



Understanding the psychosocial factors influencing the risky behaviour of young drivers

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Title:

Understanding the Psychosocial Factors Influencing the Risky Behaviour of Young Drivers

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Abstract:

Young people aged 17-24 years are at high risk of being killed in road crashes around the world. Road safety interventions consider some influences upon young driver behaviour; for example, imposing passenger restrictions on young novice drivers indirectly minimises the potential negative social influences of peers as passengers. To change young driver risky behaviour, the multitude of psychosocial influences upon its initiation and maintenance must be identified. A study questionnaire was developed to investigate the relationships between risky driving and Akers' social learning theory, social identity theory, and thrill seeking variables. The questionnaire was completed by

165 participants (105 women, 60 men) residing in south-east Queensland, Australia. The sociodemographic variables of age, gender, and exposure explained 19% of the variance in self-reported risky driving behaviour, whilst Akers' social learning variables explained an additional 42%. Thrill seeking and social identity variables did not explain any significant additional variance. Significant predictors of risky driving included imitation of the driving behaviours of, and rewards and punishments administered by, parents and peers. Road safety policy that directly considers and incorporates these factors in their design, implementation, and enforcement of young driver road safety interventions should prove more efficacious than current approaches.

Keywords:

Social Learning Theory, Social Identity Theory, Young Drivers, Risky Driving, Road Safety

Understanding the Psychosocial Factors Influencing the Risky Behaviour of Young Drivers

1. Introduction

The overrepresentation of young drivers in motor vehicle crashes is a persistent global road safety problem (Doherty, Andrey, & MacGregor, 1998) that was recognised more than half a century ago (Chliaoutakis, Darviri, & Demakakos, 1999). Car crashes are the leading cause of death for persons aged 15-24, who constituted 10% of the population in OECD countries in 2004, but represented 27% of all crash fatalities (OECD, 2006). Young drivers also tend to engage in risky behaviours (Durkin, 1995), for example young males report that speeding is a normal non-serious behaviour (Rothe, 1987b, as cited in Harre, Field, & Kirkwood, 1996). Whilst gaining a driver's licence is generally seen as a developmental rite of passage (Freund & Martin, 2002), safety concerns have led to 1 in 5 parents reporting attempts to delay their children obtaining a learner's permit (Sherman, Lapidus, Gelven, & Banco, 2004).

Epidemiological studies (e.g., ATSB, 2004a) from around the world have repeatedly demonstrated that crash risks are highest for the youngest drivers who are twice as likely to be killed as older drivers (OECD, 2006). Young passengers contribute half of all vehicle occupant deaths amongst this age group (Williams & Wells, 1995). A number of factors consistently emerge in the international literature as contributors to young driver crashes. Driver characteristics contributing to young driver crashes include age (e.g., TAC, 2007), gender (e.g., ATSB, 2004a), licence status (e.g., Lam, 2003), driving experience (e.g., Berg, Eliasson, Palmkvist, & Gregersen, 1999), consumption of alcohol (e.g., Isaac, Kennedy, & Graham, 1995), fatigue (e.g., Queensland Transport,

2005), inattention (e.g., Zhang, Fraser, Lindsay, Clarke, & Mao, 1998), and not wearing seat belts (e.g., Begg & Langley, 2000). Influential passenger variables are the age (e.g., Miller, Spicer, & Lestina, 1998), gender (e.g., Williams & Wells, 1995), and the number of passengers (e.g., Miller et al., 1998).

2. Relevant Theoretical Perspectives

It is apparent that young driver crashes arise from a multitude of variables, the majority of which involve volitional factors. Throughout the young drivers' lifetime, they are exposed to numerous powerful influences on driving attitudes and behaviours. These include parents, peers, schoolmates, and workmates (James, 2002), whose influence is mediated by further variables, for example, the behaviour of young drivers is likely to reflect that of their same-sex parent (Taubman-Ben-Ari, Mikulincer, & Gillath, 2005). Entrenchment of attitudes and motivations regarding road use are apparent long before obtaining a driver's licence (Boyes & Litke, 2002; Carcary, 2002). Adolescence is also a period characterised by developmental changes (of a physiological, cognitive, behavioural, and social nature) during which youths increase their reliance on peers in forming attitudes and behaviours (Sharpley, 2003). Road crash statistics indicate that as adolescents mature, deaths and fatalities decrease, reflecting physical and psychological maturation, the assumption of culturally- and age-appropriate behaviours (Jessor, Turbin, & Costa, 1997), and diminishing susceptibility to the negative influences of young passengers (Engstrom, 2003). In an attempt to ameliorate the pervasive problem of young driver risky behaviour, it is important that research into the psychosocial influences upon risky driving be informed by relevant psychological theory. Relevant psychological theory that has the potential to make a

contribution includes Akers' differential-association-reinforcement theory and social identity theory. In addition, thrill seeking in the driving context has also been shown to be predictive of the risky behaviour of young people.

2.1. *Differential-Association-Reinforcement Theory (Akers' Social Learning Theory)*

Akers' differential-association-reinforcement theory (herein referred to as Akers' social learning theory, consistent with current psychological practice) extends Bandura's social learning theory principles (Bandura, Ross, & Ross, 2003) within the criminological domain. The theory was developed to account for the persistent finding that youth are more likely to indulge in proscribed behaviour if they differentially associate with peers who are accepting of and/or promote such deviance (Akers, Krohn, Lanza-Kaduce, & Radosevich, 1979; Hochstetler, Copes, & DeLisi, 2002). *Normative definitions*¹ are influenced by significant others and represent the individual's general and more specific beliefs about socially- and culturally-appropriate rules and values. The duration, intensity, frequency, and priority of *differential association* with parents and peers with whom adolescents interact varies, with greater association leading to greater influence. Whilst initial behaviour is primarily learned via *imitation*, continuing behaviours are influenced by *differential reinforcement*, which is the balance of actual and perceived reinforcement. *Rewards* – which include social and non-social sources of rewards – are likely to increase the frequency of the behaviour. Conversely, *punishments* – similarly from social and non-social sources – are likely to reduce the frequency of the behaviour (Akers & Sellers, 2004; Brezina & Piquero, 2003).

