



## COVER SHEET

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# Psychosocial influences on drug driving in young Australian drivers

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## ABSTRACT

Epidemiological evidence regarding the occurrence of drug driving amongst young drivers is concerning. This study examined the prevalence of drug driving in a sample of 331 young Australian drivers (average age 24 years), as well as a number of social and psychological influences associated with the behaviour. Results revealed that 26% reported having driven under the influence of psychoactive drugs at least once in their lifetime, and 15% indicated driving within 6 hours of taking drugs and alcohol. While no participants reported being convicted of a drug driving offence, 3% had been involved in one or more crashes whilst drug driving (10% of those who had ever drug driven). Investigations revealed that drug driving behaviour was significantly correlated with vicarious punishment avoidance ( $r = .41$ ) and direct punishment avoidance ( $r = .35$ ), suggesting an important link between young peoples' perceptions about detection and punishment and their own propensity to drug drive. Sensation seeking ( $r = .24$ ) and attitudes ( $r = .34$ ) were also significantly correlated with drug driving. Further evidence indicated that those who perceived more social and non-social rewards than punishments associated with drug driving, were more likely to engage in the behaviour. Results suggest that perceptions about detection and punishment are an important influence upon drug driving behaviour for young drivers. The social and non-social rewards associated with drug driving also play an important role.

## INTRODUCTION

Drug driving is a problematic issue for road safety in Australia. Epidemiological evidence indicates that incidence of the behaviour has increased over the past two decades (Drummer et al., 2003; Travelsafe, 1999), although one survey reported a slight decrease in recent years (Australian Institute of Health and Welfare, 2005). This research suggests that drugs other than alcohol may be involved in up to 40% of road fatalities and 10% of road injuries (Poysner, Makkai, Norman, & Mills, 2002). The effects of drugs on driving ability range according to the type or combination of drugs ingested and can include detrimental effects upon the driver's cognitive and psychomotor functioning, including attention, concentration, tracking ability, decision making, visual perception, anticipation, speed perception, overconfidence, and carelessness (e.g. Albery, Gossop, & Strang, 1998; Lenne, Dietz, Rumbold, Redman, & Triggs, 2000; Potter, 2000; Raemakers, Berghaus, van Laar, & Drummer, 2004). As the legal status of a drug does not establish that it will have an effect on an individual's ability to drive or increase crash risk (Potter, 2000), the focus of the current investigation is on drugs taken for recreational purposes prior to driving.

### **Drug use and younger drivers**

Evidence suggests that drug use amongst young people is of particular concern (Stevenson et al., 2001). For example, the Australian Institute of Health and Welfare (2005) found that although the prevalence of drug use appears to have declined over the past decade (37.5% in 2004 down from 46.1% in 1995), those aged between 20-29 years were consistently the largest user group. Among Australian University students, marijuana use over a 12 month period has been reported to range from 33% to 37% (Davey, Davey, & Obst, 2002; Stevenson et al., 2001). In the US, 35% of University students report having used marijuana (Bennett, Miller, & Woodall, 1999; Prendergrast, 1994). Davey et al. (2002) also found that 55% of their sample reported that they had used illicit drugs (of any type) at some time. In comparison, recent evidence suggests approximately 11% of the general population (aged 14 years and over) had used marijuana in the previous 12 months, and 38% had used any illicit drug at least once (Australian Institute of Health and Welfare, 2005).

