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Risky driving in young adults: a review of the literature

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Abstract

Young drivers aged between 16 and 25 are consistently over-represented in fatal crash statistics and are more likely than older drivers to be involved in a range of intentional risky driving behaviours, such as drink driving, speeding, drag racing, and tailgating. This paper reports the findings of a systematic search of published peer-reviewed literature, identifying the association between age and the characteristics of risky drivers, as well as interventions that have been developed to improve their safety. The results suggest that it is young males who are predominantly involved in unsafe driving and that these drivers are generally high in reward sensitivity, have antisocial peers, and believe that they are not dangerous drivers. Further to this, deterrence-based interventions have shown limited effectiveness for the specific category of ‘hoon’ drivers, suggesting the need for targeted interventions across a multitude of domains. Effective intervention requires an understanding of the antecedents of dangerous driving behaviour, and it is concluded that interventions might be most effective when targeted towards these identified criminogenic needs.

INTRODUCTION

Intentional risky driving is a serious social problem. Not only is there an increased rate of injury and fatalities for drivers themselves, but the dangers to other road users and the potential for noise and vandalism to roads are also exacerbated (Leal, Watson & Armstrong 2010a). Drivers between 16 and 25 years of age remain significantly over-represented in fatal crash statistics and have been found to be more involved in intentional hazardous driving activities such as drink driving, drug driving, high-level speeding, tailgating (driving closely behind another vehicle) and drag racing (competing with other drivers in a race along a straight course, usually from a standing start) (Blows et al. 2005;
Department of Infrastructure and Transport 2012). Interventions that target this age group appear to hold much promise in improving road safety.

For the purposes of this paper the terms ‘risky’, ‘unsafe’, ‘hazardous’ and ‘dangerous driving’ are used interchangeably to refer to any driving behaviour that is intentionally antisocial or has the potential to cause a traffic collision or road injury and is engaged in due to perceived positive outcomes for the driver. This paper reports the results of a review of published research relevant to intentional risky driving with the aim of establishing what is currently known about those factors that link age with intentional unsafe driving. The literature is summarised in terms of what is known about the demographic characteristics of hazardous drivers, and the psychological and social influences on such driving. This is then discussed in relation to the further development of interventions targeted at those young people who are known to be involved in intentional unsafe driving.

**REVIEW METHODOLOGY**

A systematic search of peer-reviewed literature was conducted to identify studies relating to risky driving. Articles were located through multiple databases including Academic Search Complete, PsycINFO, Psychology and Behavioral Sciences Collection, Proquest, Cinch and SocINDEX. Key search terms used in the review included ‘risky driv*’, ‘dangerous driv*’, ‘hoon*’, ‘street racing’, ‘drag racing’, ‘drink driv*’, ‘drunk driv*’, ‘speeding’. Titles and abstracts were reviewed to determine whether studies met the inclusion criteria for the review that (a) the study related to characteristics and attitudes of adolescent hazardous drivers, (b) the paper was not a duplicate of a previous paper, and (c) the study had been peer-reviewed. The only exclusion criteria were the removal of articles prior to the year 2000 (in order to maintain currency) and the removal of articles pertaining only to the use of motorcycles. It should be noted that search terms relating to ‘young drivers’ were not used, as the aim of the paper was to review the literature relating to risky driving, without any a priori assumptions about the characteristics of such drivers.

**Results**

A total of 2035 articles were identified in the initial searches. After removing articles according to the exclusion criteria, 652 articles remained. Titles and abstracts for each article were then reviewed according to the inclusion criteria, leaving 63 articles that were read in-depth to determine suitability for inclusion in this review. A final set of 33 articles was obtained, which were then grouped in terms of emerging themes of demographic influences such as age and gender, psychological influences, including sensation seeking, reward sensitivity and driver’s attitudes and, finally, social influences.

**DEMOGRAPHIC INFLUENCES**

**Age**

Seven studies were identified that investigated the relationship between age and risky driving. In one study, an analysis of police data, Leal, Watson and King (2007) revealed that more than three quarters (76.9%) of offenders convicted of dangerous driving offences were aged under 25 years. The suggestion that younger drivers have a higher propensity for involvement in unsafe driving is supported by the findings of a more recent study conducted by Palk et al. (2011), which demonstrates that the highest frequency of involvement in intentional dangerous driving is reported by young drivers under the age of 24. Furthermore, Begg and Langley (2001) found that the prevalence of drink driving, speeding for thrills, and intentionally driving faster than others decreased from age 21 to age 26.