The constructs within Akers' social learning theory are traditionally measured as composite scales comprising a number of items exploring the variables of interest, with

the data first being subjected to a descriptive analysis via correlations, following which multiple regression analyses are undertaken. Self-report questionnaires are typically used (e.g., see Akers et al., 1979) in which the participant ranks the frequency of the behaviour under investigation (e.g., ‘how often do you use alcohol’ scaled from ‘never’ to ‘nearly every day’). Imitation is gauged by exploring the models liked by the participant, and by measuring the favourable and unfavourable attitudes of the participant and their imitated models measured. Differential association is measured by the participant scaling the perceived favourable, unfavourable and neutral attitudes held by these significant models. Differential reinforcement is quantified by exploring the social and non-social rewards received from performing the risky behaviour, as well as the social (including legal) and non-social punishment.

Akers’ social learning theory has been used in a number of studies to explain risky behaviours among adolescent populations (Shinew & Parry, 2005). It has often been found to be better than other theoretical models in explaining substantial variance in deviant behaviour, for example accounting for 41% of variance in adolescent smoking (Krohn, Skinner, Massey, & Akers, 1985), 68% of marijuana and 55% of alcohol use (Akers et al., 1979), and 67% of variance in Korean adolescent’s substance use (Hwang & Akers, 2003). Differential association with peers has consistently emerged as the strongest predictor of adolescent psycho-active substance use in Italian populations (Bonino, Cattelino, & Ciairino, 2005), and the differential association variable ‘change in friends’ was the only significant predictor of smoking cessation in more than 300 adolescent New Jersey residents (Chen, White, & Pandina, 2001).

Whilst the normative social influence of parents and peers upon the seat belt use of Spanish young drivers has been recognised (Gras, Cunill, Sullman, Planes, & Font-

Mayolas, 2007), there has been limited but promising application of the social learning constructs within the realm of road safety. DiBlasio (1987) reported that differential association with peers, differential reinforcements, modelling, and attitudes favouring risky behaviour significantly predicted whether a sample of American youths aged less than 15 years travelled as passengers of drinking drivers. Watson (2004) reported that differential association was the predominant psychosocial influence upon the intentions of 309 suspended and disqualified adult Australians to drive whilst unlicensed, with prediction based on Akers' social learning variables being superior to prediction based on deterrence theory for the most non-compliant participants. Fleiter, Watson and Lewis (2006) reported that Akers' social learning variables significantly explained speeding behaviour over and above the explanatory contribution of deterrence theory in 320 Australian adults aged 17 to 79 years. Moreover, a study of the drug driving behaviour of Queensland university students aged 17 to 56 years found that drug driving was positively correlated with social rewards and negatively correlated with social punishments (Armstrong, Wills, & Watson, 2005).

These findings support Akers' assertion that his theory is a comprehensive model which encapsulates many psychosocial influences (Akers et al., 1979). As such it appears a potentially useful model to examine the self-reported risky behaviours amongst young Australian drivers aged 17 to 24 years. In addition, a number of other psychosocial theories may be used to understand how parents and peers influence the risky behaviour of young drivers. Notwithstanding Akers' claim of a comprehensive theory, it would also be valuable to consider other factors that would uniquely apply to this group, such as social identity theory, capturing the influences at a social level, and thrill seeking in the driving domain, capturing the influences at a personal level. The

inclusion of these theories within the scope of the research provides an opportunity to examine how comprehensive Akers' theory is, and if these theories apply to the young driver. Accordingly theories such as social identity theory and thrill seeking in the driving context shall also be explored.

2.2. *Social Identity Theory (SIT)*

Social identity theory (SIT) asserts that in order to maintain positive self-esteem and social identity as a member of a certain group, an individual makes inter- and intra-group comparisons across important salient dimensions of attitudes, behaviours, and other characteristics that favour the individual belonging to that group (Tajfel & Turner, 2003; Tarrant et al., 2001). Identity is therefore constructed through self-categorisation and internalisation of group norms, attitudes, and behaviour standards (Tajfel & Turner, 2003). Identity development is evident across the lifespan (Erikson, 1968, cited in Nash & Brinker, 2002; Jaccard, Blanton, & Dodge, 2005), and group membership and identification is often central to this (Boyes & Litke, 2002; Heaven, Caputi, Trivellion-Scott, & Swinton, 2000). Social identity theory (SIT) posits that social identity, peers, and impression management efforts become a priority for the adolescent (Tajfel & Turner, 2003), which may be inconsistent with safe driving behaviour. Given that the majority of young driver crashes result from risky behaviours and attitudes (see Evans, 1991), SIT offers potential benefits in enhancing our understanding of the variables influencing young drivers aged 17-24 years.

The interaction between identity and road use has been previously recognised in the literature (Fletcher, 1997). Young drivers know what they should do on the road to be safe (e.g., Falk & Montgomery, 2007; Tuohy & Stradling, 1992, cited in Clarke,

Ward, & Truman, 2005) however they are willing to modify their behaviours to fit in with desirable social groups (Brown & Lohr, 1987; Hogg & Williams, 2000; O'Connell, 2002). Young drivers also report their self-esteem is inextricably intertwined with their self-perceptions of themselves as drivers (Falk & Montgomery, 2007), with potential embarrassment and social disapproval being powerful influences upon compliance. For males in particular (Bonino et al., 2005) the more cohesive the group, for example a car full of male friends, the greater the group pressure to conform (Zimbardo & Leippe, 1991). Social identity theory has not been utilised to explore young driver behaviour, although it has been applied to risky adolescent behaviour such as smoking (Kobus, 2003; Stewart-Knox et al., 2005) and drinking (Scheier & Botvin, 1997), prior research within the social identity domain including ethnographic studies utilising grounded theory (e.g., Wiltshire, Bancroft, Amos, & Parry, 2001, cited in Stewart-Knox et al., 2005), and individual interviews (Stewart-Knox et al., 2005).