### **Drug driving**

An extensive international review of drug and drink driving research by Kelly et al. (2004) identified 11 studies suggesting that the incidence of drug driving was particularly higher amongst younger age groups. Amongst young Australian drug users, reported rates of driving under the influence of marijuana over 12 month periods have ranged from 77% to 88% (Darke, Kelly, & Ross, 2004; Davey & French, 2002). Terry and Wright (2005) found a similar percentage (82%) for drug users in the UK, although this prevalence dropped to 40% amongst a general sample of University students. The prevalence of drug driving amongst younger samples is particularly concerning when considered in comparison to general driver populations. For example, the Australian Institute for Health and Welfare (2005) found that around 3.3% of the general population admitted driving a motor vehicle whilst under the influence of drugs within the previous 12 months. Similar figures (4%) have been reported for general populations in the US (Office of Applied Studies, 2002, as cited in Kelly, Darke, & Ross, 2004). Adding to the concern is the interaction between the factors mentioned and the increased propensity for younger drivers to take risks (Jonah, 1997a, 1997b) whilst also possessing less on-road driving experience.

### **Psychosocial predictors of drug driving**

Research has primarily focused on the prevalence of drug impaired driving (Behrendorf & Steentoft, 2003; Longo, Hunter, Lokan, White, & White, 2000), the effects of drugs on driving performance (Alvarez & del Rio, 2002; Brookhuis, 1998; Raemakers et al., 2004), the contribution of drug use to traffic crashes (Drummer et al., 2004; Fergusson & Horwood, 2001) and the beliefs and perceptions of those who take drugs and drive (Aitken, Kerger, & Crofts, 2000; Darke et al., 2004; Davey & French, 2002; Lenton & Davidson, 1999). The issue becomes highly complex when the interacting effects of age, gender, and psychosocial factors are also considered.

Psychosocial factors may also play an important role in influencing the likelihood of drug driving. In many instances, drug driving is thought to be strongly tied to drug use in a social and cultural nature (Davey, Williams, & Davies, 2001). For example, for regular users, drug driving represents a means for obtaining drugs (Aitken et al., 2000; Davey & French, 2002). Research also suggests that social factors, such as encouragement from friends, have a strong influence upon drug driving behaviour (McKnight, Langston, McKnight, & Lange, n.d.). It is argued that such encouragement frames the behaviour as socially acceptable. Among younger drivers, this issue is particularly problematic given their sensitivity to peer-group influences and the greater likelihood of drug use through involvement in "raves" (Lenton & Davidson, 1999). Perceived social rewards and punishments for drug driving are expected to be strongly linked to drug driving amongst younger drivers.

Similarly, perceptions regarding the likelihood of detection and apprehension for driving whilst under the influence of drugs are also expected to be related to the behaviour. Research shows that general perceptions about the likelihood of being apprehended for drug driving are low (Davey & French, 2002; Lenton & Davidson, 1999). Such perceptions may be reinforced by direct and vicarious experiences of avoiding punishment for drug driving. This is in line with Stafford and Warr's (1993) expanded model of deterrence theory, in that general deterrence can be reconceptualised as the deterrent effect of an individual's vicarious experiences of punishment and punishment avoidance through association with others. Investigations conducted by Piquero and colleagues (Piquero & Paternoster, 1998; Piquero & Pogarsky, 2002), as well as Fleiter (2004), have revealed that personal and vicarious experiences of punishment and punishment avoidance have a significant influence on an individual's behavioural intentions. In other words, when younger drivers (or their peers) successfully evade detection whilst driving under the influence of drugs, this may encourage them to engage in future drug driving due to a perceived lack of punishment. Conversely, direct or vicarious experiences of punishment or detection for drug driving should be expected to reduce the likelihood of future behaviour.

Another factor which may contribute towards the higher incidence of drug driving amongst younger individuals is their propensity for sensation seeking, which is particularly pertinent amongst younger males. A review of literature by Jonah (1997b) confirmed an association between sensation seeking and a number of risky on-road behaviours, including drink driving, speeding, and following too closely. Research has also identified that sensation seeking may have a strong association with drug use (Wagner, 2001).

### **Aims**

While research has provided some insight into the prevalence and potential outcomes of drug driving, there is a lack of empirical investigation into the psychosocial predictors of drug driving behaviour amongst younger drivers in Australia. This study will begin to address this via the following aims:

1. describe the incidence of drug driving among a sample of predominately young drivers;
2. investigate the social influences upon drug driving behaviour in this sample; and
3. investigate the influence of sensation seeking.