These studies do not, however, explain whether these changes are due to increased driving experience or physiological and psychosocial maturation. In a study that sought to determine the relative role of driving experience and age in the cessation of unsafe driving, Constantinou et al. (2011) observed that younger drivers reported higher levels of deliberate risk taking in driving and that the correlation between age and risk taking remained significant even when years of driving experience was controlled for. These results suggest that young age is a significant predictor of intentional dangerous driving independent of driving experience (see also the review by McCartt et al. 2009).

Conversely, McKnight and McKnight (2003) reported that the most common causes of non-fatal vehicle collisions for 16 to 19 year olds were factors relating to inattention, errors in hazard recognition, and incorrect emergency manoeuvres. These results suggest that errors associated with inexperience contribute to road incidents over and above intentional risk taking. While these findings appear contradictory, there are at least two possible explanations. First, that younger drivers are more involved in intentional unsafe driving, but that this does not contribute to increased vehicle collisions. Alternatively, young drivers may be at an
increased likelihood of traffic collision due to both intentional dangerous driving behaviours as well as unintentional errors made due to inexperience on the road. Given that the connection between intentional risky driving and traffic incidents and injury is well established, there is little empirical support for the first explanation, and further studies should seek to clarify the relative importance of intentional hazardous driving and inexperience in traffic incidents. Nevertheless, it is evident that dangerous driving is a significant contributor to traffic incidents for young drivers and is, at least in part, an explanation for the association between age and rates of road collision and injury. As such, there is justification for focusing intervention efforts towards young drivers and a need to understand more about the characteristics of young hazardous drivers.

**Gender**

Eight papers were identified that considered the relationship between gender and propensity for unsafe driving. Studies have consistently demonstrated that male drivers have more traffic citations, higher crash rates, report more dangerous driving and have greater intentions to speed than female drivers (Fergusson, Swain-Campbell & Horwood 2003; Horvath, Lewis & Watson 2012; Lonczak, Neighbors & Donovan 2007; Li et al. 2008; Palk et al. 2011). However, Blows et al. (2005) found no significant difference between males and females in rates of reported motor vehicle driving injury. Thus, although females may not be involved in high levels of intentional risky driving and may have a lower probability of crashing, it appears that they may be more likely to get injured if they do crash (see Lonczak et al. 2007).

Further research should explore the reasons for this phenomenon, although a recent study by Rhodes and Pivik (2011) concluded that both perceptions of danger and positive affect are highly linked to the personal experiences of gender and injury. In other words, there may not be a direct link between gender and traffic injury, but rather it is perception of risk and positive affect that are most predictive of traffic injury. Furthermore, levels of driving sensation seeking are significantly higher in males than females (Delhomme, Chaurand & Paran 2012). That is, it appears that being male does not itself predict hazardous driving; rather, it is the psychological factors and the attitudes of individuals towards such driving that are most influential.

**PSYCHOLOGICAL INFLUENCES**

**Sensation seeking**

Eight studies considered the influence of sensation seeking on risky driving. Jonah, Thiessen and Au-Yeung (2001), for example, reported that drivers who scored high on measures of sensation seeking were significantly more likely to report willingness to perform dangerous driving behaviours, such as speeding and drink driving, and were more likely to have a record of traffic violations than those who did not. Other studies have also demonstrated that sensation seeking correlates with self-reported collisions, traffic citations and the likelihood of speeding; however, these correlations have been relatively weak, explaining less than ten per cent of variance (see Constantinou et al. 2011; Lonczak et al. 2007; Delhomme et al. 2012).

