questionnaire version) related to the benefits associated with not performing one of the risky driving behaviours. One question asked the extent to which peers influence the decision to engage in one of the risky driving behaviours. Responses were made on a 7-point scale, ranging from “Strongly agree” to “Strongly disagree”.

Section Three: Behavioural Intentions. Participants reported the frequency with which they intended to engage in one of the risky driving behaviours (depending on the questionnaire version), under various circumstances. Four different circumstances were presented for each behaviour. For example, in relation to speeding, participants were asked how often they would intend to drive at 15km/hr and more than 15km/hr over a 60km/hr speed limit, and over a 100km/hr speed limit. Participants gave responses as a percentage of the occasions that they were in each circumstance, ranging from “0% of such occasions” to “100% of such occasions”, on a percentage scale guide. For each behaviour, behavioural intention scales were formulated by adding the percentage scores for each of the five questions pertaining to a given behaviour.

Section Four: Personality Scales. Widely researched measures of relevant personality dimensions were administered. These were the *Authoritarian-Rebellion Scale* (Kohn, 1972), the *Time Urgency Scale* (Landy, Rastegary, Thayer & Colvin, 1991), the *Sensation Seeking Scale-Form V* (Zuckerman, 1980), and the *Driving Anger Scale* (Deffenbacher et al., 1994). Further, a 13-item true/false short form of the Marlowe-Crowne Social Desirability Scale (Reynolds, 1982) was administered to assess potential bias from socially desirable responding (Paulhus, 1984). All of these scales have sound parametric properties.

Section Five: Infringement and Crash History. Participants indicated how many times they had been fined for traffic infringements, and how many crashes they had been involved in while driving, in the last two years.

*Section Six: Specific Perceived Severity.* Participants rated the severity of three different consequences (being fined, gaining demerit points, and sustaining injuries) for one of the risky driving behaviours (depending on the questionnaire version), in terms of the impact each circumstance would have on their lives. Responses were made on a 7-point scale, ranging from “Extremely severe” to “Not severe at all”.

*Section Seven: Demographics.* Participants responded to questions regarding their age, gender, language spoken, postcode, driving experience (in years), and drivers license status.

## PROCEDURE

All people entering the grounds of each motor registry who appeared to be between 16 and 25 years old were approached by researchers (who worked in pairs, and stood outside the entrance of each selected motor registry), and invited to participate. The refusal rate was approximately 35%. Participants who confirmed that they were between 16 and 25 years old and held a current NSW drivers license completed a short questionnaire, taking approximately 10 minutes, while they waited for service inside the registry. In accordance with the ‘Bogus Pipeline’ technique (Jones & Sigall, 1971), to reduce motivation for socially desirable responding, participants were asked to provide their Drivers’ License number so that researchers could check driving records. Participants were debriefed and thanked for their participation.

## RESULTS

A Type 1 error rate of 0.05 was employed for all analyses, and all tests were 2-tailed.

### Scale Construction

Original instructions for the scoring of all personality scales, as well as the Marlowe-Crowne Social Desirability scale, were followed. Internal consistency was assessed employing Cronbach’s Alpha (see Table 1), except for the illusory invulnerability scales which contained only two items, and so the correlation between these items was calculated (see Table 2).

*Table 1: Cronbach’s Alpha for all scales constructed (except illusory invulnerability scales), for each questionnaire version.*

	“Speeding” version	“Drink- driving” version	“Driving While Fatigued” version	“Not Wearing Seat belts” version
$\alpha$ (general severity)	0.69	0.65	0.66	0.55
$\alpha$ (specific severity)	0.62	0.80	0.73	0.85
$\alpha$ (general susceptibility)	0.68	0.66	0.54	0.55
$\alpha$ (specific susceptibility)	0.68	0.81	0.55	0.53
$\alpha$ (perceived benefits)	0.62	0.56	0.77	0.55
$\alpha$ (perceived costs)	0.75	0.66	0.63	0.80
$\alpha$ (driver anger)	0.71	0.70	0.70	0.69
$\alpha$ (behavioural intentions)	0.91	0.81	0.69	0.89

Internal consistency was acceptable ( $\alpha > 0.60$ ) for all scales except general severity for not wearing seat belts ( $\alpha = 0.55$ ), general susceptibility for driving while fatigued ( $\alpha = 0.54$ ) and not wearing seat belts ( $\alpha = 0.55$ ), specific susceptibility for driving while fatigued ( $\alpha = 0.55$ ) and not wearing seat belts ( $\alpha = 0.53$ ), and perceived benefits of not drink-driving ( $\alpha = 0.56$ ) and wearing seat belts ( $\alpha = 0.55$ ).