There are a number of conceptual similarities between Akers' social learning theory and SIT, including the young driver associating with friends who act as models of attitudes and behaviours, and who can reinforce the attitudes and behaviours of the young driver through social punishments and rewards. From an Akers' social learning perspective, it appears that it is the frequency, priority, duration and intensity of the differential association with friends that influences the young driver's behaviour (Akers et al., 1979). From a SIT perspective, it appears that it is the young person's sense of 'social belongingness' to this peer *group* which is particularly important to and therefore influential over the young driver. It could be asserted that this social belongingness, captured as group identity in the research, is encapsulated within Akers' social learning theory, however this remains unclear. Accordingly, to more fully

investigate the relative utility of different theoretical perspectives, and in particular to determine whether Akers' social learning theory indeed is as comprehensive as purported by Akers, the influence of SIT on young driver behaviour will be explored as a separate 'group identity' construct.

2.3. *Thrill Seeking*

Young people tend to report that driving serves many purposes, apart from efficient and economical transport, which can impact upon road safety (Cavallo, Montero, Sangster, & Maunders, 1997). These include skilful graduation to adulthood (Smith, 1997); status in front of peers and the opposite sex (Deery, 1999); and autonomy and control (Boyes & Litke, 2002). Of particular concern is sensation seeking behaviour (see Jonah, 1997, for a review), such as expressing feelings of excitement, anger, and frustration (Arnett, Offer, & Fine, 1997; Sullman, 2006) and competitiveness (Ulleberg, 2002). Thrill seeking was the stated cause of the behaviours for which one in four Australian young drivers were fined (Ross & Guarnieri, 1994, cited in Cavallo et al., 1997), and has consistently been found to be associated with risky driving, offences and crashes (Rimmo & Aberg, 1999). Recently a number of researchers have focused on the driving-specific dimensions of sensation seeking measured by the Thrill Seeking Scale (Lawton, Parker, Manstead, & Stradling, 1997), which has been found to predict risky driving behaviour in young adults (e.g., Bates, Watson, & King, 2009). Accordingly the person-related variable of sensation seeking in the research has been conceptualised as the young person's thrill seeking behaviour in the driving context, rather than the more broad personality traits of impulsivity and sensation seeking frequently utilised in research into driver behaviour. In addition, recent Australian

research has also shown that thrill seeking correlates highly with the non-social rewards inherent in the differential reinforcement construct, suggesting that the influences of thrill seeking may also be encapsulated within Akers' social learning model (Fleiter et al., 2006). To more fully investigate this supposition, the influence of thrill seeking on young driver behaviour will also be investigated.

3. Study Objectives

The current study was designed to explore the sociodemographic and psychosocial factors influencing the risky behaviour of young drivers. The influence of various psychosocial variables encapsulated within Akers' social learning theory, the group identity variable of SIT, and driving-specific thrill seeking upon the self-reported risky driving behaviour of young drivers will be examined. It is hypothesised that the sociodemographic variables of age², gender, and driving exposure will significantly predict the risky driving of young drivers (Hypothesis 1). It is hypothesised that the variables within Akers' social learning model will significantly predict the risky driving of young drivers over and above the participant's sociodemographic characteristics (Hypothesis 2). It is further hypothesised that whilst group identity and thrill seeking in isolation may be predictive of risky driving, they will not add to the variance in prediction of risky driving over and above the social learning variables (Hypothesis 3). In addition, a number of exploratory analyses stemming from the hypotheses will be undertaken to investigate any differences in predictors for male and female drivers.

4. Method

4.1. Preliminary Qualitative Research

A preliminary study was undertaken to inform the design of the items to be used in the main study. Fourteen young drivers (8 male, 6 female) aged 17-24 years (mean age = 19.2 years) were recruited through convenience sampling of friends and acquaintances of the researcher. A semi-structured questionnaire guided the 20-minute informal small group interview held in the home of the researcher or the volunteer. Example questions include ‘Have your friends ever made fun of your driving? If so, when, where, and why?’ and ‘If you do something in the car your parents don’t like, how do they react?’ Of note, a majority of participants ($n = 12$) reported their main concern when driving was the number of points on the licences of themselves and their friends, and that the legality of their behaviour was only considered when a large number of demerit points had accumulated. The draft questionnaire was subsequently modified to incorporate four items relating to police punishment of risky driving. The age-appropriateness of the language to be used was also checked, with terms such as “racing around on the roads” used in item 30 taken directly from the participants’ responses.

4.2. *Main Study*

4.2.1. *Participants*

One hundred and sixty-five licensed drivers (105 women and 60 men) aged 17-24 years ($M = 19.65$ years, $SD = 2.10$) who had a drivers licence volunteered to participate in the study. Sixty-one participants were psychology undergraduates at the Queensland University of Technology, and they were granted course credit for their participation. Eighty-six participants were students of other faculties and members of the public recruited via convenience sampling of friends, relatives, and work colleagues.

Eighteen participants were recruited from the local Government Driver Licensing centre with Departmental permission.

4.2.2. Design

The study utilised a cross-sectional survey design involving the collection of a range of self-report data. The main dependent variable was participant '*self-reported risky driving behaviour*', further validated by measuring self-reported '*crashes*' and '*offences*' within the previous three years. The main independent variables included the sociodemographic variables of participant *age*, *gender* and driving exposure measured as the number of hours spent driving each week ('*exposure*'). The independent variables comprising the social learning psychosocial constructs were measured as '*personal attitudes*' towards driving; '*differential association*'; '*anticipated punishment*', '*anticipated rewards*', and '*imitation*' of parents and peers. '*Group identity*' measured the priority of social identification within the psychosocial construct of SIT; and the propensity for '*thrill seeking*' by young drivers measured the thrill seeking construct within the driving context.