Ulleberg and Rundmo (2003) found that sensation seeking was positively correlated with risk-taking behaviour, as measured by self-reporting of speeding and rule violation ($r = 0.34$, $p < 0.01$), and negatively correlated with attitudes towards traffic safety ($r = -0.38$, $p < 0.01$). Furthermore, Warn, Tranter and Kingham (2004) found a medium positive correlation between sensation seeking and driving violations ($r = 0.39$, $p < 0.05$). A recent study by Simons-Morton et al. (2013), however, noted that sensation seeking was not significantly associated with unsafe driving. In their study, hazardous driving was measured through a data recording system for elevated gravitational force, which records rates of acceleration and deceleration. The findings of this study, when considered in conjunction with the weak correlations found in previous studies, suggest that sensation seeking may not be as important as had been previously assumed. However, the key difference between these studies is the different scales used to measure sensation seeking. The relationship between sensation seeking and risky driving therefore appears to be highly dependent on the measures used to assess these variables. The fact that different, albeit valid, measures of sensation seeking do not yield consistent results makes it difficult to draw firm conclusions about the exact nature of the relationship between sensation seeking and unsafe driving.

Conversely, it may be that a different personality trait moderates the relationship. Pearson, Murphy and Doane (2013) investigated the relationship between impulsivity and risky driving, and concluded that although the subscale of sensation seeking was weakly correlated with driving violations ($r = 0.17$, $p < 0.05$), positive urgency had a far stronger relationship with driving outcomes.
demonstrate a moderate relationship (\( r = 0.30, p < 0.05 \)). Therefore, although sensation seeking specifically may not be an important predictor of dangerous driving, positive urgency, which is defined as behaving impulsively when experiencing positive affect, may be a better predictor. It is recommended that further research investigate the nature of the relationship between positive urgency and intentional unsafe driving, as this is a relatively new factor and may prove to be an important consideration in the design of intervention programs.

**Reward sensitivity**

The relationship between risky driving and sensitivity to reward was considered in five identified studies. Scott-Parker et al. (2012a) reported a moderate positive correlation between unsafe driving and reward sensitivity (\( r = 0.41, p < 0.001 \)), such that as sensitivity to reward increases, so too does propensity for hazardous driving. Similarly, Constantinou et al. (2011) demonstrate a moderate relationship (\( r = 0.36, p < 0.01 \)) between sensitivity to reward and traffic violations as a measure of deliberate risk taking on the road. Although sensation seeking and reward sensitivity are related constructs (\( r = 0.52, p < 0.001 \)), there appears to be shared variance rather than a moderated relationship, suggesting that reward sensitivity is a unique predictor of hazardous driving (Scott-Parker et al. 2012a).

In a simulator study of risky driving, Jongen et al. (2011) reported that the percentage of time spent speeding increased when a monetary reward was offered for quickly completing the drive without making any traffic violations. These results provide some support for the suggestion that sensitivity to reward predicts unsafe driving. However, it is important to acknowledge the substantial limitation inherent in simulator studies, given that the consequences of dangerous driving are artificial, while the reward is real. In other words, how people behave in a driving simulator does not necessarily reflect their behaviour on the road where traffic collisions and offending have real consequences. Harbeck and Glendon (2013), however, found that higher reward responsiveness was a significant predictor of dangerous driving, with both a direct and an indirect effect through perceived risk. Therefore, it appears that reward sensitivity increases the propensity for unsafe driving, even when an individual acknowledges that there are risks involved.

The relationship between gender and sensitivity to reward is less clear. Scott-Parker et al. (2013) observed a moderate association between gender and reward sensitivity such that greater reward sensitivity was reported by males. However, Scott-Parker et al. (2012a) report that although there was a positive relationship between reward sensitivity and unsafe driving for both males and females, this relationship was stronger for females. The reason for this inconsistency is unclear and, once again, further research in this area appears necessary. Nevertheless, sensitivity to reward appears to be a significant predictor of dangerous driving explaining about 13–17 per cent of variance, and is therefore an important factor that should be targeted in the delivery of intervention programs.

**Attitudes of risky drivers**

Seven studies were identified that considered the relationship between attitudes and intentional unsafe driving. In a longitudinal study by Iversen (2004), it was concluded that positive attitudes towards rule violation, drink driving and careless driving tested at time one, explained 52 per cent of variance in dangerous driving one year later. Therefore, holding positive attitudes towards rule violation and believing that it is acceptable to break the rules appears to be a significant predictor of involvement in unsafe driving. Lheureux (2012) further reported that holding positive attitudes towards speeding and negative evaluations of speed limits predicts likelihood of speeding. Similarly, Scott-Parker et al. (2013) demonstrate that the personal attitudes of young drivers explains most of the variance in speeding among novice drivers in their first years of unsupervised driving (adj. \( R^2 = 0.178 \)). However, it is important to note that attitudes can vary significantly between individuals, and it is not clear exactly what sort of attitudes individuals hold that lead to hazardous driving.

