A comparison of the psychological, social, and legal factors contributing to speeding and drink driving behaviour

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Abstract

Within Australia, motor vehicle injury is the leading cause of hospital admissions and fatalities. Road crash data reveals that among the factors contributing to crashes in Queensland, speed and alcohol continue to be over-represented. While alcohol is the number one contributing factor to fatal crashes, speeding also contributes to a high proportion of crashes. Research indicates that risky driving is an important contributor to road crashes. However, it has been debated whether all risky driving behaviours are similar enough to be explained by the same combination of factors. Further, road safety authorities have traditionally relied upon deterrence based countermeasures to reduce the incidence of illegal driving behaviours such as speeding and drink driving. However, more recent research has focussed on social factors to explain illegal driving behaviours.

The purpose of this research was to examine and compare the psychological, legal, and social factors contributing to two illegal driving behaviours: exceeding the posted speed limit and driving when over the legal blood alcohol concentration (BAC) for the drivers licence type. Complementary theoretical perspectives were chosen to comprehensively examine these two behaviours including Akers' social learning theory, Stafford and Warr's expanded deterrence theory, and personality perspectives encompassing alcohol misuse, sensation seeking, and Type-A behaviour pattern. The program of research consisted of two phases: a preliminary pilot study, and the main quantitative phase.

The preliminary pilot study was undertaken to inform the development of the quantitative study and to ensure the clarity of the theoretical constructs operationalised in this research. Semi-structured interviews were conducted with 11 Queensland drivers recruited from Queensland Transport Licensing Centres and

Queensland University of Technology (QUT). These interviews demonstrated that the majority of participants had engaged in at least one of the behaviours, or knew of someone who had. It was also found among these drivers that the social environment in which both behaviours operated, including family and friends, and the social rewards and punishments associated with the behaviours, are important in their decision making.

The main quantitative phase of the research involved a cross-sectional survey of 547 Queensland licensed drivers. The aim of this study was to determine the relationship between speeding and drink driving and whether there were any similarities or differences in the factors that contribute to a driver's decision to engage in one or the other. A comparison of the participants self-reported speeding and self-reported drink driving behaviour demonstrated that there was a weak positive association between these two behaviours. Further, participants reported engaging in more frequent speeding at both low (i.e., up to 10 kilometres per hour) and high (i.e., 10 kilometres per hour or more) levels, than engaging in drink driving behaviour. It was noted that those who indicated they drove when they may be over the legal limit for their licence type, more frequently exceeded the posted speed limit by 10 kilometres per hour or more than those who complied with the regulatory limits for drink driving.

A series of regression analyses were conducted to investigate the factors that predict self-reported speeding, self-reported drink driving, and the preparedness to engage in both behaviours. In relation to self-reported speeding (n = 465), it was found that among the sociodemographic and person-related factors, younger drivers and those who score high on measures of sensation seeking were more likely to report exceeding the posted speed limit. In addition, among the legal and

psychosocial factors it was observed that direct exposure to punishment (i.e., being detected by police), direct punishment avoidance (i.e., engaging in an illegal driving behaviour and not being detected by police), personal definitions (i.e., personal orientation or attitudes toward the behaviour), both the normative and behavioural dimensions of differential association (i.e., refers to both the orientation or attitude of their friends and family, as well as the behaviour of these individuals), and anticipated punishments were significant predictors of self-reported speeding. It was interesting to note that associating with significant others who held unfavourable definitions towards speeding (the normative dimension of differential association) and anticipating punishments from others were both significant predictors of a reduction in self-reported speeding.

In relation to self-reported drink driving (n = 462), a logistic regression analysis indicated that there were a number of significant predictors which increased the likelihood of whether participants had driven in the last six months when they thought they may have been over the legal alcohol limit. These included: experiences of direct punishment avoidance; having a family member convicted of drink driving; higher levels of Type-A behaviour pattern; greater alcohol misuse (as measured by the AUDIT); and the normative dimension of differential association (i.e., associating with others who held favourable attitudes to drink driving).

A final logistic regression analysis examined the predictors of whether the participants reported engaging in both drink driving and speeding versus those who reported engaging in only speeding (the more common of the two behaviours) (n = 465). It was found that experiences of punishment avoidance for speeding decreased the likelihood of engaging in both speeding and drink driving; whereas in the case of drink driving, direct punishment avoidance increased the likelihood of engaging in

both behaviours. It was also noted that holding favourable personal definitions toward speeding and drink driving, as well as higher levels of on Type-A behaviour pattern, and greater alcohol misuse significantly increased the likelihood of engaging in both speeding and drink driving.

This research has demonstrated that the compliance with the regulatory limits was much higher for drink driving than it was for speeding. It is acknowledged that while speed limits are a fundamental component of speed management practices in Australia, the countermeasures applied to both speeding and drink driving do not appear to elicit the same level of compliance across the driving population. Further, the findings suggest that while the principles underpinning the current regime of deterrence based countermeasures are sound, current enforcement practices are insufficient to force compliance among the driving population, particularly in the case of speeding. Future research should further examine the degree of overlap between speeding and drink driving behaviour and whether punishment avoidance experiences for a specific illegal driving behaviour serve to undermine the deterrent effect of countermeasures aimed at reducing the incidence of another illegal driving behaviour. Furthermore, future work should seek to understand the factors which predict engaging in speeding and drink driving behaviours at the same time. Speeding has shown itself to be a pervasive and persistent behaviour, hence it would be useful to examine why road safety authorities have been successful in convincing the majority of drivers of the dangers of drink driving, but not those associated with speeding. In conclusion, the challenge for road safety practitioners will be to convince drivers that speeding and drink driving are equally risky behaviours, with the ultimate goal to reduce the prevalence of both behaviours.

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List of Abbreviations

BAC	Blood Alcohol Concentration
QUT	Queensland University of Technology
CARRS-Q	Centre for Accident Research and Road Safety - Queensland
TABP	Type-A behaviour pattern
RBT	Random Breath Testing
DWI	Driving while intoxicated
QTLC	Queensland Transport Licensing Centres
ImpSS	Zuckerman-Kuhlmann Impulsivity Sensation Seeking Scale
AUDIT	Alcohol Use Disorders Identification Test
SEM	Structural Equation Modelling
SPSS	Statistical Package for the Social Sciences
DTMR	Department of Transport and Main Roads

Statement of original authorship

The work contained in this thesis has not been previously submitted for a degree or diploma at any other higher education institution. To the best of my knowledge and belief, this thesis contains no material previously published or written by another person except where due reference is made.

Signed: .....…….....…

Date: .....……

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Chapter One: Introduction

1.1 Introduction

The World Health Organisation (2008) lists road traffic crashes as the ninth largest cause of disability-adjusted life years lost in prosperous countries. Further, motor vehicle crashes represent one of the largest causes of injury in highly motorised countries (Lam, 2002). Within the Australian context, motor vehicle injury is the leading cause of hospital admissions and fatalities (Lam, 2002). It has also been estimated that in 2003 the economic impact of road traffic crash casualties in Australia was approximately $17 billion dollars (Connelly & Supangan, 2006).

Since the 1970's, there has been a downward trend in the number of road deaths in Australia, however the number of deaths per annum has not substantially changed since 2003 (Australian Transport Safety Bureau, 2007). In Queensland 3,500 people died and 46,000 were seriously injured over the past seventeen years due to road trauma (Queensland Transport, 2003). The death and injury road crash statistics for Queensland reveal that issues such as alcohol and drugs; speed; non-use of restraints; driver fatigue; driver inexperience; and driver inattention are over represented (Queensland Transport, 2005); and have been targeted by road safety authorities in an effort to reduce road trauma (Queensland Transport, 2003). Taken together, the data suggests that while good progress has been made in changing some road user behaviours there is still more research required to better understand the major issues contributing to the current levels of death and injury on Queensland roads.

Fernandes, Hatfield, and Job (2006) argue that risky driving is an important contributor to road crashes, and questions whether all risky behaviours are similar enough to be explained by the same combination of factors. Speed and alcohol have

both been found to be over-involved in injury and fatal crashes in Queensland, with alcohol found to be the number one contributing factor and speed significantly increasing the likelihood and severity of injury when a crash occurs (Queensland Transport, 2003). As such, the focus of this research is to examine the combination of factors contributing to speeding and drink driving.

In relation to these two behaviours, Elliott (1992b) has argued that speeding and drink driving are qualitatively and quantitatively different; not only in terms of public perception of the behaviour, but also in terms of the attitudes toward the behaviour and intentions to perform the behaviour. Research has also highlighted that while there have been a number of new initiatives introduced since the early 1990's to reduce the incidence of both speeding and drink driving, road safety authorities have not been successful in convincing the general driving population of the dangers associated with speeding (Cameron, 2008; Elliott, 1992a, 1992b; Fildes & Lee, 1993; Harrison, 2001; Lahausse, van Nes, Fildes, Langford, & Keall, 2010; McKenna, 2005; Newstead, 2004, 2005, 2006; Newstead & Cameron, 2003; Silcock, Smith, Knox, & Beuret, 2000). Thus, the challenge for road safety researchers and practitioners is to understand the variety of factors underpinning these two behaviours, in order to develop countermeasures that target the appropriate combination of factors to reduce the incidence of these two behaviours.

1.2 Rationale for the research

Research has highlighted differences in the ways that speeding and drink driving are perceived by the driving community (Elliott, 1992b). However, road safety practitioners have traditionally relied heavily upon deterrence based countermeasures, such as enforcement and sanctions, to reduce the incidence of a range of illegal driving behaviours (Freeman & Watson, 2009; Harrison & Pronk,

1999; Homel, 1988; Ross, 1982; Watson et al., 1996). More recently, road safety research has demonstrated the influence of social factors in explaining illegal driving behaviours (Armstrong, Wills, & Watson, 2005; Bingham, Elliott, & Shope, 2007; De Pelsmacker & Janssens, 2007; Elliott, 2001; Fleiter, Lennon, & Watson, 2010; Fleiter, Watson, Lennon, & Lewis, 2006; Watson, 2004b). However, there has been no research conducted that specifically compares speeding and drink driving behaviour utilising a comprehensive framework that considers a combination of personal, legal, and social factors to explain these behaviours. Hence, a multidisciplinary approach was chosen for the current research that draws upon psychology, sociology, and criminology.

Two complementary theories were chosen to explore these behaviours: Stafford and Warr's expanded deterrence theory (Stafford & Warr, 1993) and Aker's social learning theory (Akers, 1998; Akers, Krohn, Lanza-Kaduce, & Radosevich, 1979). Expanded deterrence theory is a criminological theory grounded in sociology that describes the prevention of criminal behaviour through the threat of apprehension and application of legal sanctions and includes concepts relating to punishment avoidance and vicarious learning. In contrast, social learning theory is a perspective that is more concerned with the overall social setting in which behaviours occur and the way in which they are differentially rewarded and punished (Akers et al., 1979; Akers & Sellers, 2009). In addition to these theories, other constructs encompassing various personality factors were included to ensure that the chosen framework was comprehensive in nature.

1.3 Research objectives

Based on the limited amount of empirical research comparing the factors contributing to speeding and drink driving and the theoretical considerations outlined above, the main objectives of this research were to:

1. Examine the similarities and differences in speeding and drink driving behaviour amongst Queensland drivers;
2. Examine the personal, social and legal factors influencing speeding and drink driving;
3. Examine driver perceptions of the current regime of legislation, enforcement, and detection practices to determine whether they influence drivers' speeding and drink driving behaviour; and,
4. Identify potential improvements to current countermeasures and new approaches to reduce the incidence of speeding and drink driving.

1.4 Demarcation of scope

This chapter has outlined the scope of the research program documented within this thesis. The purpose of the research is to compare the speeding and drink driving behaviour of Queensland drivers and the factors that influence a driver's decision to engage in one or both of the behaviours. While the literature review includes a brief overview of the situational factors that have been shown to influence speeding and drink driving behaviour, these factors have been looked at extensively in the social psychology literature. The purpose of the research was to examine the links between speeding and drink driving; therefore the practicalities of utilising a strong theoretical model to investigate these two behaviours meant that the questionnaire could not include an exhaustive list of all the factors which have previously been shown to

influence these behaviours. Thus, it was decided that situational influences were outside the scope of this program of research.

In addition, self-report data was chosen as the primary data collection method as it was also beyond the scope of this research to examine official traffic and licensing histories of participants to verify offence and sanction information. It should also be clarified that while this research utilises a comprehensive theoretical framework to examine self-reported speeding and self-reported drink driving behaviour, it was not the intention of the research to explicitly test the validity or structure of the individual theories.

1.5 Structure of thesis

This thesis has been structured to reflect the research activities undertaken to comprehensively examine speeding and drink driving behaviour. Thus, there are five chapters which divide the research process into its individual components. Chapter Two comprises the literature review that informed this research. It provides an overview of speeding and drink driving by defining each of the behaviours and discussing the associated magnitude of the problem. It also examines a range of factors that have been found to be associated with speeding and drink driving. These include a variety of psychological, legal, and social theoretical perspectives relevant to these behaviours. The chapter concludes with the research questions and individual hypotheses that underpinned the research.

Chapter Three outlines the method and includes the recruitment strategy, materials, participants, procedure, and statistical analyses undertaken. It is broken into two sections encompassing the preliminary pilot study and the main quantitative study. In particular, the chapter outlines the development of the questionnaire used

in the main study and processes undertaken to ensure that the broad range of factors contributing to speeding and drink driving were explored.

Chapter Four documents the results of the main study which was a quantitative examination of the psychological, legal, and social factors that contribute to a driver's decision to exceed the posted speed limit and/or to drive when they may be over the legal BAC limit for their licence type. Finally, Chapter Five provides a discussion of the overall significance of the research, and makes recommendations for future research directions in the area of speeding and drink driving research.