## **METHOD**

### **Participants**

A total of 331 participants were recruited from the student population across three Brisbane campuses at the Queensland University of Technology (QUT), Australia in June 2004. Participation was voluntary and all participants reported holding a current drivers' licence. The sample consisted of 27% male participants with a mean age of 23.9 years ( $SD = 8.02$ , ranging from 17-52 years), and 73% female participants with a mean age of 24.1 years ( $SD = 8.02$ , ranging from 17-56 years). As the mean age of the participants was approximately 24 years, the decision was made to retain the older participants in the analyses.

### **Procedure**

This research was conducted with approval from QUT's research ethics committee. Students were recruited through a number of sources at QUT including sign-up sheets posted across QUT campuses, while others were randomly approached and asked to participate. Participants perused an instruction and information sheet explaining the voluntary and anonymous nature of the study. All participants received standardised instructions.

## Measures

The questionnaire used in this research included both existing and purpose-designed measures. Several sections of items were drawn from previous research by Watson (2004) including items pertaining to direct and vicarious experiences of punishment and punishment avoidance, perceived social rewards and punishments, and attitudes (personal definitions\*). Sensation seeking was measured using the Impulsive-Sensation Seeking subscale of the Zuckerman-Kuhlman Personality Questionnaire (Zuckerman, 2002), with modifications as outlined by Stephenson, Hoyle, Palmgreen, and Slater (2003). Drug driving was measured by asking participants to indicate how often they had driven within six hours of taking drugs as this is the established period used in previous research (Davey, Davies, French, Williams, & Lang, 2004), and drink driving behaviour. Data relating to crash involvement in the previous three year period was also collected, as were demographic details.

## RESULTS

### Drug use and drug driving

Of the 331 drivers surveyed, 183 (55%) reported 'ever' using drugs at some time, 102 (30.8%) reported using them within the previous 12 months, and 50 (15.1%) reported using drugs within the previous four weeks. As shown in Table 1, Marijuana was the most common drug type taken, followed by Speed/Amphetamines and Ecstasy.

Table 1. Drug use reported

Drug	Drug usage		
	Ever (%)	Last 12 months (%)	Last 4 weeks (%)
Marijuana	53.2	26.0	12.1
Speed/Amphetamines	23.9	10.3	4.2
Heroin	1.5	0	0
Ecstasy	20.5	13.6	6.0
LSD	9.7	0.9	0.3
Cocaine	11.2	2.7	0.3
Other <sup>1</sup>	4.8	0	0
Total %	55.0	30.8	15.1

<sup>1</sup>Including crystal, daytura, kava, cream bulbs, ketamine, fantasy, poppers, and mushrooms

Self-reported drug driving behaviour (driving within six hours of using one or more psychoactive drugs) is shown in Table 2. A total of 82 (25.7%) participants reported drug driving at some time, 27 reported (8.2%) reported drug driving within the last 12 months, and 18 (5.7%) reported drug driving within the previous four weeks. Marijuana was the most commonly reported drug taken before driving, followed by Speed and Ecstasy. In addition, 44 participants (14.6%) reported driving within six hours of taking drugs and consuming alcohol simultaneously, at least once. A total of 134 participants (44.8%) reported driving when they thought they were over the legal blood alcohol limit (drink driving sometime in their life), 75 (25.1%) reported drink driving in the previous 12 months, and 20 (6.7%) reported drink driving in the previous four weeks.

\* Note. The term *attitudes* was used to describe the construct of *definitions*. This was prompted by the more common use of *attitudes* in road safety and traffic psychology research. However, the construct retains its meaning as intended by Akers *i.e.* it refers to attitudes, beliefs or orientations that individuals hold toward different behaviours.