Table 2: Item correlations for all road-unrelated, road-related general and road-related specific illusory invulnerability scales, for each questionnaire version.

	“Speeding” version	“Drink- driving” version	“Driving While Fatigued” version	“Not Wearing Seat belts” version
$\alpha$ (road-unrelated)	.187*	.248**	.264**	.391**
$\alpha$ (road-related general)	.420**	.394**	.158	.132
$\alpha$ (road-related specific)	.539**	.698**	.749**	.580**

\* Significant at the 0.05 level (2-tailed); \*\* Significant at the 0.001 level (2-tailed).

Item correlations were satisfactory for all illusory invulnerability scales, except road-related general illusory invulnerability for driving while fatigued and not wearing seat belts.

### *Correlations between Social Desirability Scores and All Factors Examined*

Pearson correlations between Marlowe-Crowne social desirability scores and all factors were examined. Social desirability scores correlated significantly only with behavioural intentions for both driving while fatigued and speeding. Given the number of tests performed, these correlations are likely to reflect a Type I error. Thus, social desirability was not included as a covariate in subsequent regression analyses.

### *Regression Analyses*

Regression models for each of the four driving behaviours were compared. Three hierarchical regression models were considered for each behaviour:

- (1) *‘Demographics only’ Model* – Age and Gender are fixed attributes of an individual. These factors were included as covariates, and were forced to enter first in the regression analyses.
- (2) *‘Demographics plus personality factors’ Model* – Personality factors are defined as stable and consistent individual characteristics (Weiten, 2001). These factors were included as covariates, and were considered after the effects of demographics were incorporated.
- (3) *‘Demographics plus personality factors plus attitudes and beliefs’ Model* – In order to understand whether attitudes and beliefs influence risky driving, the effects of age, gender and personality factors must be taken into account. Thus, attitude and belief factors were considered after the effects of demographic and personality factors were incorporated.

The summary of results for regression analyses performed for each of the four risky driving behaviours is shown in Table 3.

Table 3: Summary of regression analyses results, illustrating the factors significantly predicting each of the four risky driving behaviours within each of the three behaviour models (with the proportion of variance accounted for by each model in brackets).

BEHAVIOUR	'Demographics only' Model	'Demographics plus personality factors' Model	'Demographics plus personality factors plus attitudinal factors' Model
<b><i>SPEEDING</i></b>	Gender**  (12.7%)	Gender** Driver Anger**  (25.8%)	Authority Rebellion* Driver Anger* Road-Unrelated Illusory Invulnerability* Perceived Costs* Perceived Benefits** (49.0%)
<b><i>DRINK-DRIVING</i></b>	Gender**  (9.4%)	Gender** Driver Anger**  (19.8%)	Road-Unrelated Illusory Invulnerability* Perceived Costs** Peer Influence* (38.7%)
<b><i>DRIVING WHILE FATIGUED</i></b>	– (0.5%)	– (2.3%)	Perceived Benefits** (11.0%)
<b><i>NOT WEARING SEAT BELTS</i></b>	– (0.5%)	– (-1.5%)	Road-Related Specific Illusory Invulnerability* Perceived Costs* (24.5%)

\* Significant at the 0.05 level (2-tailed); \*\* Significant at the 0.001 level (2-tailed).

Speeding was predicted by authority rebellion, driver anger, road-unrelated illusory invulnerability, perceived costs, and perceived benefits; drink-driving was predicted by road-unrelated illusory invulnerability, perceived costs, and peer influence; driving while fatigued was predicted by perceived benefits; and not wearing seat belts was predicted by road-related specific illusory invulnerability, and perceived costs. The proportion of variance accounted for by the regression models ranged from 9.6% to 62.3%.

## DISCUSSION

The present research tested the apparent assumption that demographic, personality, and attitudinal factors contribute to risky driving behaviours in the same way, regardless of the behaviour. Results illustrate the varying patterns of predictors between individual driving behaviours, supporting previous findings by the present researchers (Fernandes & Job, 2003).

Intention to **speed** was significantly predicted authority rebellion, driver anger, road-unrelated illusory invulnerability, as well as the perceived costs and perceived benefits of not speeding. Lower perceived likelihood that negative events (unrelated to driving) will happen to them (compared peers of the same age and gender), as well as higher anger elicited from driving situations, was associated with more frequent intended speeding. This supports past findings illustrating that driver anger may be an influential factor for speeding behaviour (e.g. Jonah, 1986). Furthermore, results illustrate that higher endorsement of the perceived costs of driving within the speed limit (such as taking longer to get to a destination and not being able to keep up with traffic), and lower endorsement of the perceived benefits of driving within the speed limit (such as saving money on petrol consumption and avoiding engine wear and tear), was associated with more frequent intended speeding.