In order to investigate the attitudes drivers more closely, a number of qualitative research studies have investigated a specific category of illegal driving in Australia, that of 'hoon driving'. Although hoon driving offences differ between States, they generally include offences such as dangerous and careless driving, street racing, speeding 45 km/h over the speed limit, and loss-of-traction offences such as performing burnouts (Clark et al. 2011; Leal, Watson & Armstrong 2010b). Armstrong and Steinhardt (2006) conducted semi-structured focus groups with 14 self-reported hoon drivers, and found that participants expressed a strong opinion that there are two types of hoon drivers: ‘enthusiasts’ and ‘antisocial drivers’. These results suggest one of two things: either hoon drivers are not a homogenous
category of offender\(^2\) or, alternatively, there is a strong attribution bias\(^3\), where offenders blame others and fail to acknowledge the dangerousness of their own actions.

The presence of an attribution bias is supported by Clark et al. (2011) who assert that, not only is there a strong sentiment of invulnerability among hoon drivers, but there is also a sense of victimisation, such that when offenders are approached by law enforcement they feel they are being unjustly targeted. Given the limitations of these studies utilising small sample sizes, reliable generalisations cannot be made. However, Harré, Brandt and Houkamau (2004) demonstrate a strong attribution bias for young drivers more generally, with participants rating their friends as taking many more risks on the road than themselves. Quantitative research also demonstrates that low perceived risk is one of the strongest predictors of engagement in risky driving (Harbeck & Glendon 2013). Understanding the nature of attitudes among offenders therefore suggests that interventions should focus on changing drivers’ inaccurate beliefs about the dangerousness of their actions.

**Attitudes of ‘hoon drivers’ toward intervention measures**

Five qualitative studies investigating hoon drivers’ attitudes toward legislative interventions were identified in the searches. Generally these demonstrate that deterrence-based approaches are limited, with studies consistently reporting that although hoon drivers see impoundment as a severe response and view crushing cars as more severe than vehicle forfeiture, these consequences are unlikely to change their behaviour (Clark et al. 2011; Leal et al. 2010b; Armstrong & Steinhardt 2006; Leal et al. 2009). In fact, a weak but significant positive correlation was found between perceived severity of legislation and likelihood of future hoon driving (Leal et al. 2010b). In other words, participants who rated severity as ‘high’ were more likely to state that they would offend again. Furthermore, Gee Kee, Steinhardt and Palk (2007) reported that although deterrence variables were a significant predictor of willingness to engage in hoon driving, the model explained only six per cent of unique variance. This suggests that deterrence-based interventions are not effective for the hoon driving population, and that implementing more severe measures is not likely to be effective since perceived severity of punishment does not lead to decreased offending.

What remains unclear is why hoon drivers are not deterred by legislative responses, which they themselves see as being severe. Deterrence theory asserts that the likelihood of offending will decrease if the punishment is seen as certain, swift and severe, which can be achieved through specific deterrence (direct exposure to sanctions) and general deterrence (awareness of existing sanctions). Leal et al. (2009) suggest that most hoon drivers believe they are not likely to be caught as they know how to be ‘smart’ about where and when they engage in such behaviours. What is more concerning is the sentiment of hoon drivers that they would be likely to flee from police if they felt their car was going to be taken from them. Therefore there are grounds to suggest that the reason for the limited effectiveness of deterrence-based interventions for hoon driving is not that offenders do not see the punishment as severe, but rather that offenders do not believe they are likely to be caught. Policy responses to adolescent hoon driving should therefore seek to increase the actual and perceived likelihood of being apprehended and punished, and should focus on specific rather than general deterrence.