Chapter Two: Literature Review

2.1 Introduction

Preliminary figures released by the Department of Transport and Main Roads (2008, 2010a) indicate that the road toll for 2009 was 331 fatalities on Queensland Roads. This represents a rate of 7.51 fatalities per 100,000 head of population. Among these fatalities, 26.9 percent involved drink drivers or riders[1], and 23.3 percent involved speeding drivers or riders. It should be noted that the factors contributing to crashes overlap in most instances. Given their involvement in fatal crashes, these two factors warrant further investigation to ensure that future road safety countermeasures have a sound theoretical and empirical basis.

This chapter begins with a discussion of the different ways to define speeding and drink driving behaviour, and puts forward a definition for each of the behaviours that will be used throughout this research. It will also review prevalence of speeding and drink driving, covering both international and local jurisdictions and an examination of how speed and alcohol influence crash risk. Further, this chapter will provide a comprehensive review of a broad range of personal, social, legal, and situational factors that have been shown to influence an individual's decision to engage in both speeding and/or drink driving behaviour. In addition, this chapter examines the relevant theoretical perspectives and how they relate to the behaviours under review.

2.2 Defining the behaviours

Prior to examining the factors that have been shown to influence speeding and drink driving behaviour, it is important to understand how each of the behaviours are defined by road safety authorities, researchers, and drivers. This discussion will

[1] Alcohol figures are not finalised as test results can take up to 12 months to be finalised. Therefore the drink driving figure is from 1 January 2007 to 31 December 2007.

encompass both legal definitions and community perceptions toward the behaviours. In addition, a definition for each of the behaviours will be outlined, which will be used throughout the research to conceptualise speeding and drink driving behaviour. Included in this section is a discussion of recidivist speeding and drink driving offenders and how they differ from the general driving population. Please note that this section does not include a discussion of unintended speeding or drink driving behaviour. This was considered beyond the scope of the research, given the focus on volitional risk taking.

2.2.1 Speeding behaviour

Within the area of speeding, there are three main perspectives used to define this behaviour: legal, absolute, and relative definitions (Lahausse, van Nes, Fildes, & Keall, 2010). Legal definitions regard speeding as any travel speed that exceeds the posted speed limit for a specific section of road. In contrast, absolute definitions of speeding specify an amount over the posted speed limit which a driver can travel at, before it is considered speeding (Lahausse, van Nes, Fildes, & Keall, 2010). This incorporates what is often referred to as an "enforcement tolerance" into the identification of speeding behaviour (Fildes, Langford, Andrea, & Scully, 2005).

The Queensland Police Service (2008) acknowledge that speed measurement devices are set in a way to allow for a non-disclosed number of kilometres over the speed limit to be recorded before a speed offence is registered. Further, it has been argued that the exact number of kilometres should not be released to the general public to ensure that a *defacto* speed limit is not created (Queensland Police Service, 2008). However, Fildes and Lee (1993) have postulated that as drivers become aware of the existence of an enforcement tolerance, it is likely to create a *defacto* speed limit and result in drivers choosing speeds higher than the posted speed limit

on a regular basis. Indeed, research undertaken in Queensland suggests that for many drivers a *defacto* speed limit may already exist (Fleiter & Watson, 2006).

Relative definitions of speeding refer to instances where a driver chooses to travel at a speed that is unsuitable or inappropriate for the prevailing road or traffic conditions (Fildes et al., 2005; Lahausse, van Nes, Fildes, & Keall, 2010). While the driver might be travelling at a speed consistent with the posted speed limit, it is possible that they may be doing so with an elevated risk due to conditions such as reduced visibility, poor weather conditions, or poor road surfaces (Fildes et al., 2005). Thus, while the posted speed limit provides a maximum driving speed, there are instances where the driver needs to adjust their travelling speed to reflect the demands of the driving task at any given time.

While there is variation in what constitutes speeding among drivers, researchers, and road safety authorities, the focus of this research is on illegal driving behaviours. Hence, for the purpose of this research a legal definition will be employed, whereby exceeding the posted speed limit by any amount will be considered speeding. It is important to note however that in order to characterise the full extent of an individual's speeding behaviour it is necessary to differentiate between travel speeds that are in excess of the posted limit but within a 'perceived enforcement tolerance', and those considered to be in excess of this 'enforcement tolerance'.

2.2.2 Drink driving behaviour

There is a significant body of research highlighting the diversity of influences contributing to a drivers' decision to drive while under the influence of alcohol (Elliott, 1992b; Homel, 1988; Leal, King, & Lewis, 2006; Simpson, Beirness, Robertson, Mayhew, & Hedlund, 2004; Vanlaar, Emery, & Simpson, 2007; Watson,

1998). While speeding has been defined in the literature in three different ways (i.e., legal, absolute, and relative); drink driving does not appear to have the same level of variation. Interestingly, while the majority of research examined as part of this review does not specifically define the phrase 'drink driving', it does make a connection between 'drink driving' and legal definitions, such as .05 Blood Alcohol Concentration (BAC).

In terms of defining drink driving, a legal definition will be adopted for the purpose of this review. Queensland legislation currently provides two different alcohol limits: one applying to those who hold learner and provisional licences, as well as those classified as a 'professional driver' who are required to have a 'no alcohol limit', where the driver will be driving under the influence of alcohol if any concentration above zero is found in blood or breath samples; and, a 'general alcohol limit' which applies to open licence holders, where drivers are deemed to be over the limit if the concentration of alcohol in either blood or breath samples is equal to or greater than .05 (Department of Transport and Main Roads, 2010b). However, it is important to note that the application of these two limits varies by licence class, type, and age of the driver, see Table 2.1 for further information.

Table 2.1

Legal alcohol limits by licence class, type, and age (Adapted from Department of Transport and Main Roads, 2010b)

Licence class, type and/or age	Legal BAC
Holder of learner, provisional or probationary licence and aged under 25 years	0.00
Holder of a restricted licence	0.00
Holder of a licence when driving or in charge of a truck, bus, articulated motor vehicle, B-double, road train, vehicle carrying dangerous goods, taxi, limousine, tow truck, pilot or escort vehicle escorting an oversize vehicle and public passenger vehicle or a vehicle while it is being used by a driver trainer to give driver training (but not a parent etc. supervising a learner driver)	0.00
Holder of a learner, provisional or probationary licence and aged 25 years and over*	Below 0.05
Holder of an open licence	Below 0.05

* Zero BAC for all provisional licence holders were introduced in 2010.

Interestingly, legislation also provides a legal definition of a recidivist drink driver. For instance, under Queensland legislation, a person is considered to be a recidivist offender if they have a minimum of two drink driving offences within a five year period (Parliamentary Travelsafe Committee, 2006). While legislative definitions are important, they only encompass individuals who have been caught for driving after drinking and do not reflect the number of times that a driver may have driven when they were over the legal BAC limit for their licence type.

2.2.3 Differences among speeding and drink driving offenders

Despite the attempts of authorities to promote compliance amongst drivers by introducing a range of countermeasures targeting both speeding and drink driving behaviour, it has been argued that threats of punishment for specific illegal behaviours are only effective for a portion of the population (Pogarsky, 2002). The

proposition is that individuals respond differently to sanction threats and should be assigned to different 'offending profiles' based on how these threats enter into their decision whether to engage in an illegal behaviour or not (Pogarsky, 2002). Others suggest that a distinction be drawn between those who abide by the law due to instrumental decisions (e.g., speed cameras, random breath testing, or police presence), and those who conform to the law due to a 'normative commitment' to generally uphold the laws governing society (Stradling et al., 2003).

In the case of speeding, this distinction is reflected in the work conducted by Blincoe, and colleagues (2006) who examined the beliefs of a group of road users who had been prosecuted for speeding offences. Based on responses to questions relating to the type and amount of self-reported speeding behaviour, participants were categorised into one of four groups. The group labelled 'conformers' were those who reported that they never exceeded the speed limit; the 'deterred' group were those who reported that they did not speed due to the presence of speed cameras; the group labelled 'manipulators' were those who only reduced their driving speed at speed camera locations; and the group labelled 'defiers' reported that they exceeded the speed limit regardless of the presence of speed cameras. The distinction between these groups is important for the design of effective countermeasures, since they need to be aimed at those who do not obey the rules and not those who already comply.

Also amongst those who engage in speeding behaviour are those who could be classified as persistent or recidivist offenders. To date, the literature provides little in the way of guidance for determining how to measure speeding recidivism. While this term is often used in a general sense to describe those who re-offend, Watson, Siskind, Fleiter, and Watson (2010) argue that those who engage in speeding

behaviour are not a homogenous group. In their view recidivism can be conceptualised in a number of different ways. For instance, repeat offenders could be classified based on the number of times they engage in the behaviour, as well as the number of offences with a particular magnitude (e.g., 10 kilometres versus 20 kilometres per hour over the posted speed limit). Thus, those who exceed the posted speed limit by amounts up to 10 kilometres per hour some of the time are not necessarily the same as those who do it with greater frequency and magnitude.

Further, this concept is also reflected in research whereby the investigator makes a distinction regarding different levels of speeding, for example moderate speeding, e.g., up to 10 kilometres per hour over the posted speed limit; excessive speeding, between 10 to 25 kilometres per hour over the posted speed limit or greater than 25 kilometres per hour over the posted speed limit (Fildes et al., 2005). This distinction captures the perception among drivers of the existence of an 'enforcement tolerance' with regard to speed limits. It could also be argued that for many drivers, the moderate speeding category is not seen as an illegal behaviour. It is important to examine these distinctions given the persistent nature of speeding and the need to target interventions at different groups within the driving population.

With regard to drink driving, it is apparent that those who engage in drink driving are not a homogenous group, and as such there are many different labels applied to the different types of drinking drivers. For instance, there are differences between individuals who are referred to as a 'one-time' or 'first-time' offender and those considered to be a recidivist offender (Ferguson, Sheehan, Davey, & Watson, 1999; Leal et al., 2006). The 'one-time' offender is most likely to be someone who has incorrectly judged their alcohol consumption and subsequently been caught while over the legal BAC limit for their licence type (Ferguson et al., 1999).

In the case of the 'first-time' offender, the particular incident when they were caught driving while over the legal BAC limit may have been the first time they have engaged in the behaviour and thus they could be likened to a 'one-time' offender. However, it is also possible that this incident was only the first time that the individual had been caught for the behaviour and not the first time they had driven when they may have been over the legal BAC limit for their licence type (Simpson et al., 2004). Other research uses labels such as 'social drinker' and 'heavy drinker' (Simpson et al., 2004). The social drinker label is conceptually similar in nature to the 'one time' offender category as any instances of drink driving are considered to be lapses in a driver's judgement of their BAC level (Ferguson et al., 1999; Parliamentary Travelsafe Committee, 2006); and are otherwise considered to be rational individuals who generally comply with the law and are unlikely to engage in socially undesirable behaviour (Simpson et al., 2004).

Conversely, the 'heavy drinker' frequently drinks to excess and in most cases could be classified with a clinical diagnosis of alcohol dependence or alcohol abuse (Ferguson et al., 1999; Simpson et al., 2004). Hence, it is common for these individual to drive while under the influence of alcohol and to have high BACs (Simpson et al., 2004). Accordingly, the 'heavy drinker' category is conceptually similar to that of a recidivist drink driver or persistent drink driver, as they are mostly resistant to changing their drink driving behaviour due to issues of addiction (Bingham et al., 2007; Morrison, Begg, & Langley, 2002; Simpson et al., 2004).

The recidivist offender can be defined in a number of ways, for instance under Queensland legislation, a person is considered to be a recidivist offender if they have had a previous drink driving offence within five years (Leal et al., 2006). While legislative definitions provide important information for investigating these types of

drivers, a broader definition could encompass any driver who has more than one drink driving offence, or even any driver who drives when they may be over the legal limit for their licence type on more than one occasion. This distinction highlights that many individuals may engage in drink driving behaviour without being detected (see Freeman, Liossis, Schonfeld, & Sheehan, 2004).

Research has tended to focus on the recidivist drink driving offender and has identified a number of demographic and lifestyle characteristics which can be used to distinguish high risk, "hard-core" recidivist offenders from the general driving population. These factors may also be useful for distinguishing between sub-groups of drink driving offenders (Beirness, Mayhew, & Simpson, 1997; Ferguson et al., 1999). While it is useful to profile recidivist offenders, it is apparent from previous research that those who engage in drink driving do so for many different reasons and therefore do not represent a homogenous group of offenders (Beirness et al., 1997; Ferguson et al., 1999; Hedlund, 1995).

Despite the variation across drink driving offender types, the following characteristics have been found to be associated with recidivist offenders. As outlined in section 2.6.1, offenders tend to be male (Ferguson et al., 1999; Leal et al., 2006; Morrison et al., 2002; Vanlaar et al., 2007); to come from low socioeconomic backgrounds (Ferguson et al., 1999; Morrison et al., 2002); are more likely to be single, separated, or divorced, and to have low levels of literacy and self esteem (Ferguson et al., 1999; Leal et al., 2006); have heightened levels of hostility, aggression, and sensation seeking (Beirness et al., 1997; Leal et al., 2006); have greater problems coping with frustration, anger, and depression, and be regular users of illicit drugs (Ferguson et al., 1999; Leal et al., 2006; Vanlaar et al., 2007). However, over and above these characteristics, alcohol misuse and alcohol

dependence have been suggested as one of the most recognisable traits associated with the recidivist offender (Beirness et al., 1997). Arguably, the high number of recidivist offenders who are detected driving with a BAC of ≥0.15 or above is further evidence of the extent of their alcohol-related problems (Beirness et al., 1997).