4.2.3. Materials

The study utilised a self-administered questionnaire which was informed by the findings of the literature review and the group interviews with young drivers. Section I measured driver age, gender, and driving exposure including the type and age of the vehicle driven. Section II measured the number and type of traffic offences and car crashes that the participants had been involved in during the last three years. To assess thrill seeking, section III comprised a nine-item thrill seeking scale (Lawton et al., 1997) exploring the feelings and emotions associated with driving. The participants

were required to rank their responses to items such as “I get a real thrill out of driving fast” on a Likert scale of 1 (‘not at all’) to 6 (‘very much’).

Section IV incorporated 70 items that explored the attitudes, behaviour and the social learning experiences of the young driver via a 7-point Likert scale ranging from 1 (‘strongly disagree’) to 7 (‘strongly agree’). Current risky driving behaviours were assessed using eight items such as Item 19: “I drive around a lot and I don’t really care if I follow the road rules”, and others items exploring common high risk behaviours such as speeding and drinking before driving. Higher scores on the *self-reported risky driving behaviour* scale correspond to more risky driving. Personal attitudes towards driving were assessed using eight items, higher scores on the *personal attitudes* scale corresponding to more risky personal attitudes towards driving. Item 27: “Cars should give way to me – I am the better driver” was included as young drivers consistently overestimate their driving ability and capacity for control, particularly when speeding (Harrison, Triggs, & Pronk, 1999).

The attitudes of others that are perceived by the young driver that constitute the normative dimension of Akers’ social learning theory were explored via 16 items summed into a composite *differential association* scale. Items such as Item 11: “My parents wouldn’t like the way I drive with friends in the car” were purpose-designed and modelled on the results of the preliminary research and prior studies (e.g., DiBlasio, 1987; Lang, Waller, & Shope, 1996; Regan & Mitsopolous, 2001). Higher scores correspond to the perception that the significant persons in the young driver’s life – their parents and peers – have attitudes and norms that favour risky driving in the young driver. *Imitation* of peers and parents fundamental to Akers’ social learning theory were explored via four items. Higher scores correspond to more imitation by the young driver

of risky driving that was modelled by their parents and peers. Item 24: “I’ve copied lots of cool tricks in the car from my friends, and they think it’s great” was included as conformity and approval (Zimbardo & Leippe, 1991) have consistently been found to be a powerful influence upon adolescent behaviour.

The *anticipated rewards* administered by parents and peers inherent to Akers’ social learning theory were assessed through a composite of eight items. Item 29: “My mates and I talk for ages about really cool risky things I have done in the car”, was designed to capture young drivers verifying their status amongst their peers (Tarrant et al., 2001), found in this and other study’s group interviews (Moller, 2004). Higher scores indicate that more rewards are anticipated from parents and peers for risky driving. *Anticipated punishments* by peers, parents, and police were assessed via four items each combined into a composite of 12 purpose-designed items. Item 40: “My mates make fun of me when I don’t show off” was specifically included as teasing is one of the most common forms of adolescent punishment reported in the literature (e.g., Vanzetti & Duck, 1996) and in the preliminary group interviews. Higher scores on this scale indicate that the participant anticipates a higher likelihood of punishment from parents, peers, and police for risky driving.

The importance to – and therefore influence of – *group identity* with a significant peer group as a measure of SIT belongingness is explored via six items. Young drivers commonly report a lack of control over their own driving behaviour (e.g., Regan & Mitsopolous, 2001). Item 42: “It’s more important to me to fit in with my friends and do the things they want me to even if I don’t want to” is indicative of youth anxious to please their friends (Parker, Manstead, Stradling, Reason, & Baxter,

1992) and was also found in the group interviews. Higher scores indicate that the young driver identifies more strongly with the unsafe influences of their significant peer group.

Forty items within the scales specifically examined driver behaviour when passengers were present in the vehicle contributing half of all scales such as the risky driving behaviour scale³. Young drivers are more likely to carry passengers than to travel alone; therefore items such as number 22 “I am especially careful driving friends at night” were specifically included, this item forming part of the self-reported risky driving behaviour scale. Eight scales were created from the responses to these items, and Table 1 details the driving-related concepts explored, number of items within and the Cronbach’s alpha for each scale.

4.2.4. Procedure

The questionnaires were distributed to participants at University lectures, the Government Driver Licensing Centre, and the workplace and social gatherings of the primary researcher. The questionnaire required approximately 25 minutes to complete, and withdrawal from the study was permitted at any time. No identifying information was included in the questionnaire ensuring confidentiality of responses. Strategies used to increase response rates included announcements at University lectures, course credit, telephone calls and personal visits to collect completed questionnaires. Newly-returned questionnaires were shuffled amongst those completed earlier in order to not compromise the anonymity of the participants (particularly since some were known to the primary researcher). Whilst this strategy preserved the anonymity of the participants, it precluded subsequent comparisons of the different participant groups. Of the 480 questionnaires distributed, 165 were returned, representing a response rate of 34.4% (43.6% for females, 25.2% for males).

4.2.5. Statistical Analyses

The study utilised bivariate correlations to explore the strength of association between all dependent and independent variables (Howell, 1997). Bivariate correlations between continuous variables utilised Pearson's product moment correlation (r); bivariate correlations between continuous and dichotomous variables utilised point biserial correlations (r_{pb}); and bivariate correlations between dichotomous variables utilised the phi coefficient (Φ) (Cohen, 1996). Hierarchical multiple regression (HMR) was used to allow control over the order in which the theoretically-relevant variables were entered into the regression equations. A minimum sample size of $n \geq 50 + 8m$ (where m = number of independent variables) (Tabachnick & Fidell, 1996) is required for a preferred power of 80%, and to detect a medium effect size of .20. Unless otherwise stated sample size requirements were met. All analyses were conducted using the Statistical Package for the Social Sciences (SPSS) version 15.0 and were evaluated at a significance level of $\alpha = .05$. Scale and subscale reliability analyses used Cronbach's alpha.