Table 2. Drug driving frequency including drug type

Drug	Drug driving		
	Ever (%)	Last 12 months (%)	Last 4 weeks (%)
Marijuana	21.4	8.5	4.5
Speed/Amphetamines	7.6	2.7	2.4
Heroin	0	0	0
Ecstasy	8.8	5.4	2.0
LSD	2.1	.3	0
Cocaine	3.1	.3	0
Other <sup>1</sup>	2.8	.6	.3
Total %	25.7	5.7	8.5

<sup>1</sup>Including crystal, daytura, kava, cream bulbs, ketamine, fantasy, poppers, and mushrooms

### Relationships between variables and drug driving behaviour

As shown in the Appendix, there were a number of significant correlations between the variables studied and drug driving\*. It is important to note that the general pattern of correlations between drug driving and the other variables included was present for each of measure of drug driving (ever, in the 12 months prior, and in the previous four weeks).

#### *Punishment perceptions and exposure*

Of the punishment related variables included, vicarious exposure to punishment avoidance was strongly related to drug driving ( $r = .41$ ), followed by direct punishment avoidance ( $r = .35$ ). Vicarious exposure to punishment and perceived risk of apprehension for drug driving correlated weakly with each of the three measures of drug driving. As shown in Figure 1, the majority (63.7%) of participants thought it was unlikely that they would be apprehended for drug driving (based on participant responses to the first three response categories shown below).

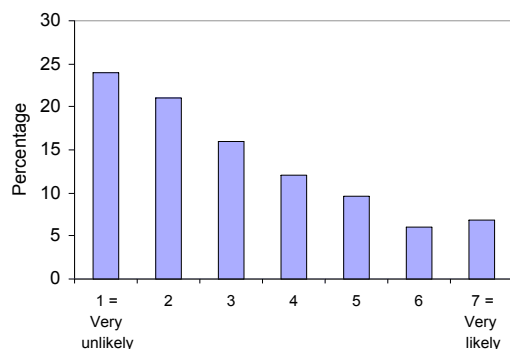


Figure 1. Perceived likelihood of apprehension for drug driving

#### *Psychosocial factors*

There was a moderate negative correlation between perceived social punishments and drug driving ( $r = -.29$ ), and a positive correlation between drug driving and social rewards ( $r = .21$ ). An independent groups  $t$  test was performed to determine whether those who reported more anticipated social rewards than punishments for drug driving, would be more likely to drug drive. Participants were divided into two groups, those who reported more rewards than punishments, and those who report more punishments than rewards. This was done by subtracting the total punishments score from the total rewards score and allocating the resulting negative or positive scores to either group as appropriate. Drug driving reported as a function of more anticipated social rewards than punishments was significant,  $t(307) = 2.62$ ,  $p = .01$ . This result indicates that among those who admitted to having ‘ever’ drug driving, more social rewards for drug driving were reported than punishments.

\*Note. For clarity, the use of the terms ‘drug driving’ or ‘drug driving behaviour’ throughout this paper refers to drug driving ever unless otherwise stated.

### *Sensation seeking and attitudes*

Sensation seeking was moderately correlated with reported drug driving ( $r = .24$ ). To further investigate the impact of sensation seeking upon participants' drug driving behaviour, a second independent groups  $t$  test was conducted to examine if those who scored high on a measure of sensation seeking would be more likely to drug drive. Participants were divided into two groups, high or low, based on whether their overall sensation seeking score was one standard deviation above or below the mean respectively. Drug driving reported as a function of high or low sensation seeking was significant,  $t(104) = 1.992, p = .04$ . This result indicates that those participants who scored high on the measure of sensation seeking were more likely to report drug driving than low sensation seeking participants.