2.3 Prevalence of the behaviours

2.3.1 Prevalence of speeding

As described in section 2.4.1, the choice of driving speed is an important factor in road safety, influencing both the risk of being involved in a crash and the severity of the crash (Aarts & van Schagen, 2006; Elliott, Armitage, & Baughan, 2003; Kloeden, McLean, Moore, & Ponte, 1997; Kloeden, Ponte, & McLean, 2001). Thus, in the last 20 years there has been a substantial focus from researchers and road safety authorities on reducing speeding behaviour through the enforcement of speed limits (e.g., the use of speed cameras), and increased penalties for those who do not comply with speed limits.

Most of what is known about the prevalence of speeding comes from official data sources such as crash data and other information recording the number of speeding offences committed. Police figures reported for Queensland demonstrated that between 2003 and 2006 there was an average of 300,250 speeding offences detected each year, which resulted in 249,500 infringements being issued (Cameron, 2008). As seen in Figure 2.1, the Department of Transport and Main Roads estimates that the proportion of road fatalities which were the result of crashes involving speeding drivers or riders, rose from approximately 15 percent in 1994, to over 25 percent in 2005 to 2007, and in 2009 dropping to 22.7 percent. Further, on average more than 1700 drivers per day were caught speeding (Department of Transport and Main Roads, 2010c).

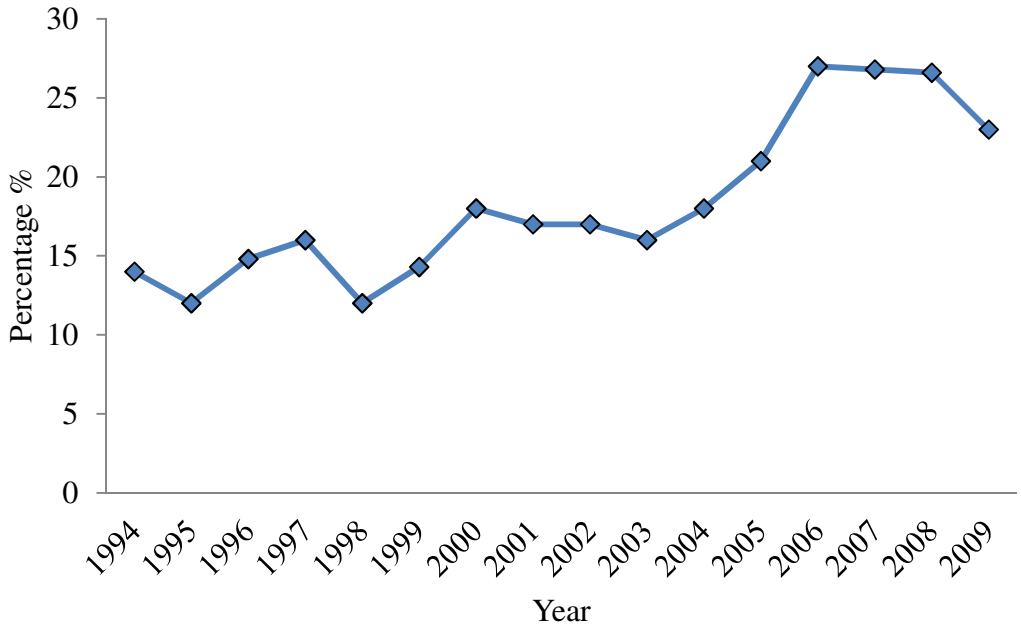

Figure 2.1. Speeding-related fatalities as a percentage of all road fatalities in Queensland between 1994 and 2009 (Adapted from Queensland Government, 2010, p. 4).

In addition to official sources, self-report surveys provide an important insight into the speeding behaviour of drivers. For instance, Fleiter and Watson (2006) reported that participants reported that for a 60 kilometre per hour zone, participants reported a preferred driving speed ranging from 50 to 80 kilometres per hour (M = 61.97 km/hour, SD = 4.09), and in a 100 kilometre per hour zone, the preferred driving speed ranged from 80 to 140 kilometres per hour (M = 104.93, SD = 6.37). This research also reported that 34.4 percent of participants preferred to drive above the limit in slower speed zones, i.e., 60 kilometres per hour, and in faster speed limits, i.e., 100 kilometres per hour zone, 58.4 percent indicated they liked to drive faster than the speed limit. These results provide further evidence that exceeding the posted speed limit is reasonably common among drivers and across road types.

2.3.2 Prevalence of drink driving

The prevalence of drink driving in Australia has been substantially reduced

over the previous two decades due to the introduction of a number of initiatives, including: improved laws targeting alcohol and driving, an enhanced enforcement regime, and an increase in the number of public education countermeasures (Australian Transport Safety Bureau, 1998; Department of Transport and Main Roads, 2010b; Sweedler et al., 2004). In Queensland, official road crash data indicates that for the 2008/2009 period, approximately 24 percent of all road fatalities were drink driving related (Department of Transport and Main Roads, 2010b). Internationally, it has been estimated that the percentage of alcohol related fatalities in Canada is approximately 38 percent, 22 percent in the United States, and 24 percent in Great Britain (Sweedler et al., 2004).

It has also been noted more recently that trends toward a decrease in the levels of drinking and driving have stagnated and in some cases small increases have been observed in some countries (Sweedler et al., 2004). Interestingly, this finding was highlighted in a publication released by the Department of Transport and Main Roads (2010b). The Department noted that the latest RBT figures indicated that approximately one percent of drivers are apprehended for drink driving (see Figure 2.2) (Department of Transport and Main Roads, 2010b). It was also noted that there was a 25.5 percent increase in the number of drink driving offences detected from the period 2001-2002 to 2007-2008; whereas the percentage increase in the number of licences on record for the same period was 21.53 percent. Hence, it is important to note that the observed increase in the number of drink driving offences each year is over and above the percentage increase in the number of licences on issue (Department of Transport and Main Roads, 2010b). It is possible that this may be reflective of an increase in the level of enforcement targeting drink driving, such as RBT's conducted by Queensland Police. The RBT program has seen the rate of

positive breath tests to all breath tests conducted increased from 1:102 in 2001-2002 to 1:85 in 2007-2008 (Department of Transport and Main Roads, 2010b).

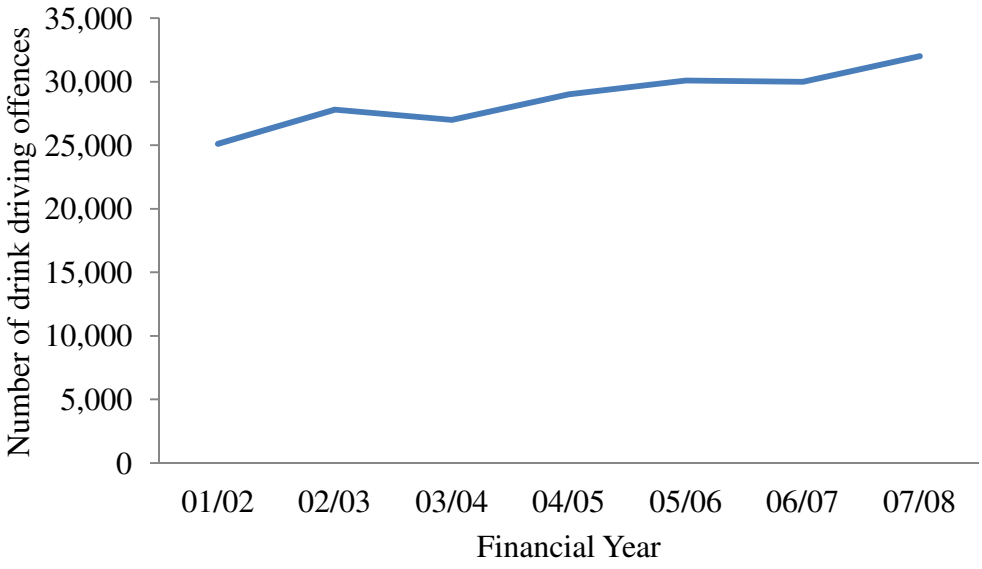

Figure 2.2. Number of drink driving offences detected in Queensland by financial year for the period 1st July 2001 to 30 June 2008 (trend over time) (Adapted from Department of Transport and Main Roads, 2010b, p. 8).

The disparity between official and unofficial measures of drink driving was highlighted in research undertaken by Freeman (2004). Freeman compared the self-reported "unofficial" drink driving behaviour of a sample of repeat drink driving offenders with their "official" records of drink driving convictions. Freeman found that the offenders reported engaging in drink driving much more frequently than their official driving histories indicated. Whilst the average number of convictions recorded by Freeman's sample of 166 repeat offenders was 2.91 (range 2 to 7), the majority of the sample (n = 113, 68.1%) reported having driven after drinking more than ten times in their lifetime. Additionally, 60.2% (n = 100) reported having engaged in drink driving regularly in the six month period prior to their most recent (or index) offence at the time of the study. Other studies have found that there may be as many as 100 drink driving episodes for each offence detected (Smith, 2003).

While official crash and RBT data provide insight into the behaviour of Queensland drivers they tend to represent a sub-set of drink driving offending and not an overall measure of the prevalence of drink driving at any one time (Ryan, Ferrante, Loh, & Cercarelli, 1996). Moreover, the reliability of crash statistics is contingent upon the rate at which illegal BACs are actually tested and reported. In Queensland, the extent of post-mortem testing of driver and motorcycle rider fatalities to determine BAC levels at the time of the crash has increased from 77 percent in 1999 to 93 percent in 2004 (Department of Transport and Main Roads, 2009). Of those drivers and riders involved in a fatal crash in 2004, 25 percent of those tested recorded a BAC of 0.05gm/100ml or greater and 17 percent of those tested had a BAC of 0.15/100ml or greater.

Another method that is widely utilised in research to estimate the prevalence of drink driving is the use of self-report surveys. Watson and Freeman (2007) surveyed 780 Queensland drivers and found that 37 percent reported driving when they may have been over the legal BAC limit at least once and five percent reported drink driving twice in the six months prior to the interview. It is interesting to note that while a large proportion of drivers in this research reported driving while they may have been over the legal BAC limit in the six months prior, approximately 60 percent had not been random breath tested during the same period. This finding highlights that while the RBT practices detect and apprehend a considerable number of individuals who drive while over the prescribed BAC limit, there remains a group of individual's in the wider community who drink and drive without detection.

The RBT program currently deployed in Queensland represents one of the most extensive within Australia, operating with a target of conducting one test per licensed driver per annum, which equates to approximately three million tests be

conducted each year (Department of Transport and Main Roads, 2010b). The level of RBT enforcement varies by geographical region and is controlled by local police to determine the best locations and times to conduct these operations (Department of Transport and Main Roads, 2010b). In light of self-report data highlighting the large number of drivers who have not been tested within a six month period, it could be argued that while the theory behind this program is sound, the practice falls short of achieving its aims. This has implications for the effectiveness of current deterrence based measures.

2.4 Crash risk of the behaviours

2.4.1 The influence of speed on crash risk

It is well established in the literature that the speed choice of drivers is a major factor influencing the incidence and severity of traffic crashes (Aarts & van Schagen, 2006; Kloeden et al., 1997; Kloeden et al., 2001). The relationship between speed and crash involvement is such that it reduces the amount of time the driver has to recognise hazards; reduces stopping distance when the brakes are applied; decreases the time to avoid a collision; and, increases the impact forces in the event of a crash (Fildes et al., 2005).

In the event of a crash, the higher the speed the greater the corresponding amount of kinetic energy that must be absorbed by the impact; thereby increasing the likelihood of serious injury (Global Road Safety Partnership, 2008). During a collision, injury results from the transfer of energy to the human body in amounts that exceed tolerance levels for bodily structures (e.g., tissues, blood vessels etc). This becomes important when considering that increases in travelling speed, increase the reaction and braking distance when a hazard is perceived. Figure 2.3 demonstrates the distances arising from typical driver reaction and braking times at

different speeds. For example, if the car is travelling at 30 kilometres per hour it would most likely stop before hitting an obstacle 13 metres away. However if a car is travelling at 50 kilometres per hour, the distance covered before the driver reacts would exceed the same obstacle.

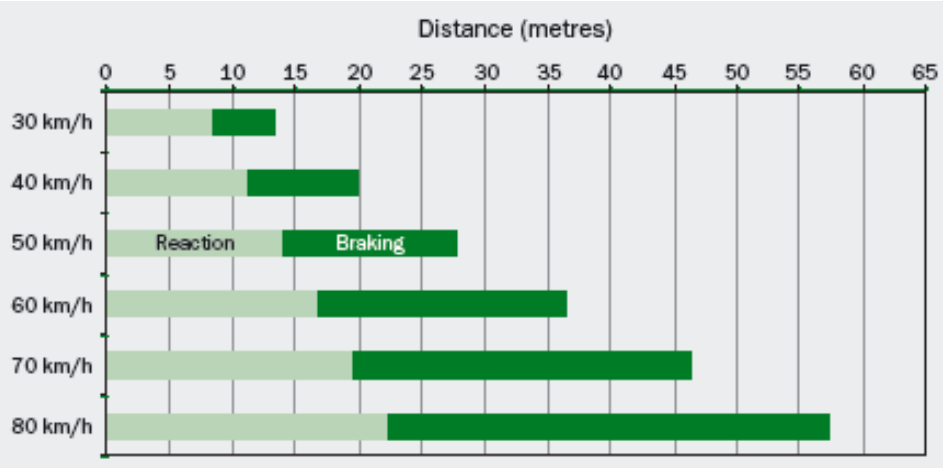

Figure 2.3. Illustration of the stopping distance in an emergency braking situation (Adapted from Global Road Safety Partnership, 2008, page 7).

It is estimated that 23 percent of all fatal crashes in Queensland are due to speeding (Department of Transport and Main Roads, 2008). Moreover, in cases where speed is not the main contributing factor in crashes, it is the deciding factor that influences the severity of the crash and associated injury outcomes (Corben, Lenne, Regan, & Triggs, 2001). UK research has suggested that for every 1.61 kilometres per hour reduction in average speed, there is a corresponding two to seven percent decrease in the number of traffic crashes (Blincoe et al., 2006).