5. Results

5.1. Data Cleaning and Manipulation

Estimated marginal means for the entire sample replaced missing values within the participant driving exposure measures in Section I. Missing values were found to be missing completely at random (MCAR) (Hair, Anderson, Tatham, & Black, 1998). One univariate outlier (Tabachnick & Fidell, 1996) and three participants who failed to respond to more than 30% of Section IV were excluded from the analysis. Individual responses were used to replace missing values within Section IV, and participant

responses to the remaining scale items were averaged to provide the missing values to reflect accurate individual perceptions. Assumptions of regression including normality, linearity and homoscedasticity were not met by the raw data, and logarithmic transformations undertaken on all scales to correct negative skew greater than 1 remedied these violations (Tabachnick & Fidell, 1996). The logarithmic transformations also remedied kurtosis evident in the raw data. Tests of regression assumptions confirmed bivariate linearity and homoscedasticity of residuals were acceptable. No multicollinearity was in evidence. The Cronbach's alphas shown in Table 1 of the scales measuring risky driving, personal attitudes, differential association, anticipated rewards, thrill seeking, and group identity were characterised by acceptable Cronbach's alphas of greater than .70. The remaining scales originally had unacceptable Cronbach's alphas, and upon exclusion of various items for their poor contribution to internal reliability, the majority of these improved considerably. However the relatively poor Cronbach's alpha could not be improved for imitation and anticipated punishment.

5.2. Descriptive Statistics

Of the 60 male and 101 female participants, 58 were aged 17-18 years, 47 were 19-20, 36 were 21-22, and 20 were aged 23-24 years. Males reported more hours spent driving each week ($M = 14.20$ hours, $SD = 11.59$) than females ($M = 9.39$ hours, $SD = 11.42$). As can be seen in Table 2, driving more each week was significantly associated with more risky driving. Males were more likely to report risky driving than females (although this relationship did not remain significant in the subsequent regression, once age and exposure were controlled for). There are also strong positive correlations between risky driving and each of differential association, personal attitudes, imitation,

anticipated rewards, thrill seeking, and group identity, indicating that scoring more highly (that is more riskily) on each of these scales is associated with more self-reported risky driving. More anticipated punishment was associated with less risky driving. These significant correlations confirmed that all the independent variables of interest were significantly correlated with the main dependent variable of self-reported risky driving behaviour and therefore warranted inclusion in the regression analyses.

One third of drivers reported being detected for an offence, and one in five reported crashing their car, in the previous three years. Most offences and crashes occurred when participants were travelling home (one third of first offences and crashes) and going to work (a quarter of crashes). Crashes and offences reported in the study also partly confirmed the validity of the self-report measure of risky driving, and a complex relationship between risky behaviour, crashes and offences emerged, the bivariate correlations of which are depicted in Table 3. Self-reported risky driving behaviour was not significantly correlated with crashes; however it was significantly positively correlated with committing an offence, and offending whilst carrying passengers. Both committing an offence and offending whilst carrying passengers were significantly correlated with being involved in a crash and crashing whilst carrying passengers, with 53% of those being detected for an offence also reporting a crash. Those detected for an offence also scored more highly on thrill seeking than those reporting no offence.

5.3. Hypothesis Testing

To test Hypothesis 1, the sociodemographic variables of age, gender, and exposure were entered as the first step in the HMR. The social learning variables of

imitation, anticipated punishments and rewards, differential association, and personal attitudes were entered at the second step as a test of Hypothesis 2, and thrill seeking and group identity variables were entered at step three to test Hypothesis 3. As shown in Table 4, the overall model was significant, $F(10, 150) = 24.18, p < .001$. The first step accounted for 19% of the variance in risky driving ($F(3, 157) = 12.31, p < .001$). The second step accounted for a significant additional 42% ($\Delta R^2 = .42$) of variance in risky driving ($F(5, 152) = 32.79, p < .001$). The third step was nonsignificant ($F(2, 150) = 1.31, p = .27$), accounting for less than 1% of variance in risky driving ($\Delta R^2 = .01$). No significant individual predictors emerged in step 1. Of the variables entered in step 2, imitation, anticipated rewards, and anticipated punishment emerged as significant predictors of risky driving. This revealed that the more the young driver imitated significant others' risky driving, and the more rewards and less punishments they anticipated for doing so, the more risky their reported driving became. The strongest predictor was anticipated rewards ($\beta = .23$) which accounted for 2% of unique variance in risky driving, closely followed by imitation ($\beta = .21$, unique variance = 3%), and anticipated punishment ($\beta = -.20$, unique variance = 2%). The step three variables of thrill seeking and group identity did not emerge as significant predictors.

To investigate Akers' assertions of a comprehensive theory, an additional analysis was undertaken in which the order the predictors were entered in the HMR was changed, with thrill seeking and group identity entered at step two, and the social learning variables entered at step 3. When this was done, thrill seeking and group identity in step two accounted for an additional 15% ($\Delta R^2 = .15$), whereas the social learning variables in step three subsequently accounted for an additional 27% ($\Delta R^2 = .27$), of variance in risky driving, supporting Akers' assertions.

Given the differences between the sexes apparent in the literature review, two additional HMR were undertaken for exploratory purposes, operationalising the same variables for each gender. Step 1 again included the sociodemographic variables of age, gender, and driving exposure; Step 2 included the imitation, anticipated punishments and rewards, differential association, and personal attitude variables of Akers' social learning theory; and Step 3 included the thrill seeking and group identity variables. Significant models emerged for both females ($F(9, 91) = 17.39, p < .001$), and males ($F(9, 50) = 8.32, p < .001$), accounting for 60% and 53% of variance in risky driving respectively. Interestingly the significant predictors that emerged for each sex differed. The only significant predictor for males was anticipated rewards, whilst for females it included greater driving exposure, personal attitudes, anticipated rewards, and imitation variables. In addition, for females, identifying with a peer group corresponded to less risky driving. It is important to note however that the sample sizes for the gender analysis were not large enough to maintain adequate power to detect a medium effect size at an alpha level of .05 (females: $n = 101$, males: $n = 60$), therefore these findings are suggestive at best.