Sensation seeking was also positively correlated with perceived rewards ( $r = .38$ ), indicating that sensation seekers were more likely to anticipate social reinforcements for drug driving. Conversely, sensation seeking was negatively correlated with perceived social punishments for drug driving ( $r = -.30$ ), suggesting that sensation seekers are less likely to anticipate social punishments for drug driving. Attitudes was strongly correlated to participants' willingness to drug drive ( $r = .52$ ) and sensation seeking was positively correlated with attitudes towards drug driving ( $r = .40$ ) and willingness to drug drive ( $r = .34$ ), indicating that sensation seekers held more positive attitudes towards drug driving and were more prepared to engage in the behaviour in the future. Similarly, sensation seeking was correlated with participants' willingness to drive while over the legal BAC ( $r = .35$ ).

### *Crashes, offences and willingness to drug drive*

Eight participants (9.7%) of those who reported 'ever' drug driving, reported being involved in one or more crashes whilst drug driving within the previous three years (3% of the total sample). Whilst no participants reported ever being detected for drug driving, 94 participants (29.4%) reported that they had been caught for other traffic or driving-related offences whilst drug driving. The most common of these was speeding (84%).

Willingness to drug drive was strongly correlated with drug driving behaviour – ever ( $r = .47$ ), in the previous 12 months ( $r = .44$ ), and the previous 4 weeks ( $r = .39$ ). Participants' willingness to drive even if they suspected they were over the legal BAC was weakly correlated with drug driving (eg.  $r = .11$  with drug driving ever). While the majority of participants were very unwilling to drug drive (73.5%) or drive over the legal BAC limit (67.2%), they were slightly more willing to drug drive. These measures of willingness to drug or drink drive were positively correlated ( $r = .42$ ). Perceived social rewards was positively correlated to willingness to drug drive ( $r = .35$ ), and perceived social punishments was negatively correlated ( $r = -.44$ ).

### *Other correlations*

There was a strong negative correlation between attitudes and perceived social punishments ( $r = -.58$ ) suggesting that those who held favourable attitudes towards drug driving were also likely to perceive fewer/less severe punishments for drug driving. Similarly, a strong positive correlation between attitudes and perceived social rewards ( $r = .60$ ) indicates that favourable attitudes towards drug driving is associated with perceived social rewards than punishments for drug driving. As would be expected, perceived social rewards and perceived social punishments were negatively correlated ( $r = -.51$ ).

## **DISCUSSION**

### **Drug use and drug driving**

The current findings are consistent with previous research into the prevalence of drug use and drug driving behaviour amongst Australian University students (e.g. Davey et al., 2002)

reiterating that drug taking is apart of the student culture. The prevalence of drug driving amongst this sample appears to be lower in comparison to those reported in previous samples of University students (e.g. Terry & Wright, 2005) and amongst samples of drug users (e.g. Davey & French, 2002). Further, the results reveal that within the five year gap between testing periods of the current investigation and Davey et al. (2002), the prevalence of drug use amongst younger Australians within a University environment appears to be static (data collection years range from 2000 [Davey et al., 2002] and 2004 for the current investigation). It is also of interest to note that current sample reported higher rates of drug driving than have been found in general populations.

### **Psychosocial predictors**

Investigations revealed that vicarious punishment avoidance and direct punishment avoidance were more strongly associated with drug driving behaviour, than either vicarious exposure to punishment or perceived risk of apprehension. These results suggest an important link between young peoples' perceptions about detection and punishment and their own propensity to drug drive. In particular, participants held stronger perceptions about the lack of potential punishments and the ease with which punishments or detection could be avoided, than they did about the likelihood of getting punished. Results relating to the social rewards and punishments associated with drug driving (including peer group influence), indicates that for those who admitted to having ever drug driven perceive more social rewards for drug driving than punishments.

As expected, sensation seeking was strongly linked to drug driving behaviour. Sensation seekers were also more likely to hold positive attitudes towards drug driving were more willing to drug drive, anticipated less social punishments and more social rewards for the behaviour. This finding is not surprising and is consistent with previous research (see Begg, Langley, & Stephenson, 2003; Wagner, 2001) in that low constraint (impulsivity and incautious behaviour) was strongly correlated with driving whilst under the influence of drugs and that those people who were high on measures of sensation seeking are more likely to engage in greater substance use and reckless driving behaviour.