**SOCIAL INFLUENCES**

Eight studies were identified that investigated the influence of peer relationships on hazardous driving. Simons-Morton et al. (2013) reported that involvement with friends who were unsafe drivers predicts rates of risky driving behaviour. It has also been demonstrated that increased hazardous driving is not only predicted by affiliation with other unsafe drivers but also by association more generally with risk-taking peers who are involved in behaviours such as substance use, theft and other offending (Fergusson et al. 2003). These findings are highly suggestive that peer influence plays an important role in the driving behaviour of young people and that dangerous driving is associated with other risk-taking activities.

Similarly, Simons-Morton et al. (2011) reported that rates of dangerous driving are lower in the presence of an adult passenger compared to a teenage passenger and, further, demonstrate that having more risk-taking friends in general, regardless of presence during driving, increases unsafe driving in young adults. It may be that it is not the presence of peers that leads to increased hazardous driving but, more specifically, the association with risk-taking
friends. What remains unclear is the direction of this relationship. Affiliation with risk-taking friends could lead to dangerous driving through pressure to fit in and be liked. Alternatively, those involved in unsafe driving may seek out those who share their values and beliefs.

These observations are broadly consistent with social learning theory, which asserts that individuals are more likely to engage in antisocial behaviours if they differentially associate with peers who are accepting of and promote such behaviour (Akers et al. 1979). Gee Kee et al. (2007) illustrate that social learning variables account for 29 per cent of unique variance in risky driving behaviours, with anticipated rewards, attitudes and learnt interactions being significant predictors of likelihood of unsafe driving. Similarly, Scott-Parker, Watson and King (2009) demonstrate that social learning factors account for 42 per cent of additional variance after accounting for age and gender. However, Scott-Parker et al. (2009) conclude that although anticipated rewards are a significant predictor, anticipated punishment and imitation are also significant predictors of adolescent risky driving behaviour. Although further research remains necessary to clarify the specific predictors within social learning theory, these studies provide support for the conclusion that association with antisocial peers is a key factor in adolescent unsafe driving.

In an attempt to further understand the influence of peer relationships, Scott-Parker et al. (2012b) conducted in-depth interviews with 21 young drivers and demonstrated that friends can serve to either increase or decrease the likelihood of dangerous driving. Passengers of similar or younger ages were more likely to condone unsafe driving and therefore increase likelihood of such driving, while older passengers were more likely to disapprove of risk taking, resulting in decreased propensity for such driving. Notably, the presence of peers can therefore act as either a protective or risk factor for dangerous driving, depending on the age and attitudes of the peers. These conclusions are supported by Shepherd and Lane (2011) who found that participants who were encouraged to drive faster in a simulator were more likely to speed than those who were encouraged to drive more slowly.

Simons-Morton et al. (2012) did, however, report that while affiliation with antisocial friends was the best predictor of speeding for young drivers, perceived risk was a partial mediator of the relationship between speeding and antisocial friends. This conclusion indicates that the effect of peers on unsafe driving is also dependent on one’s perceived risk. Although it is clearly important to understand the nature of drivers’ attitudes and cognitive processes, peer influence also exerts a considerable influence on driving behaviour and should be a key consideration in the development of intervention programs for young drivers.

CONCLUSIONS AND IMPLICATIONS

This review has highlighted a number of inconsistencies and gaps in the current literature. Research consistently demonstrates that young drivers have the highest risk of harm on the road due to both intentional hazardous driving as well as inexperience; however, future research should seek to understand the relative contribution of these factors in traffic incidents for young drivers. Furthermore, despite consistent evidence that young males are more frequently involved in intentional dangerous driving than females, further research remains necessary to understand the reasons for this phenomenon. A number of studies suggest psychological factors mediate the relationship; however, it remains unclear whether factors such as sensation seeking, positive urgency, sensitivity to reward and attitudes fully mediate the relationship or whether biological and hormonal factors also play a role.

While there is some evidence that sensation seeking and positive urgency may be key personality traits associated with hazardous driving, there are major inconsistencies in findings, depending on measures used. Therefore, further study is required to determine the strength of these relationships and the role that reward sensitivity plays. In addition, although a number of qualitative studies have demonstrated the potential presence of an attribution bias in young drivers, there have been limited quantitative studies confirming these findings. Thus further quantitative studies utilising larger sample sizes should be a key aim of future research in this area. Finally, given that the current review used limited and overly restrictive search terms, future studies should seek to widen the range of characteristics and factors reviewed, and seek to cover broader issues not covered in the research literature, such as the influence of substance use and media portrayals.