6. Discussion

6.1. Support for Hypotheses

There was strong support for all hypotheses within the study. Nineteen percent of the variance in risky driving was explained by gender, age, and exposure (Hypothesis 1); the variables within Akers' social learning theory significantly predicted an additional 42% of variance in risky driving (Hypothesis 2); and group identity and thrill seeking did not emerge as significant predictors over and above Akers' model and

sociodemographic variables (Hypothesis 3). Subsequent exploratory analysis revealed that significant predictors for males included anticipated rewards; for females, exposure, personal attitudes, imitation, anticipated rewards, and group identity were significant predictors.

6.2. Theoretical implications

The psychosocial constructs within Akers' social learning theory have not previously been applied to young drivers, and the findings of the current study provide strong support for doing so. The amount of variance in young driver risky behaviour explained by the traditional applications of age, gender, and exposure influences was more than tripled when social learning variables were included. Moreover, the social learning variables explained significantly more influence upon risky driving than group identity and thrill seeking in the current study. These findings suggest for this study at least that the influences of thrill seeking and group identity were partly or wholly captured within the social learning variables in accordance with Akers' assertions. The reliability of two psychosocial scales was less than ideal; however it is noteworthy that this was the first application of such theoretical constructs to the risky behaviour of young drivers. Theoretically-sound items were created in attempts to operationalise the relevant construct, utilising age-appropriate language and experiences and attitudes reported by the participants of the preliminary focus groups. Future applications are expected to further refine item content and accordingly improve scale internal consistency. Notwithstanding some alpha insufficiencies, the study findings provide additional support for the operationalisation of Akers' social learning theory within the realm of young drivers' road safety.

6.3. Practical implications

This research was one of the first attempts to apply the social psychological principles of Akers' social learning theory to a persistent behavioural phenomenon that interventions such as graduated licencing (GDL) systems (e.g., in Queensland, Queensland Transport, 2007) have attempted to ameliorate. GDL systems are designed to keep *young* drivers out of hazardous *situations* (Ferguson, 2003) by regulating their *exposure*. This study found these variables accounted for only 19% of the variance in young drivers' risky behaviour. In contrast social learning variables *in conjunction* with the sociodemographics of age, gender, and exposure, explained substantially more risky behaviour by young drivers. It is noteworthy that Akers' social learning theory incorporates anticipated police punishments which are part of GDL systems; however GDL systems have not fully considered the significant role that imitation and anticipated rewards and punishments from peers and parents play in the risky behaviour of young drivers.

To change young driver behaviour, it is essential to understand how behaviour is initiated and maintained, and the variety and magnitude of the psychosocial influences upon the young driver's behaviour. Akers' social learning theory is particularly suited to this, highlighting numerous opportunities and avenues for intervention (Triplett & Payne, 2004). In addition, whilst thrill seeking has repeatedly emerged as a contributor to risky behaviour in young drivers (e.g., Rimmo & Aberg, 1999), studies exploring *only* the role of thrill seeking do not explain as much variance in risky driving as the numerous other psychosocial influences included in the current study. Accordingly, comprehensive psychological theories such as Akers' social learning theory reveal potential avenues and directions for intervention (Elliott, Baughan, & Armitage, 2003),

including education (OECD, 2006) and enforcement (Regan & Mitsopoulos, 2001). Young driver road safety policy to date has emerged reactively in a theoretical desert and fundamentally this will affect its efficacy (Nash & Brinker, 2002).

Anticipated rewards consistently emerged as a significant predictor of risky behaviour by young drivers, and this has considerable practical implications, particularly as thrill seeking and non-social rewards are highly correlated ($r = .41, p < .001$). Intervention programmes to date have not typically considered the implicit and explicit rewards young drivers experience from risky behaviour (Falk & Montgomery, 2007), which are most influential. Passenger restrictions within GDL indirectly reduce these rewards by initially limiting the type and number of passengers that can be carried by the young driver (Queensland Transport, 2007). It is reasonable to suggest that reducing the anticipated and actual rewards for risky driving behaviour by young drivers would be associated with reductions in risky driving. Friends talking and boasting about the risky behaviour of young drivers is not readily amenable to change, requiring change at the broader cultural level. While it will be a challenge to directly modify the tendency for young people to reward risky behaviour in young drivers, public and targeted media and education campaigns, and peer programmes that discourage rewarding risky driver behaviour as opposed to making them socially punish the risky driver, are potential avenues for intervention. In contrast, parents who reward the young driver by letting them use the car, and who do not exert any punishment for risky driving, are more accessible, potential avenues for intervention. This is in accordance with the findings of the Checkpoints program recently implemented and evaluated in the United States, in which parents have been found to reduce the risky behaviour of their young driver by more closely monitoring their driving behaviour and

administering rewards and punishments in response to their behaviour (Simons-Morton, Hartos, Leaf, & Preusser, 2006).

Existing GDL do not consider the influence of imitation upon the risky behaviour of young drivers, and targeted and public education campaigns for parents and younger persons alike provide an avenue for intervention. Parents could be encouraged to consider the role model they portray to their child and future-young-driver in a targeted education campaign. Similarly, young people could be encouraged to drive as a safe role model when carrying their friends in a targeted education campaign, including encouraging them to not reinforce risky driving behaviour in their peers. This is a viable alternative for young people who report that they would not feel comfortable speaking against risky behaviour by the young person driving the car (Regan & Mitsopoulos, 2001).

Road safety interventions are predominantly police-punishment based, the threat of police detection of risky driving extensively relied upon to curtail risky young driver behaviour. Whilst anticipated punishment was a significant predictor, young drivers are less likely to comply with road rules (Yagil, 1998), and 80% of Californian teens report violating GDL passenger restrictions whilst police report a lack of GDL enforcement programmes (Rice, Peek-Asa, & Kraus, 2004). It is reasonable to assert that existing GDL interventions such as qualified supervision, passenger restrictions and night driving curfews may be more efficacious in the event of a targeted education and enforcement campaign, particularly as the GDL program relies heavily upon the young driver voluntarily complying with the restrictions associated with the various licensing levels.