### **Crashes and offences**

Whilst no participants reported being detected for drug driving, over 28% reported that they had been caught for other traffic related offences whilst drug driving, predominately speeding. Although only 3% of the entire sample reported being involved in a crash whilst driving under the influence of drugs, over 12% of those who reported having drug driven in the past had.

### **Limitations**

In interpreting the results, it is important to consider the sample utilised (University students) before applying the findings to more general populations or those from cultures or communities which may differ significantly from that investigated. Additionally, as all data analysed were based on participants' self-reports, these results are subject to the limitations associated with such techniques. Further, as previous research (see Davey et al., 2002) has found that recorded drug use appears to be higher in males than females, the over-representation of females in the current investigation may have had impact on the results and indeed may be an underestimate of current behaviour in this sub-group.

### **Policy implications**

In Australia, in order to deter individuals from engaging in driving while under the influence of drugs, there is a strong need for improved detection measures. Drug driving is a particular concern given the target population – young people. The results from this study suggest that a number of psychosocial factors pose serious barriers against the utility of current countermeasures. The young drivers surveyed perceive that there are social rewards for Drug driving and young drivers

driving whilst under the influence of drugs; coupled with this are their beliefs about a lack of punishment associated with the behaviour. In addition, there is a combination of factors which make drug driving amongst young people particularly concerning - sensation seeking, risk taking, lack of driving experience, and drug-related effects. In counteracting the problem of drug driving among young people, there is much that can be learnt from the success of the methods employed in the drink driving campaigns over the last two decades. For example, while drink driving campaigns have had a strong deterrent element (i.e., increasing the perceived risk of apprehension and punishment), there has also been an increased focus upon making drink driving a socially unacceptable behaviour. In Australia, the problematic and risky behaviour of drug driving is reinforced by strong psychosocial and sub-cultural influences, which need to be targeted in addition to deterrence and apprehension. While it may be difficult to directly emulate anti-drink driving campaigns; in the case of drug driving, it may be useful to consider why drink driving campaigns in Australia have been relatively successful. This has the potential aid in the development of an efficacious drug driving program.

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*Appendix. Nonparametric (Spearman's Rho) correlations between variables*

Variable	Drug driving (ever)	Drug driving (last 12 months)	Drug driving (last 4 weeks)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1.Vicarious punishment avoidance	.41**	.28**	.25**	-										
2.Vicarious punishment	.07	.10	.11*	.22**	-									
3.Perceived risk of apprehension	-.14*	-.02	-.01	-.15**	.12*	-								
4.Punishment avoidance (direct)	.35**	.17**	.23**	.23**	-.05	-.07	-							
5.Perceived social rewards	.21**	.11*	.15**	.18**	-.01	-.09	.05	-						
6.Perceived social punishments	-.29**	-.27**	-.20**	-.23**	-.06	.11	-.10	-.51**	-					
7.Attitudes	.34**	.29**	.18**	.26**	.08	-.09	.11*	.60**	-.58**	-				
8.Sensation seeking	.24**	.23**	.12*	.19**	.10	-.03	.13*	.38**	-.30**	.40**	-			
9.Willingness to drug drive	.47**	.44**	.39**	.27**	.13*	-.07	.06	.35**	-.44**	.52**	.34**	-		
10.Driven (drugs and alcohol)	.53**	.32**	.20**	.28**	.08	-.04	.29**	.21**	-.16**	.26**	.23**	.29**	-	
11.Willingness to drive while over legal BAC	.11	.09	.09	.06	.13*	-.04	-.00	.24**	-.21**	.28**	.35**	.42**	.14*	-

*Note.* \* $p < .05$  \*\* $p < .001$