Two separate studies have been conducted in South Australia to review the relationship between travelling speed and the risk of being involved in a casualty crash in both an urban 60 kilometre per hour speed limit zone (Kloeden et al., 1997) and a rural 80 kilometre per hour speed limit zone (Kloeden et al., 2001). The research conducted in an urban setting found that vehicles involved in a casualty crash were generally travelling faster than the vehicles that were not involved in a

crash (Kloeden et al., 1997). In 68 percent of the casualty crashes, the vehicle exceeded the 60 kilometre per hour limit compared to 42 percent of vehicles not involved in a crash, and even greater differences were observed at higher speeds, with 14 percent of casualty crashes involving vehicles travelling faster than 80 kilometres per hour in a 60 kilometres per hour speed zone, compared to less than one percent of the vehicles not involved in a crash (Kloeden et al., 1997). Kloeden and colleagues (1997) estimated that half of the crashes recorded in this study would have been avoided, or not have resulted in a casualty, if the vehicles had not been exceeding the posted 60 kilometre per hour speed limit. These researchers also calculated that for each five kilometre per hour increase in travelling speed the risk of being involved in a casualty crash doubled.

Similar results were reported in the rural study conducted on an 80 kilometre per hour speed zone, with the risk of being involved in a casualty crash doubling when vehicles travelled 10 kilometres per hour above the speed limit, and a six-fold increase when they travelled 20 kilometres per hour above the speed limit (Kloeden et al., 2001). It is clear from the research reviewed in this section that an increase in speed impacts on the likelihood of being involved in a crash and increases the severity of associated injuries.

2.4.2 The influence of alcohol on crash risk

Alcohol misuse is the second most preventable cause of death and hospitalisation in Australia (Loxley et al., 2005) and is highly correlated with crashes, violent crime, and general social disruption (McLean, Wood, Davidson, Montgomery, & Jones, 1993). Thus, it is not surprising that driving while under the influence of alcohol continues to be one of the most common contributing factors in the incidence and severity of traffic crashes worldwide (Appenzeller, Schneider,

Yegles, Maul, & Wennig, 2005; Begg, Langley, & Stephenson, 2003; Bingham et al., 2007; Department of Transport and Main Roads, 2010b; McLean et al., 1993).

It is well established that alcohol is a leading contributor to road crashes (Caldicott, Pfeiffer, Edwards, Pearce, & Davey, 2007; Davey, Davies, French, Williams, & Lang, 2005; Drummer et al., 2004; Wagenaar, Maldonado-Molina, Ma, Tobler, & Komro, 2007), and considerable research demonstrating that alcohol impairs driver performance (Kelly, Darke, & Ross, 2004). The legal BAC limits set by road transport authorities are based on epidemiological data which shows that as BAC increases, so does the risk of being involved in a crash (Borkenstein, Crowther, Shumate, Zeil, & Zylman, 1974).

In their classic study, Borkenstein et al. (1974) undertook an investigation of 5,366 drivers involved in a multi-vehicle crash and 622 drivers involved in a single-vehicle crash over a 3 year period spanning 1959 through to 1962. Drivers were divided into two subgroups: those deemed to be at-fault and those who were not. Breath tests were conducted on all drivers and combined with a control group of drivers interviewed in general traffic locations at times similar to the crashes recorded in the study. The results revealed that crash risk increased exponentially, with a driver with a BAC of .06 percent being two times more likely to be involved in a crash, whereas a driver with a BAC of .10 percent is six to seven times more likely to be involved in a crash. At .15 BAC, a driver is estimated to be 25 times more likely to be involved in a crash than a driver with a zero BAC (Borkenstein et al., 1974).

These results have been validated many times and in many different ways. For instance, Christophersen et al. (1995) investigated the prevalence of alcohol in the blood samples of drivers involved in non-fatal crashes and found that compared to a

driver with no alcohol in their system the crash risk was four times greater for a driver with a BAC of .05 to .09 percent; 12 times greater for a driver with a BAC between .1 to .15 percent; and 45 times greater for those with a BAC greater than .15 percent. Further, in a more recent study, Fergusson and Horwood (2001) examined the involvement of alcohol in traffic crashes of 'at fault' drivers and found that drivers with a BAC of .10 percent or more were responsible for approximately 90 percent of the reported crashes in which they were involved.

2.5 Factors contributing to speeding behaviour

There has been considerable research examining the multitude of factors that impact on an individual's choice of driving speed. It is important to understand these factors in order to develop tailored policy and countermeasures designed to reduce the prevalence of this behaviour. This section will first examine the personal, social, legal, and situational factors associated with speeding behaviour. It is acknowledged that legal factors could be subsumed under situational factors to acknowledge the influence that enforcement and detection practices have on driving behaviour. However, consistent with the deterrence-based literature, it was decided to classify them separately as legal factors.

2.5.1 Personal factors

Personal factors relate to individual characteristics of the driver such as sociodemographic and psychological factors. For instance, among the sociodemographic characteristics, factors that have been examined include the driver's level of education (Shinar, 2007), income (Shinar, 2007; Stradling, Meadows, & Beatty, 2004), and prior crash involvement (Stradling et al., 2004; Williams, Kyrychenko, & Retting, 2006). It has also been found that those who drive on a more regular basis and record higher levels of annual kilometres travelled

are more likely to engage in speeding behaviour (Forward, 2009).

Research has also found a relationship between the age and gender of the driver and exceeding the posted speed limit. For instance, there is considerable evidence indicating that speeding is more common among: younger drivers (Elliott et al., 2003; Fleiter et al., 2006; Hatfield & Job, 2006; Jonah, 1997; Palamara & Stevenson, 2003; Stradling et al., 2004; Tay, Champness, & Watson, 2003; Vassallo et al., 2007; Williams et al., 2006); and male drivers (Elliott et al., 2003; Fleiter et al., 2006; Hatfield & Job, 2006; Jonah, 1997; Palamara & Stevenson, 2003; Stradling et al., 2004; Tay et al., 2003; Vassallo et al., 2007). However, in a review conducted by Stradling et al. (2003) it was found that the link between speeding and gender is not as conclusive as other research suggests. The research reviewed contends that women are less likely to admit to risk taking while driving, and females under the age of 20 are more likely to report speeding behaviour similar to male drivers in the same age group. There is also some evidence suggesting that novice drivers or drivers who have held a licence for a shorter period of time engage in more frequent speeding (Hatfield & Job, 2006; Lawpoolsri, Li, & Braver, 2007; Manderson, Siskind, Bain, & Watson, 2004; Stradling et al., 2003). It is important to note that while novice drivers tend to be younger, it is possible that some individuals may obtain their licence at an older age.

The personality characteristics that have tended to attract attention in the research literature cover a broad range of traits. For instance, a driver's beliefs about their level of skill or driving ability has been found to be related to their driving speeds (Harrison, Fitzgerald, Pronk, & Fildes, 1998). These investigators argue that speeding drivers tend to overestimate their driving ability and perceive their own driving to be safer and more skilful than 'other' drivers on the road. It should be

noted that such overestimation of driving skill has tended to be highest among younger drivers and particularly in younger male drivers (Harrison et al., 1998). This is of particular concern given the over-involvement of younger drivers in crashes. It was also found that those who drove at higher speeds, and also had a long history of exceeding the speed limit by varying amounts, believed other drivers were also travelling at relatively high speeds, and were less likely to rate travelling fast as dangerous (Harrison et al., 1998).

It has also been found that those who meet the criteria for 'Type A' behaviour pattern are also more likely to engage in speeding behaviour (Tay et al., 2003). 'Type A' behaviour is characterised by competitiveness, time urgency, aggressiveness, drive, achievement striving, and has been linked to an increased risk of coronary heart disease (Friedman & Rosenman, 1959; Shahidi, Henley, Willows, & Furnham, 1991). It has been found that drivers with Type-A personality were found to have higher rates of traffic violation and crashes, take more risks, drive more erratically, and reported higher incidences of aggressive driving and speeding (Perry, 1986; Perry & Baldwin, 2000; Shahidi et al., 1991; West, Elander, & French, 1993).

Another psychological trait found to be related to speeding is sensation seeking. Sensation seeking is defined as *". . . the seeking of varied, novel, complex, and intense sensations and experiences, and the willingness to take physical, social, legal, and financial risks for the sake of such experience"* (Zuckerman, 1994, p. 20). These experiences could include participation in risky physical activities, or potentially addictive activities such as gambling and substance use (Zuckerman, 1994). This trait is thought to be a normally distributed personality construct that is influenced by both biological and environmental factors (Zuckerman, 1994).

Sensation seeking has been described as a multidimensional construct that is comprised of thrill and adventure seeking, experience seeking, disinhibition, and boredom susceptibility (Zuckerman, 1994).

Individuals who score high on measures of sensation seeking maintain their need for heightened levels of physiological arousal by seeking novel experiences, and underestimate or accept any inherent risk as the cost of engaging in the experience or activity (Zuckerman, 1994). It is important to note, that while Zuckerman (1994) argues risk taking and sensation seeking are positively correlated; risk taking is not an essential element of the definition of sensation seeking. Further, research has shown that individuals who score high on measures of sensation seeking have a tendency to focus on the benefits of their risk taking behaviour, rather than the threat or experience of punishment associated with their actions (Zuckerman, 1994). Interestingly, sensation seeking has been found to be higher in males than females, and for both sexes, increases until the age of 16 before declining (Zuckerman, 1994).

Research has also shown that individuals who score high on measures of sensation seeking are more likely to exceed the speed limit (Fleiter et al., 2006; Jonah, 1997; Jonah, Thiessen, & Au-Yeung, 2001; Palamara & Stevenson, 2003; Tay et al., 2003; Tay, Watson, & Hart, 2002; Zuckerman, 1994) and to have received a speeding ticket (Whissell & Bigelow, 2003). Jonah (1997) found that sensation seeking is more strongly related with self-reported and observed risky driving behaviours than with police records of traffic offences. It was suggested that the police records represent only detected instances of risky behaviour, which may or may not be a true indication of the individuals' usual driving style or the number of times they may have engaged in the behaviour.

Moreover, those who score high on measures of sensation seeking also tend to

display a stronger disposition toward risky driving behaviours (Jonah, 1997; Palamara & Stevenson, 2003). Jonah (1997) considers that the propensity to engage in risky driving behaviours, such as speeding, is mediated by driver attitudes and beliefs regarding the consequences of risky driving. He concluded that sensation seeking is moderately related to speeding, and is more likely to be relevant to a general style of risky driving than any specific driving behaviour.

Fernandes and colleagues (2004) conducted research to test the assumption that attitudinal and personality factors, such as optimism bias and sensation seeking, contribute to different types of risky driving behaviour. These authors concluded that predictors varied across individual risky driving behaviours. Specifically, in testing their model (demographics plus personality factors plus attitudes), these authors found that sensation seeking was a significant predictor for drink driving only; whereas speeding was significantly predicted by 'authority rebellion' and holding a positive attitude toward speeding. It is important to note that this research was conducted on a student population and therefore the generalisability of these results to the overall driving community should be interpreted with caution.

It has also been shown that individuals who hold a positive attitude toward speeding were more likely to engage in this behaviour (Fleiter & Watson, 2006; Stradling et al., 2003; Tay et al., 2002). Hatfield and Job (2006) surveyed 362 licensed drivers in New South Wales regarding their attitudes and behaviour toward exceeding the posted speed limit. These researchers found that 24 percent of their sample reported being likely to speed "under typical driving conditions in the middle of the day". Further, 23 percent of respondents agreed that "speeding can be safe for a skilful driver" and 38 percent agreed that "speeding can be safe under some circumstances". These results suggest that drivers in this study do not believe that

speeding poses a significant crash risk in certain situations. Another possible explanation for these beliefs could be that those who speed may attempt to justify their actions by supporting views that speeding can be safe. This study highlights that an individual's attitude toward speeding involves a complex relationship between the perceived risks associated with the behaviour and cognitive dissonance processes.

The speeding literature has also suggested that a paradox exists among drivers in relation to their attitude toward speeding behaviour. Fleiter and Watson (2006) conducted survey research with a group of drivers recruited both from the general driving population and a group of first year psychology students. They found that participants agreed with statements that exceeding posted speed limits is an unacceptable risk and plays an important causal role in road crashes. Nevertheless, in spite of this attitude, these authors found that more than half the sample reported a preference to drive over the 100 kilometres per hour speed limit, with approximately 33 percent of these drivers reporting that they exceed the speed limit by 10 to 20 kilometres per hour. Adams-Guppy and Guppy (1995) reported similar results, with more than 50 percent of the drivers they surveyed stating they frequently exceed the speed limit by 16 kilometres per hour.

Silcock and colleagues (2000) surveyed 243 drivers in the United Kingdom and found that 85 percent of respondents reported driving over the speed limit at some point, with 98 percent of drivers exceeding the speed limit at least once during a one hour drive. There was also a general agreement among participants that 'everyone' exceeds the speed limit at some point over the course of their driving history. Together, this research demonstrates that speeding is a relatively common

behaviour among a large proportion of drivers, and is also perceived by the general driving population to be relatively common.

It has also been found that drivers who nominated themselves as someone who drives 'at or about' the posted speed limit, differentiated their own speeding behaviour from that of other drivers (Read, Kirby, & Batini, 2002). In the view of the participant, it was 'other drivers' who engage in speeding and not themselves. Moreover, the individuals' attitude to the posted speed limit was found to be predictive of their inclination to speed. Read and colleagues found that drivers viewed the posted speed limit as either a minimum or maximum speed for the road they were driving. For instance, it was found that for those who engaged in higher level speeding, that the posted speed limit represented a continuum of what is believed to be safe or unsafe for the conditions of the road, the behaviour of other drivers at the time and the personal ability of the driver (see Figure 2.4).