Some of the perceived costs of not speeding relate to “getting to a destination on time”, and thus the present result is consistent with previous research suggesting that drivers more likely to speed are also more likely to view being on time for appointments as desirable (Adams-Guppy & Guppy, 1995). Furthermore, authority rebellion was a significant personality predictor of intended speeding, which supports our previous research involving speeding (Fernandes & Job, 2003).

Peer influence, as well as road-unrelated illusory invulnerability and the perceived costs of not drink-driving, significantly predicted **drink-driving**. The association between peer influence and intention to drink-drive suggests that greater peer influence is associated with more frequent intended drink-driving. The association between peer influence and drink-driving may be due in part to recent road safety advertisement campaigns that have focused on social norms in relation to drink-driving behaviour. The finding also supports prior research indicating the importance of social norms to drink-driving (Gulliver & Begg, 2004). The relevance of social norms is unsurprising, given that many circumstances in which young drivers might drink-drive involve social drinking when they are with their friends. Furthermore, lower perceived likelihood that negative events (unrelated to driving) will happen to them (compared peers of the same age and gender) was associated with more frequent intended drink-driving, which supports our previous research involving drink-driving (Fernandes & Job, 2003). Also, results illustrate that higher endorsement of the costs associated with not drink-driving (such as having to plan a night out in advance and having to limit the amount of drinks consumed) was associated with more frequent intended drink-driving.

**Driving while fatigued** was predicted by perceived benefits of not driving while fatigued. Results illustrate that higher endorsement of the perceived benefits of taking a break while driving to avoid the effects of fatigue (such as comfort or security and being refreshed for the drive ahead) was associated with more frequent intended driving while fatigued. The association between perceived benefits and driving while fatigued may be due in part to recent road safety advertisement campaigns that have focused on the benefits of taking a break while driving (such as the “Stop, Revive. Survive” advertising campaign).

**Not wearing seat belts** was significantly predicted by road-related specific illusory invulnerability and perceived costs of wearing a seat belt. Results suggest that higher endorsement of the perceived costs of wearing a seat belt (such as feelings of discomfort and lack of freedom to move around in the seat) is associated with less frequent intended seat belt use. Results also suggest that higher perceived likelihood that negative events *specifically related to wearing a seat belt* will happen to them (compared to peers of the same age and gender) is associated with less frequent intended seat belt use. While our previous research has also found illusory invulnerability to predict seat belt use in a community sample (Fernandes & Job, 2003), these findings seem unusual, given the direction of regression results (suggesting that *lower* illusory invulnerability is associated with greater non-use of seat belts).

Attitudes and beliefs appear to be the strongest predictors of risky driving, even after controlling for the effects of age, gender, and personality factors. In particular, those attitudes and beliefs *specific* to individual behaviours appear to be the most pertinent factors. Present findings support recent studies illustrating the importance of investigating attitudes and beliefs that are *specific* to each individual risky driving behaviour, rather than *general* road safety attitudes and beliefs (Iversen, 2004; Fernandes & Job, 2003).

The finding that different factors predict different behaviours suggests that we should not extrapolate predictors of one behaviour to another, and indicates the importance of designing individual road safety campaigns for individual driving behaviours. For example, speeding campaigns may focus on reducing the impact of driver anger (e.g. by suggesting alternative techniques for releasing road-related anger), and drink-driving campaigns may focus on peer influence (e.g. continued promotion of negative images of drink-driving for young people).

The present research is based on self-report measures of risky driving behaviour, which may suffer from inaccuracy in recall or report. However, relevant literature suggests that participants' self-reports are reasonably accurate. For example, West, French, Kemp & Elander (1993) examined the relationship between self-reported speed and observations of speeding behaviour (secretly monitored by in-car observers), and found a significant correlation between self-reported speeding and observed driving speed. Socially desirable responding was assessed in the present study, but was minimal. The "bogus pipeline" technique (Jones & Sigall, 1971) was also employed to reduce motivation for socially desirable responses, by telling participants that their responses may be checked against official records. Nonetheless, validation against observed driving behaviour or infringement records may increase confidence in these findings.

Because this research provides only cross-sectional data, the causal relationship cannot be inferred from the findings. The present research has identified factors that are associated with different risky driving behaviours, in order to provide a basis for future experimental research. Only through manipulation of the relevant factors, and determination of the effects on associated risky driving behaviours, can underlying causal mechanisms for the risky driving behaviours be identified.

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