It is noteworthy that GDL do have requirements for supervised driving early in the licensing phase (typically during a ‘learners’ phase), however there are no explicit guidelines for the supervisor to be actively involved in rewarding safe driving behaviour and attitudes whilst punishing risky driving behaviour and attitudes. In the circumstance where the young learner driver is also carrying passengers, there are similarly no explicit guidelines for the supervisor to intervene in the instance of unsafe driving attitudes exhibited by the passenger(s). Moreover, it is noteworthy that the supervisor typically is only required to have a certain amount of driving experience, such as being licensed with an open licence. Given this specification, it is still possible for the young novice driver to be supervised by another young driver (aged less than 25 years), and GDL provisions do not consider the implications of this. Preliminary research also suggests that young driver road safety programmes that consider gender differences in psychosocial influences may be more efficacious (Lang et al., 1996), and based on the findings of Taubman-Ben-Ari and others (2005), supervisors of a similar gender may be more effective in curtailing young driver risky behaviour. In addition, Akers’ social learning theory suggests potentially protective influences (Bina, Graziano, & Bonino, 2005) on young driver behaviour, for example the reduced risky behaviour associated with females who identify with a peer group, that can also be capitalised upon in intervention programmes.

6.4. Strengths and limitations of research

A distinct advantage of the approach taken in the study is that it is soundly based in theory, attempting to explore the psychosocial influences upon the young driver, rather than simply repeating the more common epidemiological method. Whilst only

one third of questionnaires distributed were actually completed and returned to the researcher, this response rate is consistent with that achieved in many road safety studies (e.g., Davey, Wishart, Freeman, & Watson, 2007). Many scales used items that required the participant to report their perception of other's attitudes and behaviours, and it is these subjective perceptions that comprise the experiences of the individual (Zimbardo & Leippe, 1991). Attempts to improve the Cronbach's alpha for imitation and anticipated punishment scales by deleting items that were poor contributors to internal reliability were however only marginally successful. The items used to explore psychosocial constructs therefore may have been flawed; numerous items may have gauged more than one construct, or have been suitable for particular ages only.

The data used in the study were collected via self-report and may have been subject to biases inherent in this technique, however the anonymous nature of the questionnaire and the lack of consequences for reporting risky driving behaviour is likely to have minimised these (Zhao et al., 2006). Minimisation of the seriousness of crashes by young drivers became apparent during one preliminary group interview, when a 21-year old reported he'd been hurt "a bit" in a crash and the car was not worth fixing, yet his mother advised as the researcher was leaving that he had been on life support in a coma for three weeks. Impression management is a common phenomenon in young drivers (Lajunen & Summala, 2003), and these efforts and subsequent biases may also have occurred when completing the questionnaire. The generalisability of the findings are also limited by the number and type of participants sampled. Compared to official driver licensing figures, the sample included an overrepresentation of female drivers (63% of the participants were female, compared to 48% of the Queensland young driver population at the time of the research) and drivers who were of a younger

age (36.4% of the participants were 17-18 years old, compared to 22.6% of the Queensland young driver population; 34.5% of the participants were 21-24 years old, compared to 53% of the Queensland young driver population) (Queensland Transport, 2008). Over 70% of the participants were undergraduate university students who are likely to be of a higher socioeconomic status, and therefore may not be representative of the general population. This research population however is commonly sampled in the research within the field of psychology, and in the domain of road safety research in the young driver population in particular (e.g., Glendon & Cernecca, 2003; Greening & Stoppelbein, 2000).

6.5. Future research directions

A dearth of research into the psychosocial influences upon the young driver to date means a wealth of potential future research that can be utilised to reduce the global road toll of young persons. Due to practical limitations, passenger experiences and perspectives were omitted from the current study. Future research should incorporate the 'driver as passenger' (Williams, 2003); in particular exploring the phenomenon of the unsafe young driver becoming the unsafe young passenger encountered in the preliminary qualitative research. The role of multimedia in psychosocial development is well-established (Vaughan & Hogg, 1998) yet relatively unexplored within young driver road safety (ATSB, 2004b). The influence of cultural norms of risky driving as a normal phase of development, for males in particular, in a western culture typified by underage drinking and the use of the car as a tool of masculinity (Staysafe 18, 1990; Zimbardo & Leippe, 1991), merits further exploration. The literature review and preliminary analyses revealed females and males clearly use the car in different ways.

The widely-accepted links between male identity and driving behaviour (Fletcher, 1997) could be further explored within the differential association construct utilised in the present study. Identifying consistent differences between male and female young drivers will enable the development and implementation of gender-specific road safety interventions (Lang et al., 1996). The cohort 'young drivers' may require further refinement, as the psychosocial development and needs of 17 year olds are different to that of 24 year olds. Larger matched samples should also investigate the gender differences that have emerged in the preliminary explorations of behaviour. As was seen in section 3.1, differential association with peers, parents, schoolmates and workmates varies along the dimensions of priority, frequency, duration and intensity (Akers et al., 1979), therefore in order to refine the operationalisation of this social learning dimension, the extent and type of contact with significant others in the participant's life should be quantified (Shinew & Parry, 2005).

The study utilised a cross sectional design, a common approach in psychological research (e.g., Hwang & Akers, 2003). However longitudinal methodology may reveal development variation in the extent and duration of the various psychosocial influences operationalised within the study (Kobus, 2003). Such changes may also guide policies and improve the efficacy of intervention and GDL programmes (Triplett & Payne, 2004). Moreover, group identity appears to develop and influence the genders in different ways (Stewart-Knox et al., 2005). Personality studies have identified six personality subtypes of young drivers (Ulleberg, 2002), also suggesting that young drivers not be treated as a cohort and which may have ramifications for any intervention programmes. Future studies could also include matched samples of young drivers who have been detected for offences; those who offend regularly but have not been detected

as many offences remain undetected (Bina et al., 2005); and those who have crashed to explore psychosocial influences via the social learning variables of the present study. Objective measures such as police records can be used to verify self-reported data that is often criticised for being subjective (Elliott et al., 2003). The current study only comprised drivers legally using a motor vehicle, and future studies should include those young persons who do not have a licence as unlicensed driving is a pervasive problem (e.g., Bina et al., 2005; Watson, 2004).