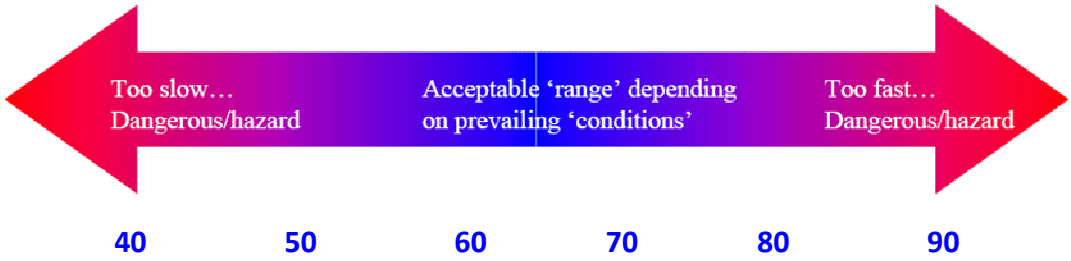

Figure 2.4. Interpretation of a 60 kilometres per hour speed zone for higher level speeding drivers represented as a continuum (Adapted from Read et al., 2002).

Another aspect to speeding is the role it plays in the individual's day to day living. Hatfield and Job (2006) discussed the direct and indirect value of speeding. For example, the direct value of speeding may be that it satisfies an innate need within the individual, such as thrill seeking; whereas the indirect value of speeding might be related to convenience as the individual may need to get from one place to another in the least amount of time. The individuals in this study legitimised their

speeding behaviour by describing situations where they needed to overtake, were late for an appointment, or to avoid a crash. This is consistent with other research where participants have cited time constraints and time pressure as reasonable circumstances for exceeding the posted speed limit (Adams-Guppy & Guppy, 1995; Read et al., 2002). An important additional finding from this research was that sometimes the sources of the time constraints or time pressure originated in the work environment and were out of the individuals control (Hatfield & Job, 2006).

2.5.2 Social factors

Among the social factors influencing speed choice, social facilitation has also been discussed in social psychology fields to explain the facilitation or inhibition of behaviour in the presence of other people and typically refers to the strengthening of the dominant response in the presence of others (Harrison et al., 1998). It has been suggested that the influence of others may play an important role in the decisions drivers make regarding their choice of speed (Harrison et al., 1998). For example, drivers who had passengers in the vehicle were less likely than solo drivers to commit traffic violations, including speeding (Baxter et al., 1990). These researchers also investigated the 'social facilitation' effect and found that younger male drivers accompanied by older female passengers tended to drive more slowly, whereas the number of violations committed by younger male drivers increased in the presence of other young male passengers (Baxter et al., 1990). The differential effect of gender and normative influences was also investigated by Conner, Smith, and McMillan (2003). They found that males reported significantly more normative pressure to speed, less personal control over not speeding, and lower moral norms not to speed. It was also found that when driving alone, normative pressure was a stronger predictor of speeding intentions for males than females.

These findings have been further explored to examine the influence of other people, such as family, and friends. Research has found that an individual is more likely to engage in speeding behaviour when they have a group of 'significant others' who hold a positive, or at least indifferent, personal definition (i.e., attitude) toward speeding (Fleiter et al., 2006). The normative influence of the personal definitions held by family and friends has been found to be independent of gender and age. Fleiter et al. (2006) found that the influence of the individual's peer group was one of the strongest predictors of self-reported speeding, whereas the influence of family norms were not found to be a significant predictor. Norms are considered to be one of the mechanisms that regulates social behaviour and guides appropriate behaviour in specific circumstances. Read and colleagues (2002) reported that most of their sample believed that their speeding behaviour was no different to that of their friends. In addition, those who engaged in more frequent and higher levels of speeding cited advertising of speed camera locations as support for their belief that everyone exceeds the speed limit, thereby reinforcing their own speeding behaviour.

2.5.3 Legal factors

Road user behaviour is managed through the process of traffic law enforcement which includes legislation, traffic policing, and sanctions and/or penalties (Watson et al., 1996). Legislation specifies the speed limit for the road network and compliance with speed limits is managed through enforcement activities and speed-related countermeasures such as speed cameras. Stradling et al. (2003) propose that the travel decisions an individual makes, such as speeding, derive from the interaction of opportunity (capability of the vehicle and well-surfaced roads); obligation (responsibilities to passengers, other road users, and time schedules); and inclination (speeding satisfies innate personality attributes). As discussed a focus on legal

factors to promote compliance with speed limits is central to reducing the severity of crashes and injuries associated with speeding (Aarts & van Schagen, 2006) and the safety of road users and the road transport system (Australian Transport Council, 2005). Given the relatively large numbers of drivers who exceed the speed limit, it would appear that the current regime of legislation and enforcement does not ensure compliance with the posted speed limit.

Compliance with speed limits has been shown to be influenced by enforcement activities (Fildes et al., 2005; Harrison et al., 1998). As a result, a number of initiatives have been implemented to reduce speeding, including automated enforcement (e.g., speed cameras), and related sanctions (e.g., demerit points and double demerit points for repeat offenders; automatic licence suspension for high-speed offenders; increases in monetary fines; and other types of licence actions). Previous research has shown that the perceived likelihood of being detected and punished for speeding exerts a strong influence on a driver's propensity to engage in the behaviour (Hatfield & Job, 2006; Stafford & Warr, 1993; Watson et al., 1996).

In Australia, speed cameras were first trialled in Victoria in 1985, and involved the operation of a small number of cameras with warning signs at high frequency crash locations (Delaney, Ward, & Cameron, 2005). An evaluation of the trial did not find any significant reductions in the number of crashes around these locations. Since this introduction, the speed camera enforcement program in Victoria has undergone several changes, which include an increase in camera operating hours, flashless cameras during daytime operation, and a reduction in the detection threshold from 10 kilometres per hour to an unspecified limit (Delaney et al., 2005). Evaluations conducted in 2005 of the overall speed enforcement program in Victoria have demonstrated the effectiveness of the program in reducing the frequency and

severity of casualty crashes at speed enforcement locations and across the road network (Delaney et al., 2005).

In Queensland, a small number of speed cameras were introduced on the 1st May 1997 and involved the overt deployment of mobile cameras at locations based on crash history (Newstead & Cameron, 2003). Cameras are deployed using a randomised schedule, with the number of sites growing from 500 in 1997 to more than 2,500 by 2001. An evaluation conducted for the period May 1997 to June 2001 reported an estimated 45 percent reduction in fatal crashes in areas within two kilometres of speed camera sites (Newstead & Cameron, 2003). A reduction in injury severity was also observed with a 31 percent decrease in hospitalisations, 39 percent reduction in those medically treated, and a 19 - 21 percent decrease in both other injury and non-injury crashes (Newstead & Cameron, 2003). These authors report that the contribution of the program to the annual road trauma in Queensland represented a 32 percent reduction in fatal crashes, a 26 percent decrease in fatal to medically treated crashes combined, and a 21 percent reduction in casualty crashes.

Since this evaluation was published, these authors have been involved in conducting further evaluations of the Queensland speed camera programs for the period 2001 to 2004 and reported sustained reductions in crashes. In the most recent evaluation for the period January to December 2005, continued sustained reductions in crashes within a 2 kilometre radius of speed camera zones were observed, with a 49 percent reduction in fatal to medically treated crashes, and a 34 percent reduction in all reported crashes, including non-injury crashes (Newstead, 2006). This reduction translated to an estimated annual saving of 9,800 crashes of all severity types (Newstead, 2006).

The development of the speed camera program has been strongly informed by

deterrence theory, which argues that an individual will be less likely to deviate from law abiding behaviour when the punishment is perceived to be certain, swift, and severe (Zimring & Hawkins, 1973). As previously noted, the Queensland speed camera detection program allows for the detection of speeding drivers through the use of mobile and fixed speed cameras which broaden the exposure of motorists to speed enforcement activities (Newstead, Cameron, & Leggett, 2001). The effectiveness of speed cameras relies on convincing drivers that they can be caught any and every time they exceed the speed limit. Speed cameras that are overt or visible to a driver act as a specific deterrent to those who are exceeding the speed limit and are apprehended for speeding behaviour, and a general deterrent to those who observe a high police presence to ensure road users are observing road rules.

In contrast, covert speed camera operations are apprehension based initiatives that act as a specific deterrent only to those who are caught for speeding (Australian Transport Council, 2005). Baldock, Woolley, Wundersitz, and McLean (2007) argue that effective speed enforcement needs to produce high levels of both specific deterrence and general deterrence. They claim that this is achieved through a balance of covert versus overt methods and fixed versus mobile operations. It is also essential that the punishment is seen by the community to fit the crime and that enforcement activities are supported by regular anti-speeding publicity designed to raise the salience of the certainty, swiftness, and severity of apprehension and punishment. Thus, it could be argued that in the view of these authors, covert operations alone do not meet their criteria for effective deterrence based countermeasures.

While speed limits are a fundamental component of the speed management practices utilised by regulatory agencies, the level of compliance with these limits

varies considerably across the driving population (Lahausse, van Nes, Fildes, & Keall, 2010). Despite the speed limits in Australia being higher than those in other countries (Lahausse, van Nes, Fildes, & Keall, 2010), many drivers perceive that the limits have been set too low or do not believe that these limits are consistently applied across the road network (Lahausse, van Nes, Fildes, & Keall, 2010). Speed limits have also been described as catering for the lowest common denominator and are generally set at or near the 85th percentile speed of the traffic, essentially the speed at which 85 percent of drivers would choose to drive (Harrison et al., 1998).

Fildes and Lee (1993) argue that driver acceptance of speed limits is necessary to ensure voluntary compliance with limits in the absence of enforcement. Many drivers report that speed limits apply to 'other' drivers and not themselves (Read et al., 2002) and justify their speeding behaviour by arguing that speed limits have been set too low (Goldenbeld & van Schagen, 2007; Lahausse, van Nes, Fildes, & Keall, 2010). It has been suggested that a key determinant in speed limit compliance is the perceived credibility of the speed limit (Delaney et al., 2005; Lahausse, van Nes, Fildes, & Keall, 2010). For instance, it has been argued that drivers are more likely to comply if they believe that the speed limit is appropriate for the characteristics of the road (Goldenbeld & van Schagen, 2007). Drivers lack of understanding of the elevated risks associated with exceeding the posted speed limit, often leads them to criticise the enforcement of speed limits, which in turn has an impact on drivers level of compliance with these speed limits (Delaney et al., 2005; Harrison et al., 1998).

Enforcement of speed laws through the use of speed cameras can be an effective method of influencing drivers' speed choice, however, the value of the deterrent to drivers who choose to exceed the speed limit may be diluted by drivers' underestimating their chances of being apprehended for the behaviour (Hatfield &

Job, 2006). Hatfield and Job found that a large proportion of drivers estimated that their chances of being caught by police for speeding were either unlikely or "even"; that is, equally likely as unlikely to be caught. This is a challenge to deterrence principles, in which the certainty of apprehension needs to be met in order to influence a driver's decision to obey road rules. Further, it is difficult to convince drivers that they have a high probability of detection when participants report high levels of punishment avoidance for speeding (Fleiter & Watson, 2006; Hatfield & Job, 2006).

Another factor relating to the enforcement of speed limits is that many drivers believe they cannot, or that it is unlikely, that they will be charged with a speeding offence when they exceed the speed limit by no more than 10 percent; in an emergency overtaking situation; or driving downhill (Hatfield & Job, 2006). Fleiter and Watson (2006) investigated the preferred speeds of Queensland drivers and found that mean preferred speeds were approximately 10 percent above the posted speed limit. Further, a 10 percent enforcement tolerance was found when participants were asked to nominate the speed in specific speed zones they would expect to be apprehended by police for speeding. As such, the expectation that the police use a speed limit enforcement tolerance appears to exert a strong influence on the driving speed of drivers.

Finally, the perceived risk of punishment is also reduced by punishment avoidance, which is defined as an individual's personal and vicarious experience of successfully evading detection when engaging in an illegal behaviour (Stafford & Warr, 1993). In their study, Hatfield and Job (2006) asked respondents about the punishment avoidance strategies they used to reduce their chances of being caught for speeding. The researchers provided participants with a list of ways to avoid

being detected for speeding, including: “slow down when you see police or a camera”, “speed if the traffic around you is speeding”, “take back streets”, and “avoid known locations of police or cameras”. In addition, many drivers believed that driving at certain times of the day reduced their chances of being caught for speeding, with most citing early morning, the middle of the day and evening as being the best times for avoiding detection. In a similar investigation, Fleiter and Watson (2006) found that punishment avoidance was a significant predictor of self-reported speeding, with those participants who indicated they were more likely to avoid being caught for speeding being more likely to report higher frequency of speeding.

2.5.4 Situational factors

Every driver of a motor vehicle is involved in a complex social environment, including other drivers, cyclists, and pedestrians (Haglund & Aberg, 2000). Previous research has suggested that drivers influence one another’s driving behaviour and speed choice (Haglund & Aberg, 2000). The mechanisms underlying this influence arguably occur for the following reasons: other drivers’ behaviour provides a direct source of information about the current speed or the appropriate speed for the driving context; there is a level of communication that occurs between drivers e.g., flashing headlights to indicate enforcement activity; and those who are intrinsically motivated to behave consistently with the normative behaviour of others use other drivers on the road as their reference group.

The proposition that driver behaviour, and more specifically speed choice, is influenced by the behaviour of others has received considerable research attention (Connolly & Aberg, 1993; Haglund & Aberg, 2000). Connolly and Aberg (1993) found that vehicles travelling close to one another tended to drive at similar speeds and this was particularly evident for those who chose to drive slower or faster.