A number of conclusions may also be drawn from this review. First, there is evidence that young male drivers have a higher propensity for risky driving, irrespective of driving experience, with psychological factors and attitudes of drivers being the most important determinants of dangerous driving behaviour. Second, it appears that personality is an important factor in hazardous driving behaviour and should be taken into consideration when
designing intervention and prevention policies. Furthermore, not only do rates of unsafe driving in young adults increase in the presence of adolescent passengers, but they also increase when a young person has antisocial peers, regardless of their presence when driving. Perhaps most importantly from the perspective of intervention, however, is that unsafe drivers have been found to hold positive attitudes towards risk taking in driving and fail to acknowledge the dangerousness of their behaviour. Finally, deterrence-based interventions for hoon drivers demonstrate limited effectiveness and should seek to increase the perceived likelihood of being punished rather than increasing the severity of punishment.

That said, improved deterrence-based interventions are likely to have only a limited effect in reducing risky driving generally or hoon driving specifically when used in isolation. In fact, responses emphasising discipline and deterrence, regardless of offence type, have demonstrated negative effects for juvenile offenders, showing an average increase in recidivism over control groups (see Lipsey 2009). Therefore, targeted interventions across a multitude of domains are recommended. Knowledge about the psychological characteristics and attitudes of unsafe drivers has important implications for the development of intervention programs and there is justification for incorporating a more rehabilitative approach to dangerous drivers.

Therapeutic approaches including counselling programs, skill building and restorative interventions have demonstrated effectiveness in reducing recidivism for juvenile offenders by up to 10–13 per cent (Lipsey 2009). Overall, the intervention types within these categories show statistically similar results, with cognitive behavioural interventions demonstrating marginally greater effects in reducing recidivism. As therapeutic interventions have been found to be effective in reducing adolescent re-offending generally, there are grounds to suggest that such programs could also be effective for hazardous drivers. This is especially the case given the findings of the current review that unsafe drivers and their peers tend to engage in other antisocial behaviours, such as drug use and petty theft. Therefore implementing therapeutic programs that draw on the methods of cognitive behavioural therapy will allow the targeting of interventions to the wide range of needs of young offenders.

This review further suggests that such programs should be targeted towards young males, given their increased propensity for hazardous driving, and should address identified criminogenic needs. At the core of effective programming is adherence to three basic principles of service delivery: intensive services should be delivered to high-risk offenders, programs should address the criminogenic needs of offenders, and treatment programs should be delivered in a style that matches individual needs (Andrews & Bonta 2010). This model of effective intervention is referred to as the risk-need-responsivity (RNR) model of offender rehabilitation and is currently regarded as best practice in rehabilitating young offenders. According to the ‘need principle’, it has been demonstrated that interventions are most effective in reducing re-offending when they address common criminogenic needs such as procriminal attitudes, antisocial personality, procriminal peer association, substance abuse and lack of prosocial pursuits (Lipsey 2009; Andrews & Bonta 2010). Consistent with these observations, the current review suggests that the criminogenic needs of hazardous drivers include sensation seeking, positive urgency, reward sensitivity, peer influence and procriminal attitudes. As unsafe drivers demonstrate similar criminogenic needs to other offender types for which the RNR model has demonstrated effectiveness, there is a strong rationale for the development of comparable programs for hazardous drivers.

It is therefore recommended that targeted intervention programs are likely to form part of a broader strategy to reduce re-offending in dangerous drivers. Traditional deterrence-based approaches such as fines, speed cameras and car impoundment, as well as preventative education programs, show some level of success (Scott-Parker 2012). However, there is strong rationale for the additional development of rehabilitative programs for known offenders that aim to bring about behaviour change. In this way, cognitive-behavioural interventions targeting identified criminogenic needs have considerable potential to reduce adolescent risky driving and improve general safety for all road users, when used in conjunction with deterrence- and prevention-based approaches. One such example, is the Safe Driving Program recently introduced in Victoria, mandating attendance at a rehabilitation-oriented program for all high-risk driving offenders (Road Safety Amendment Act 2012, (Victoria)). Should this program prove to be effective in reducing recidivism in the Victorian population, there is scope for its development in other Australian States and Territories.
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