7. Conclusion

Young drivers across the globe are killed and injured in motor vehicle crashes at rates far exceeding older and more experienced drivers. This research was aimed at studying some of the psychosocial factors which may contribute to risky driving. In this study, the social learning constructs of imitation, anticipated punishments and rewards emerged as significant influences on the risky behaviour of the young driver. The practical implications of this are considerable, as intervention strategies in this area have historically focused on the regulation and enforcement of driver behaviour. As such, this research has identified a range of potential influences on young driver behaviour that could be more specifically targeted in education and enforcement interventions.

Table 1

Scales and Cronbach's Alpha

Scale	Driving-Related Concepts	Cronbach Alpha	Number of Items
Dependent Variable			
Self-reported risky driving behaviour	Current high risk driving behaviours reported by the young driver	.76	8
Independent Variables			
Akers' Social Learning Theory			
Personal attitudes	Personal attitudes towards risky driving behaviour	.82	8
Differential association	Parents and peers attitudes towards risky driving behaviour	.79	16
Imitation	Imitation of the risky driving behaviour of parents and peers	.51	3
Anticipated rewards	Anticipated rewards for risky driving behaviour from parents and peers	.74	8
Anticipated punishments	Anticipated punishments for risky driving behaviour from parents, peers, and police	.62	9
Thrill Seeking in the Driving Context			
Thrill seeking	Feelings and emotions associated with risky driving behaviour	.91	9
Social Identity Theory			
Group identity	The importance of identifying with a peer group	.73	4

Note. All scales have been logarithmically transformed to rectify violations of normality.

Table 2

Correlations with Self-Reported Risky Driving Behaviour (SRRDB)

Variable	<i>M</i>	<i>SD</i>	Correlation with SRRDB ^b
Age	19.65	2.10	.19*
Gender	-	-	-.30***
Exposure ^a	.92	.33	.36***
Personal attitudes ^a	1.12	.19	.64***
Differential association ^a	1.59	.15	.66***
Imitation ^a	.91	.17	.58***
Anticipated rewards ^a	1.25	.17	.64***
Anticipated punishment ^a	1.67	.07	-.60***
Thrill seeking ^a	1.43	.19	.41***
Group identity ^a	.76	.20	.46***

Note. ^a = Logarithmically transformed; ^b = All correlations are measured by Pearson's product moment (r) correlations except gender, which is measured by point biserial (r_{pb}) correlation.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3

Significant Correlations amongst Crash and Offence Measures

Variable	Committed offence	Offended with passengers	Crashed vehicle	Crashed with passengers
Self-reported risky driving behaviour ^{ab}	.32***	.23***	.07	.05
Age ^b	.21**	.23**	.19*	.04
Gender ^c	-.21**	-.10	-.10	-.11
Exposure ^{ab}	.23**	.15	-.01	.04
Thrill seeking ^{ab}	.25**	.17*	.10	-.16*
Committed offence ^c	-	-.52***	.20*	.18*
Offended with passengers ^c		-	.24***	.24**
Crashed vehicle ^c			-	.69***
Crashed with passengers ^c				-

Note. ^a = Logarithmically transformed; ^b = Correlations are measured by using point biserial r_{pb} correlation; ^c = Correlations are measured by using phi Φ coefficient.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4

Hierarchical Multiple Regression Results

Variables	<i>M</i>	<i>SD</i>	<i>B</i>	<i>SE</i>	β	<i>sr</i> ²	<i>R</i> ²	<i>Adj R</i> ²	ΔR ²
Step 1									
Gender	1.63	.49	.03	.02	.08				
Age	19.66	2.10	.01	.01	.06				
Exposure ^a	.91	.32	.05	.03	.09				
							.19***	.18	
Step 2									
Differential association ^a	1.60	.14	.19	.12	.15				
Personal attitudes ^a	1.13	.18	.15	.09	.15				
Imitation ^a	.91	.17	.22**	.07	.21	.03			
Anticipated rewards ^a	1.25	.17	.25**	.08	.23	.02			
Anticipated punishment ^a	1.67	.07	-.51*	.21	-.20	.02			
							.61***	.59	.42
Step 3									
Thrill seeking ^a	1.43	.19	.07	.06	.07				
Group identity ^a	.76	.20	-.07	.06	-.07				
							.62	.59	.01

Note. ^a = Logarithmically transformed. The overall model was significant, $F(10, 150) = 24.18, p < .001$. The first step ($F(3, 157) = 12.31, p < .001$) and second steps were significant ($F(5, 152) = 32.79, p < .001$). The third step was nonsignificant ($F(2, 150) = 1.31, p = .27$).

* $p < .05$. ** $p < .01$. *** $p < .001$.

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Footnotes

1. Whilst the concept of normative definitions encompasses a range of beliefs and orientations, the term “attitudes” will be used in this paper to refer to this construct in order to be consistent with current social psychological terminology (Watson, 2004).
2. Whilst the respondent sample was comprised of all young drivers, that is, aged 17 to 24 years, there is the possibility that age may still have a differential influence upon the risky behaviours and attitudes reported by these young drivers. It is generally acknowledged that the psychosocial development of 17 year olds differs to that of 24 year olds (e.g., Vanzetti & Duck, 1996), and it is reasonable therefore to hypothesise that age will be correlated with risky driving
3. Cultural and media influences were measured by four items each; however they are excluded from the present analysis due to unsatisfactory internal reliability of these scales that could not be remedied.