Research has also found that drivers tended to overestimate the frequency in which other drivers committed speeding violations (Aberg, Larsen, Glad, & Beilinsson, 1997). Similarly, Manstead, Parker, Stradling, Reason and Baxter (1992) found that drivers who reported a high level of traffic violations perceived a high rate of violations among other drivers.

Research conducted in Western Australia (Palamara & Stevenson, 2003) found that those who reported engaging in more frequent speeding cited the behaviour of other drivers on the road as a way of justifying and normalising their own behaviour. In this case, there was a tendency to focus only on other speeders and not the drivers who comply with posted speed limits. In addition, those who engaged in more frequent speeding were inclined to overestimate the number of drivers exceeding the speed limit, and the amount other drivers were over the speed limit. Aberg, Larsen, Glad, and Beilinsson (1997) and Haglund and Aberg (2000) found similar results with drivers adopting a travelling speed according to their estimation of the speed of other drivers on the road, and believing that other drivers were generally travelling faster than the speed limit. These studies demonstrate a perceptual bias whereby drivers perceive that other drivers exceed the speed limit to normalise their own decisions to drive faster than the speed limit.

Other situational factors that have been shown to influence the travel speeds of drivers include road (Hatfield & Job, 2006; McKenna, 2005) and driving conditions such as traffic volume, weather and lighting (Blincoe et al., 2006; Hatfield & Job, 2006; McKenna, 2005; Silcock et al., 2000). In their research, Blincoe and colleagues (2006) found that favourable weather, low traffic volumes, and driving at night were used as justification by drivers who regularly exceeded the posted speed limits.

For example, participants made the following comments:

> *"As an advanced driver, if the traffic did not allow the speed I would not have done it! With nobody on the road or pavement and good weather conditions, why slow down!?"*; and, *"While I stick rigidly to limits up to and including 50 mph, I will generally drive at speeds I consider safe for road conditions, weather and traffic volume on 60 and 70 mph roads—with care and full eye out for cameras as I go."* (Blincoe et al., 2006, p. 375).

Research has found that people tend to consider wider roads to be safer than narrow roads and drive faster on these types of roads (Silcock et al., 2000). Furthermore, if they perceive that the roadside and general driving environment is uncluttered and affords a clear view immediately in front of the vehicle and to the side of the road, they also have a propensity to drive faster (Silcock et al., 2000).

2.6 Factors contributing to drink driving behaviour

As noted in section 2.4.2, alcohol continues to be a major contributing factor in both fatal and injury crashes on Queensland roads (Department of Transport and Main Roads, 2010b). Thus, it is important to ensure a comprehensive understanding of the variety of factors that impact on an individual's decision to drive after drinking alcohol. This section examines the literature relating to the personal, social, legal, and situational factors associated with this behaviour. It is acknowledged that legal factors could be subsumed under situational factors to acknowledge the influence that enforcement and detection practices have on driving behaviour. As noted earlier, legal factors were classified as a separate group of factors consistent with the deterrence-based literature.

2.6.1 Personal factors

The sociodemographic factors that have been shown to be associated with drinking and driving consistently reveals that the majority of those who are apprehended for drink driving, as well as those who self report driving while over the legal BAC limit, are male (Department of Transport and Main Roads, 2010b; Ferguson et al., 1999; Leal et al., 2006; Morrison et al., 2002; Vanlaar et al., 2007); and come from low socioeconomic backgrounds (Ferguson et al., 1999; Morrison et al., 2002). They are more likely to be single, separated, or divorced, and to have low levels of literacy and self esteem (Ferguson et al., 1999; Leal et al., 2006).

The personality related factors associated with drink driving include alcohol misuse, sensation seeking, Type-A behaviour pattern (TABP), and a propensity toward risk taking. Alcohol misuse has a strong relationship with self-reported drink driving, with high levels of consumption being a strong predictor of alcohol impaired driving (Berger & Snortum, 1986; Bingham et al., 2007; Schechtman, Shinar, & Compton, 1999). It has also been suggested that alcohol use is associated with impulsive and risky driving behaviours by impairing the drinker's ability to inhibit or suppress inappropriate actions (Fillmore, Blackburn, & Harrison, 2008).

Mann et al. (2010) examined the effect of alcohol-related measures on crash risk. Utilising the Alcohol Use Disorder Identification Test (AUDIT), these authors found that the subscales relating to alcohol dependence and alcohol problems were significant predictors of collision risk (Ors = 1.13 and 1.10 respectively). These findings, taken together, reveal that alcohol not only impacts on crash risk through the acute impairment of driving skills, it may also affect crash risk for those who develop alcohol problems or alcohol dependence issues due to a more general lifestyle issue with alcohol.

Another personality factor that has been shown to be associated with drink driving is sensation seeking (Fernandes et al., 2004; Jonah, 1997; Jonah et al., 2001). As noted in section 2.5.1, individuals who score high on measures of sensation seeking maintain their need for heightened levels of physiological arousal by seeking novel experiences, and underestimate or accept any inherent risk as the cost of engaging in the experience or activity (Zuckerman, 1994). For instance, Fernandes et al. (2004) found that sensation seeking was a significant predictor of self-reported drink driving behaviour. Similar results were also reported by Jonah et al. (2001), with those deemed to be high in sensation seeking found to be more likely to drink more frequently, drive after drinking, perceive a low risk of detection for impaired driving, and hold the belief that they could drink large amounts of alcohol before they would deem themself to be impaired.

As noted in section 2.5.1, Type-A behaviour pattern has been shown to be related to crash risk and unsafe driving behaviour (Nabi, Consoli, Chastang, Chiron, & Lafont, 2005). While there is some evidence for the relationship between TABP and drink driving, it is not as well established as it is with speeding. For instance, Nabi et al. (2005) categorised participants according to their level of alcohol consumption to examine the relationship between alcohol and TABP. Those who drank alcohol a maximum of 2 days per week were defined as consuming alcohol on an episodic basis. Participants were also asked to indicate the maximum amount of alcohol drunk during a typical day when they were drinking. Participants were classified as consuming high quantities of alcohol if they drank more than three glasses of wine, 1.42 litres of beer, or two measures of spirits. It was found that among those who were categorised in the group who consumed high quantities of alcohol, approximately 35 percent (N = 1,202) were found to score high on measures

of TABP. In contrast, only 4.4 percent (N = 150) of those classified as consuming low amounts of alcohol on a regular basis were found to have high TABP scores. Conversely, Perry and Baldwin (2000) did not find any relationship between TABP and drink driving using the Driving Appraisal Inventory (see Perry and Baldwin for further information).

Drink driving has also been found to be associated with a high disposition for general risk taking behaviours (Bingham et al., 2007). Specifically, it has been found that individuals, who are likely to drink and drive, also have a higher propensity to speed, ride with a drink driver, drug drive, and engage in aggressive driving, than those who do not engage the behaviour (Bingham et al., 2007). This finding is similar to other research that has demonstrated that those who drink and drive also have a willingness to commit driving violations (Bingham et al., 2007; Leal et al., 2006) and other criminal offences (Leal et al., 2006). Research conducted in the United Kingdom has found that drink drivers are approximately twice as likely to have previous traffic convictions as would be expected in the general population (Rose, 2000).

Alcohol is an integral part of Australian life, and while Australia is no different to other western countries in our high levels of alcohol use, it has been ranked the highest for per capita alcohol consumption among English speaking countries (Sheehan, 1994). Despite this attitude toward alcohol, it is commonly acknowledged that the wider community consider drink driving to be a serious social problem (Baum, Sheehan, Ferguson, & Schonfeld, 1998). However, Baum et al. (1998) argue that the attitudes of those caught for drink driving generally differ from those of the wider community. In their research they looked at issues relating to the knowledge of safe drinking and BAC levels and general attitudes toward drink driving among

both an offender and community sample of drivers. No differences were observed among the groups regarding BAC or safe drinking practices; both groups had a high level of knowledge about legal BAC levels, whereas both groups knew less about safe drinking, with a smaller proportion of drivers able to correctly nominate the number of standard drinks to place a driver over the legal BAC limit.

In relation to attitudes toward drink driving, Baum et al. (1998) found significant differences between the offender and community sample, with the attitudes of the community sample indicating that this group held a more negative view than the offender group. Not surprisingly, offenders were also less likely to agree with statements regarding the need for harsher penalties for drink driving offences. These findings suggest that drink driving is seen as a significant social problem for those in the wider community; however amongst those who engage in drink driving behaviour, it is seen as less problematic or something that should not be dealt with in a harsh manner.

It has also been shown that attitudes and perceptions exert an important influence on driving behaviour (Ulleberg & Rundmo, 2003), with unfavourable attitudes toward traffic safety found to be positively correlated with risky driving behaviours, such as drink driving (Bingham et al., 2007). Research has found that an individual's perception of the risk of a particular behaviour is associated with their performance of that behaviour (Bingham et al., 2007; Vanlaar et al., 2007) and is commonly developed through personal or vicarious experiences. For example, Bingham and colleagues found drink driving was predicted by a decrease in the perceived risk of being apprehended for drink driving, greater social support, greater aggression and delinquency, cigarette smoking, and other more risky driving behaviours (e.g., exceeding speed limits, and inappropriate passing etc).

2.6.2 Social factors

Drinking alcohol is a social behaviour that has become a major feature of Australian life (McLean et al., 1993; Sheehan, 1994). Over the last decade there has been an increasing trend of 'binge drinking' among young Australian adults (Ward, Snow, James, & Griffiths, 2010). While traditional views of binge drinking conjure images of personal self-destruction, the contemporary context moves binge drinking from a private or solitary activity and focuses on its social components (Ward et al., 2010). National data demonstrates that hazardous drinking has moved from being a traditionally male oriented activity to becoming one that is engaged in on a regular basis by both males and females (Australian Institute of Health and Welfare, 2002; Elliott and Shanahan Research, 1999). Furthermore, there is concern among public health officials of the levels of hazardous drinking occurring among young adults which put them at risk for alcohol related harm, such as drink driving (Australian Institute of Health and Welfare, 2002, 2003).

Australian culture has been characterised as a 'wet' drinking culture where alcohol is socially integrated within Australia's norms and values (Room, 1988). This is in line with research which demonstrates that many young people are introduced to alcohol by their parents and their attitudes toward alcohol and drink driving is modelled on the attitudes of their parents toward these behaviours (Bingham et al., 2007; Ferguson, Williams, Chapline, Reinfurt, & De Leonardis, 2001; Maldonado-Molina, Reingle, Delcher, & Branchini, 2011; Sheehan, 1994). It has been argued that alcohol misuse in Australian society is normalised and many young Australians live with or have been exposed to the misuse of alcohol by family members (Frye, Dawe, Harnett, Kowalenko, & Harlen, 2008).

Several studies have found that peer drinking patterns are strong predictors of adolescent alcohol use (Andrews, Tildesley, Hops, & Li, 2002; Bot, Engels, Knibbe, & Meeus, 2005; Windle, 2000). Both cross-sectional studies and longitudinal studies over a 12 month period have shown that friends' drinking patterns are a strong predictor of adolescent alcohol use (Bot et al., 2005; Wood, Read, Palfai, & Stevenson, 2001).

It has also been stated that social support for drink driving is one of the strongest predictors of the behaviour among both men and women (Bingham et al., 2007; Fernandes et al., 2006). Research exploring the social relationships of drink driving offenders has found that they are more likely to associate with others who hold similar values toward drinking and drink driving behaviour.

Another social factor that has been shown to have an influence on alcohol consumption and engaging in drink driving is the perceived cost of not engaging in the behaviour. Fernandes and colleagues (2006) found that there was a positive relationship between the perceived costs associated with not engaging in drinking and driving behaviour and higher levels of intended drink driving behaviour. These costs could include a variety of social or personal factors such as negative reactions from peers for not consuming alcohol, advance planning of transport options, or limiting the number of drinks consumed.

2.6.3 Legal factors

The legal factors influencing drinking and driving in the community includes both legislation and enforcement. As noted earlier, traffic law enforcement is underpinned by legislation; countermeasures; and sanctions and/or penalties (Homel, 1988; Watson et al., 1996). Legislation in Queensland allows police to request a breath specimen from a driver at any time, with or without the presence of aberrant

driving behaviour (Watson & Freeman, 2007). The breath test allows police to detect the presence of alcohol and determine whether the driver has complied with the alcohol limit associated with their licence type[2]. These conditions have allowed several countermeasures to be developed that target both the general community and specific populations such as those convicted of drink driving (Ferguson et al., 1999). General deterrence strategies target the community as a whole and are aimed at deterring drivers from driving under the influence of alcohol by publicising the detection and enforcement activities to demonstrate that they could be apprehended every time they engage in this behaviour; and, by educating individuals on the rules governing the road system and the dangers associated with drinking and driving (Ferguson et al., 1999).

As discussed in section 2.3.2, random breath testing (RBT) is one of the primary countermeasures used to deter drivers from drinking and driving. RBT is a deterrence based countermeasure which relies on the perceived certainty, severity, and swiftness of punishment and is designed to have both a general deterrent and specific deterrent effect (Homel, 1988). As noted in relation to speeding behaviour, the general deterrent effect relies on the threat of detection, thus drivers do not have to experience RBT for them to be discouraged from drinking and driving; whereas the specific deterrent effect occurs when a driver has direct experience of RBT and is apprehended for drink driving and ultimately dealt with by the judicial system, thereby making them fearful of offending again (Homel, 1988; Watson & Freeman, 2007).

In Queensland, breath testing drivers and riders has played a key role in reducing drink driving fatalities and hospitalisations by approximately 11 per cent

[2] For example, learner, provisional, probationary, and restricted licences are required to have a zero BAC; and open licence holders are required to remain under .05 BAC.

since the 1980's (Henstridge, Homel, & Mackay, 1997). Furthermore it has also been shown to be effective in reducing the prevalence of driving under the influence of alcohol (Watson & Freeman, 2007). However, in order for RBT to maintain its' deterrent impact, it must be unpredictable, difficult to evade, rigorously enforced, have consequences that are certain and severe, and be supported by a mass media campaign (Ferguson et al., 1999; Watson & Freeman, 2007). Therefore, a drivers' perception of their likelihood of being caught for drink driving will have an impact on whether they engage in the behaviour. Research conducted by Watson and Freeman (2007) found that while exposure to RBT was high, participants also reported engaging in drink driving behaviour on a number of occasions without being detected. The results indicated that the threat of apprehension associated with RBT did not appear to greatly influence offending behaviour.

The final component of the traffic law enforcement system involves the use of sanctions and penalties to help to reduce the problems associated with driving under the influence of alcohol (Nichols & Ross, 1990). Nichols and Ross (1990) argue that the general deterrent aspect is the most crucial function of sanctions. The fundamental premise of sanctioning policies is to influence the entire population of drinking drivers and ultimately reduce the negative consequences associated with this problem at a societal level. The specific deterrent effect of sanctions, operates through the application of fines; rehabilitation via remedial programs to change an offenders motivation to drink and drive; incapacitation through imprisonment or licence actions, such as disqualification, or vehicle restrictions; and retribution which is concerned with matching the appropriate punishment to the crime committed by the drink driver (Nichols & Ross, 1990; Watson, 1998).

While licence disqualification and fines have been shown to be effective in reducing the number of alcohol related crashes in both domestic and international jurisdictions, there are a significant number of offenders who appear to be resistant to legal sanctions and continue to re-offend (Freeman, Liossis, Schonfeld, & Sheehan, 2005; Yu, 2000). Indeed, research demonstrates that approximately 20-30% of convicted drink drivers have prior drink driving offences (Beirness et al., 1997; Brown et al., 2002; Hedlund & McCartt, 2002; Wiliszowski, Murphy, Jones, & Lacey, 1996). For this group, legal sanctions have limited effectiveness in incapacitating offenders or deterring them from re-offending.

In order to deal with this group of offenders, many jurisdictions have introduced vehicle sanctions such as impoundment, immobilisation, and/or forfeiture. Vehicle impoundment generally involves the removal of a vehicle to a storage facility for a specified period. Vehicle immobilisation involves securing a vehicle by steering lock or wheel clamp on the offender's property; whereas vehicle forfeiture involves the ownership of a vehicle to be forfeited, allowing authorities to sell it to recoup the costs associated with the offence. Most jurisdictions use vehicle immobilisation, impoundment or forfeiture for serious/repeat drink driving offenders and/or driving while disqualified offenders. In Queensland, vehicle impoundment and forfeiture legislation was introduced in July 2007 for specific drink driving offences. In particular, this applies to repeat offences for those with a high BAC (e.g., <.15); failing to supply a breath or blood specimen or driving while under a 24 hour suspension; driving a vehicle that is both unregistered and uninsured; or driving a vehicle that is illegally modified. No evaluations have been conducted as yet on the introduction of these new laws in Queensland.

2.6.4 Situational factors

Situational factors have been shown to have a strong influence on whether an individual engages in drink driving behaviour. One of the most important issues is the difference between rural and urban areas. While there is a common perception that drink driving is more prevalent in provincial or rural areas it appears that little research has been conducted outside metropolitan areas within Australia (Miller, Coomber, Staiger, Zinkiewicz, & Toumbourou, 2010). However, studies that have examined the issue consistently indicate that alcohol use and related harms within rural areas exceeds those of metropolitan areas. It should also be noted that these studies do not typically control for the number of vehicle registrations between rural and metropolitan areas, hence this conclusion should be interpreted with caution.

The experience of drinking alcohol and driving is also different for those in urban and rural areas. For instance, traffic law enforcement in rural areas needs to cover a wide network of roads with low traffic volumes, and in most cases they have smaller numbers of police staff to carry out enforcement activities. This contributes to drivers in rural areas experiencing and perceiving a low probability of detection (Ferguson et al., 1999).

There are also differences between rural and urban areas in terms of the number of drinking establishments and the distances required to reach these places (Ferguson et al., 1999). Therefore it follows that the location where the drinking took place is an important factor when looking at the occurrence of drinking and driving (Bingham et al., 2007; Morrison et al., 2002). However, regardless of whether the drinking took place in a rural or urban area, research has shown that drinking away from home is associated with a higher proportion of drink driving incidents than drinking at home (Morrison et al., 2002). Bingham and colleagues

(2007) have also reported that the drinking location is a stronger predictor of drink driving than beverage type or amount of alcohol consumed.

Another factor that has been found to contribute to drink driving is a lack of alternative transport options in both urban and rural areas. In many cases, lack of public transport and taxis is limited, particularly in rural areas (Ferguson et al., 1999). However, it should be noted that drinking patrons in urban areas have been found to cite these reasons for driving their vehicle after drinking (Morrison et al., 2002). Studies have also shown that the expense of public transport is another factor contributing to an individual's decision to drive after drinking (Morrison et al., 2002).

2.7 Research comparing speeding and drink driving behaviour

While speeding and drink driving have been extensively examined as individual behaviours, a comprehensive search of the literature has revealed that there have only been a small number of studies examining the two behaviours together. In an early review article published by Elliott (1992a), it was suggested that in order to achieve compliance with the regulatory limits set for both speeding and drink driving, a number of conditions needed to be achieved (see Table 2.2). This table highlights that there were major differences at the time in how drink driving and speeding were perceived among the driving community. For instance, drink driving was arguably seen as morally abhorrent, complying with the legislation was seen as the correct behaviour within the community, and was linked to reducing the incidence of road crashes. Conversely, Elliott (1992a) suggested that none of these conditions had sufficiently been achieved in the case of speeding. As such, it appears that the combined efforts of the different road safety authorities had been

successful in convincing drivers of the risks associated with drink driving behaviour, but not those associated with speeding behaviour.

Table 2.2

Factors contributing to speeding and drink driving compliance (Adapted from Elliott, 1992a)

Contributing factors	Drink Driving (RBT)	Speeding
Moral attachment to the law as fair, proper, necessary	✓	✗
Social proof – most people like me obey this – high approval of the law	✓	✗
Non-compliers (a dominant minority) are in need of punishment and forced behaviour modification	✓	✗
Current legal levels/standards are accurate and appropriate to environmental settings	✓	✗
Enforcement has road safety as primary aim not revenue collecting	✓	✗
Belief that non-compliance is as socially undesirable and indefensible as rape or assault	✓	✗
High perceived probability of detection	✓ *	✗ *
Very strong desire to avoid punishment because it is severe and certain	✓	✗
Non-compliance even at low levels is unsafe/dangerous	✓	✗
Enforcement is highly visible and aims at deterrence rather than detection	✓	✗
Circumscribed limits which are rigidly enforced (i.e., no tolerance limits	✓	✗
Focus is on all who exceed circumscribed limits	✓	✗
Proven relationship between transgression of the law and road crashes	✓	✗ *

* The factors reflect differences in practices between jurisdictions.

Since this report was published in 1992, road safety authorities have placed a strong focus on speed enforcement activities and related education attempting to

change driver behaviour and attitudes toward exceeding the posted speed limit. Despite the focus on changing the speeding behaviour of drivers in the past 18 years, many of the differences observed in Table 2.2 arguably still exist.

More recent research conducted in New Zealand examined the application of the theory of planned behaviour to driver's intentions and behaviour toward speeding, drink driving, and seat-belt wearing in rural and urban locations (Gordon & Hunt, 1998). The roadside survey asked participants to answer questions regarding one of the three behaviours under review and an opportunity to mail back questionnaires regarding the other two behaviours not answered at the roadside. Their results showed that the model was able to predict intentions but not behaviour. The aim of this research was to specifically test the utility of the theory of planned behaviour to predict the three behaviours under review; therefore no comparisons were made between speeding and drink driving.

Speeding and drink driving were also examined in research conducted by Harrison and Pronk (1999) who surveyed 3,700 licensed drivers in Victoria, Australia. They examined driver's experiences of speed and drink driving related enforcement and their perceptions of the risk of detection for each behaviour. They found that there was a moderate correlation between the perceived risk of detection for speeding and perceived risk of detection for drink driving. It was also noted in their research that respondents reported seeing an average of 5.1 instances of speed enforcement in the preceding four weeks compared to only 1.3 instances of drink driving related enforcement. This suggests that there is a difference between the effect of enforcement on the perceived risk of detection for speeding and drink driving. In the authors view, this is not surprising given the nature of the two offences. For instance they argue that drink driving is the result of decisions

regarding whether to consume alcohol and drive rather than using other forms of transport; whereas speeding is the result of a continuous decision-making process while driving, which result in continuous adjustments to vehicle speed based on a large number of factors, i.e., whether the driver has recently been exposed to enforcement.

Other research conducted in the US focussed on the relationship between self-reported seatbelt use, observance of speed limits, and abstaining from drinking any amount of alcohol and subsequent driving among the general driving population (n = 1,250) (Shinar, Schechtman, & Compton, 2001). These researchers reported that seatbelt use was not related to speeding and drink driving behaviour. However, they did report a weak correlation between speeding and drink driving behaviour, $r_s = .14$, $p < .001$.

In research conducted in Australia, Fernandes, Job, and Hatfield conducted two studies examining a range of predictors of speeding and drink driving, along with other driving behaviours such as driving while fatigued and seatbelt use. The first study conducted by these authors (Fernandes et al., 2004) found that among 129 first year psychology students, defiance toward authority figures, and holding a specific attitude toward speeding were predictive of self-reported speeding behaviour. A model encompassing demographic, personality, and attitude variables explained approximately 31 percent of the variance in self-reported speeding behaviour. In the case of drink driving, this behaviour was predicted by factors relating to sensation seeking, attitude to crash avoidance, general optimism bias (refers to an individual's tendency to expect a better future than their peers), and holding a favourable attitude toward drink driving. For drink driving behaviour, a model encompassing demographic, personality, and attitude variables explained approximately 51 percent

of the variance in self-reported drink driving behaviour. No specific comparisons were reported by the authors exploring the relationship between these two behaviours.

In similar research, Fernandes and colleagues (Fernandes et al., 2006) examined a range of demographic, personality, attitude and belief factors in the prediction of speeding, drink-driving, driving while fatigued, and seatbelt use among 587 drivers. Due to the length of the questionnaire, these researchers chose to develop four separate questionnaires; therefore no comparisons can be made regarding which combination of behaviours and to what level participants were willing to engage in more than one of these behaviours. The results of the study indicated that speeding was predicted by gender, sensation seeking, driver anger, risk perception, general perceived susceptibility, and specific perceived susceptibility. In contrast, drink driving was predicted by variables encompassing perceived risk, perceived costs and peer influence.

2.8 Theoretical perspectives on speeding and drink driving

This section provides an overview of the theoretical framework utilised in this research to examine the various factors contributing to speeding and drink driving. It is widely acknowledged that modifying well established behaviours is rarely a straightforward process (Elliott, 1992a) and it is important for research to utilise strong theoretical principles to provide a systematic basis for inquiry (Watson, 1997). Other researchers in the field of road safety have recognised the need for empirical research to be based on well recognised theoretical perspectives, arguing it allows human behaviour to be better understood, investigated, and manipulated (Brown, 1997).

This section describes the selection of the theoretical perspectives utilised in this research and the relevance of these perspectives to speeding and drink driving behavioural research. It is acknowledged that a range of theoretical perspectives have been used over recent years to examine both speeding and drink driving behaviour. Among the more common perspectives used have been the theory of reasoned action, the theory of planned behaviour, and deterrence theory. While consideration was given to using the first two of these theories, it was decided to utilise deterrence theory due to its strong focus on the role of legal factors, which is particularly relevant to both speeding and drink driving. Further, Akers' social learning theory was selected to augment deterrence theory based on its demonstrated utility in a range of more recent studies examining speeding (Fleiter et al., 2010; Fleiter & Watson, 2006; Fleiter et al., 2006), unlicensed driving (Watson, 2004b), and drug driving (Armstrong et al., 2005). In addition, perspectives relating to various personality factors will be explored, including alcohol misuse, sensation seeking, and Type-A behaviour pattern. While these are not strictly systematic theories, they represent conceptual frameworks for reviewing person-related factors that were identified as being related to speeding and drink driving.

2.8.1 Deterrence Theory

Deterrence theory is a criminological perspective that explains the prevention of criminal behaviour through the threat of legal sanctions (Homel, 1988; Meier & Johnson, 1977). In this context, deterrence refers to compliance that is brought about by the existence and administration of criminal law; thus it relates to the relationship that exists between a specific sanction and the behaviour it is aimed at deterring (Meier & Johnson, 1977). Deterrence principles have been used extensively to guide the development of many road safety countermeasures, particularly those designed to

reduce drink driving e.g., RBT, and driving over the posted speed limit e.g., speed cameras (Freeman & Watson, 2009; Harrison & Pronk, 1999; Homel, 1988; Ross, 1982; Watson et al., 1996).

2.8.1.1 Classical deterrence theory

In its classical form, deterrence theory postulates that the effectiveness of a legal threat is a function of the perceived risk of apprehension and the perceived certainty, severity, and swiftness of punishment (Homel, 1988; Meier & Johnson, 1977). Of central importance to the arguments for deterrence as a tool for social control is the premise that behaviour modification can be achieved by making individuals fearful of the consequences of engaging in a specific illegal behaviour (Homel, 1988). It has been argued that classical deterrence, is more a doctrine than a comprehensive theory that explains criminal behaviour (Akers & Sellers, 2009; Meier & Johnson, 1977).

Deterrence theory also encompasses two additional concepts, namely general and specific deterrence, (Homel, 1988). General Deterrence relies on the perceived threat among the general driving population of being caught at any time. As such, drivers are deterred by the threat of apprehension versus the actual experience of detection. Conversely, specific deterrence is experienced by those who are caught and deterred through the fear of further punishment (1988). It should be noted that these are not separate processes; rather they are the same process, only applied to different populations (Elliott, 2003). Thus, general deterrence assumes that the general driving population will be deterred from engaging in an illegal behaviour by observing those who experience punishment (i.e. specific deterrence) (Elliott, 2003).

The classical form of deterrence theory has received mixed support among researchers. For instance, Fildes and Lee (1993) suggest that the perceived risk of

detection is more important than the actual risk of detection. Similarly, Ostvik and Elvik (1990) argue that drivers underestimate real increases in the actual risk of detection. In their review, they reported that increases in the level of enforcement had practically no effect on the perceived risk of detection or on the drivers' choice of speed. Thus, increasing the perceived risk of detection is one of the most important objectives of speed enforcement strategies.

Further, greater perceived certainty and severity of punishments has not always been shown to be associated with a reduction in the targeted behaviour. Research has tended to indicate a negative relationship between certainty of punishment and illegal behaviour, however in relation to the severity of punishment the relationship is either weak or non-existent (Grosvenor, Toomey, & Wagenaar, 1999). This result was also found in work conducted by Freeman and colleagues (Freeman et al., 2004), suggesting recidivist drink drivers perceived legal sanctions to be severe and fair, but not entirely certain or swift.

In relation to speeding, Fleiter and Watson (2006) examined drivers frequency of exceeding the speed limit and found that for many of the drivers, certainty of punishment was not necessarily a deterrent. In their self-report study, the more certain a driver was of being punished, the more frequently they reported exceeding the speed limit. This has been labelled the 'speed paradox' as this finding seems counter-intuitive to the expected relationship between the threat of punishment and performance of a particular behaviour.

2.8.1.2 Expanded deterrence theory

The main criticism expressed in relation to deterrence theory is the strong emphasis it places on legal sanctions to the exception of other influences, such as social factors (Akers & Sellers, 2009; Grasmick, Bursik, & Arneklev, 1993). In

order to address this concern, deterrence theory was reconceptualised by Stafford and Warr (1993) to include concepts relating to punishment avoidance and vicarious learning. Stafford and Warr (1993) argued that there are two groups of people who escape legal punishment. The first group are those who have not yet performed the behaviour, and the second group are those who have performed the behaviour and evaded detection. The second group are deemed to have experienced punishment avoidance. Stafford and Warr (1993) further elaborated on this concept by suggesting that those whose experiences largely involved avoiding punishment may believe they are immune from punishment even in the event of occasional experiences of apprehension and punishment. Thus, certainty of punishment is diminished with increasing experiences of avoiding punishment.

The idea that punishment avoidance can decrease the perceived certainty of punishment was also noted by Harrison in relation to speeding who stated that, *"successfully avoiding detection is likely to be a powerful reward, and if a driver has often managed to avoid detection while speeding and is only detected rarely, the positive consequences will outweigh the negative"* (2001, p. 9). Piquero and Pogarsky (2002) in their research regarding drinking and driving noted that personal and vicarious punishment avoidance was positively related to offending behaviour. It was also noted in their research that punishment experiences appeared to encourage rather than discourage future offending behaviour. It was argued that the experience of punishment had a 'resetting effect' on the perception of being caught again, specifically the participant perceived that they would have to be exceedingly unlucky to be caught again thereby resetting the probability of being caught back to zero or nearly zero.

In addition, Stafford and Warr (1993) argued that classical deterrence does not consider the influence of others' experiences on an individual's perception of risk. Therefore, in their view, the impact of legal sanctions and related enforcement activities is a product of the individual's direct experience, as well as their indirect experience of these factors through vicarious learning. This finding was also discussed by Piquero and Pogarsky (2002) who reported that vicarious punishment and avoidance experiences affect behaviour by influencing sanction risk perceptions. The importance of vicarious punishment avoidance as a predictor of risky driving behaviours has also been noted in relation to speeding (Fleiter et al., 2006); unlicensed driving (Watson, 2004b); and drug driving (Armstrong et al., 2005).

Figure 2.5 illustrates a model of speeding and drink driving behaviour based on expanded deterrence theory. The model outlines the process of an individual's perceived level and knowledge of enforcement activities and experience of punishment and punishment avoidance. These concepts influence their perceptions of risk for themselves and others, and contribute to their decision to engage in speeding or drink driving behaviour.

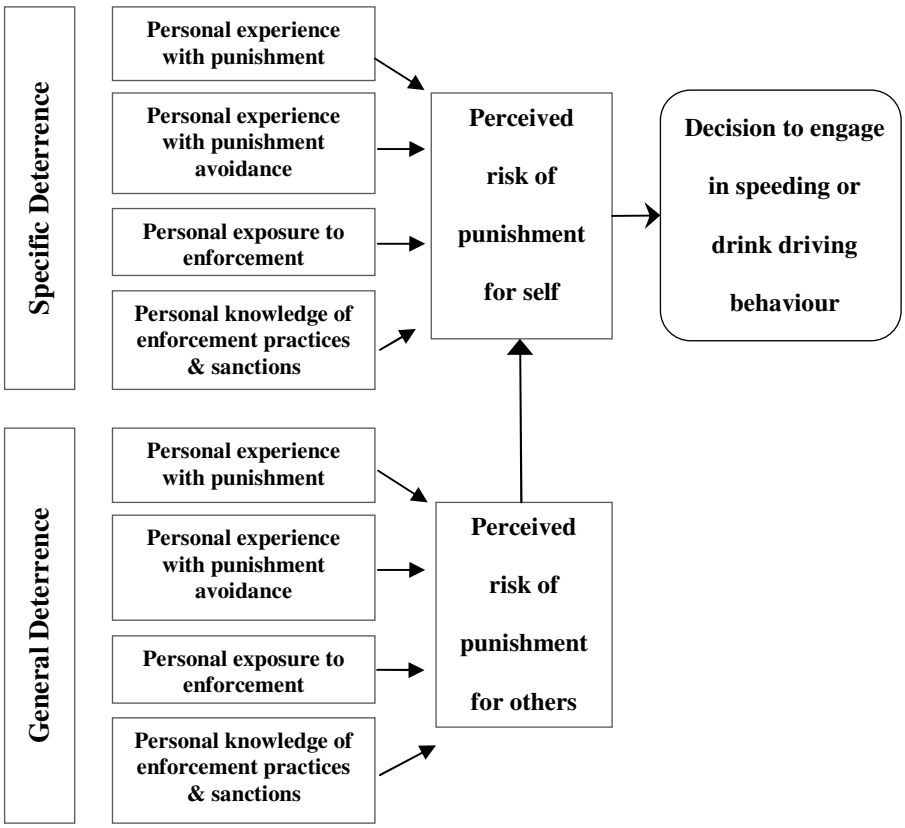

Figure 2.5 Expanded deterrence model of speeding and drink driving behaviour (adapted from Watson, 2004b)

Expanded deterrence theory has been applied to a number of areas of road safety research. For example, Freeman and Watson (2006) applied the theory to a group of recidivist drink driving offenders who were on a court-appointed probation order at the time of the study. The purpose of the research was to examine the perceptions and experiences of sanctions for these types of offenders. They found that punishment avoidance exerted the greatest influence on self-reported offending behaviours; however perceptions of arrest certainty and punishment severity were also related to drink driving offences. Specifically, this group of recidivist offenders rated the severity of punishment as being quite severe and this construct was found to significantly predict an offender's intentions to drink and drive again in the future. This result is contrary to previous research suggesting that the application of legal sanctions in isolation is not effective in reducing recidivism rates among repeat

offenders (Beirness et al., 1997). It was noted by the authors that as participants were on a probation order at the time of the study; this result could be the product of a 'recency' effect.

It was interesting to note in this research that vicarious exposure to others who had been punished or avoided being punished for drink driving was not associated with further drink driving behaviours (Freeman & Watson, 2006). The implication of these results is that recidivist drink drivers are not as strongly influenced by vicarious experiences as would be predicted by expanded deterrence theory. Thus, past behaviour appears to be a good predictor of future behaviour. Keeping in mind that this research was conducted with recidivist offenders, these results do not necessarily discount the concept of general deterrence; rather it provides further evidence on the importance of personal experience to promote habitual offending patterns for repeat offenders.

While the extended model of deterrence considers a broader range of influences than the classical form, many criticisms remain in relation to deterrence theory in general. For instance, deterrence theories continue to focus on legal sanctions only, and do not take into consideration social sanctions e.g., an individual could lose social support from family members or peers if they were to engage in an illegal behaviour. Further, deterrence theory does not discuss the social implications of behaviour, for instance, a driver might gain peer approval from engaging in speeding behaviour.

In addition to social mechanisms, deterrence theory does not consider person-related factors such as the inherent rewards associated with a specific behaviour e.g., feelings of exhilaration when driving fast. It also does not consider individuals whose driving behaviour may be secondary to their substance misuse or abuse e.g.,

driving while over the legal BAC limit for the drivers licence type. Another factor not taken into consideration is the discrepancy between the individual knowing that a particular behaviour is wrong or illegal and still choosing to engage in that behaviour (Harrison, 1998). Accordingly, a broader perspective is required to encapsulate these additional personal and social influences.

2.8.2 Social Learning Theory

Akers' social learning theory draws on both sociological and psychological perspectives and was developed with an emphasis on explaining deviant behaviour (Akers, 1977). The sociological influence was drawn from Sutherland's differential association theory of crime, which suggests that the primary reason an individual engages in deviant or illegal behaviour is due to exposure to significant others who hold favourable attitudes toward the behaviour and engage in the behaviour (Akers, 1998). There are four main components of Akers' social learning theory: differential association, imitation, definitions, and differential reinforcement. These are described below.

Differential association is a central component of Akers' social learning theory and has both behavioural and normative dimensions. The behavioural dimension encompasses direct association and interaction with others, as well as the indirect association and identification with more remote reference groups. The normative dimension refers to the different patterns of norms and values that an individual is exposed to through their association with these 'others' (Akers & Sellers, 2009). Differential association provides the social context in which social learning takes place. For instance, the interaction the individual has with different groups exposes them to particular definitions, provides models to imitate, and provides the

framework in which differential reinforcement (e.g., rewards and punishments) for criminal and conforming behaviour occurs (Akers & Sellers, 2009).

Imitation refers to the process of observational learning. However, whether the behaviour modelled by others will be imitated depends upon the characteristics of the model and to what degree the individual identifies with the model; the behaviour being observed; and the associated consequences of the behaviour (e.g., whether it is rewarded or punished) (Akers, 1998; Akers & Sellers, 2009). This construct aligns with vicarious punishment and vicarious punishment avoidance in expanded deterrence theory. It has also been argued that imitation is more influential in the acquisition and performance of behaviour than in the maintenance or cessation of behavioural patterns once established. This does not imply that imitation is not important in maintaining behaviour. The observation of salient models can come from many different sources, for instance family members, peers, work colleagues, and media can impact on both pro-social and deviant behaviours.

Definitions include an individual's attitudes, rationalisations, moral beliefs, and orientations toward a specific behaviour that defines whether the performance of a particular behaviour is good or bad, desirable or undesirable, or justified or unjustified. Within this theory, definitions can be either general or specific in nature. General definitions include religious, moral, and other conventional norms, whereas specific definitions orient the individual to particular behaviours. Definitions can be categorised as favourable, unfavourable, or neutral toward a specific behaviour. A favourable definition toward a particular behaviour would generally be positively associated with an individual engaging in the behaviour as it would be viewed as acceptable and in line with their personal attitudes. Conversely, unfavourable definitions would generally be negatively associated with an individual engaging in

the behaviour. In the case of neutral definitions, while the individual may view the behaviour as undesirable, they may still believe it is justified, rationalised, excused, or generally not seen as that bad in a specific situation (Akers, 1998; Akers & Sellers, 2009). Definitions are developed through imitation and differential reinforcement (Akers & Sellers, 2009).

Differential reinforcement relates to the overall balance of rewarding or desired outcomes against the negative or undesirable consequences that a person anticipates in relation to different behaviours. Differential reinforcement relies on the individuals' perception of the past, present, and future rewards and punishments for their actions. This construct has been described as the most relevant behavioural mechanism within social learning theory as it demonstrates how previously rewarded behaviour increases the likelihood of the behaviour being repeated, and equally how previously punished behaviours will decrease the likelihood of the behaviour being repeated (Akers, 1998).

According to Akers' social learning theory, behaviour is shaped by both direct conditioning and through modelling of others' behaviour. An individual's behaviour is strengthened through rewards (positive reinforcement) and avoidance of punishment (negative reinforcement) or weakened by punishments (positive punishment) and loss of rewards (negative punishment). The performance of either deviant or conforming behaviour depends on the past and present rewards or punishments connected with the behaviour and the rewards or punishments associated with alternative behaviours. This construct encompasses a broad range of reinforcers and punishments (e.g., social or non-social). It is important to note that social reinforcement is not limited to the actual or anticipated reactions of others, but also includes both tangible and intangible rewards valued in society or subgroups

(Akers & Sellers, 2009). Non-social reinforcers can include the direct physical effects of drugs and/or alcohol, or those who find certain forms of deviant behaviour intrinsically rewarding e.g., sensation seeking (Akers & Sellers, 2009). As such, the thrill-seeking associated with speeding may act as a non-social reward for the behaviour, while guilt or anticipated regret may represent a non-social punishment. Reinforcers and punishments can also consist of formal and informal sanctions, legal, and extra-legal penalties, direct and indirect punishment, and positive and negative reinforcement (Akers, 1998). Figure 2.6 illustrates a social learning theory model of speeding and drink driving behaviour.

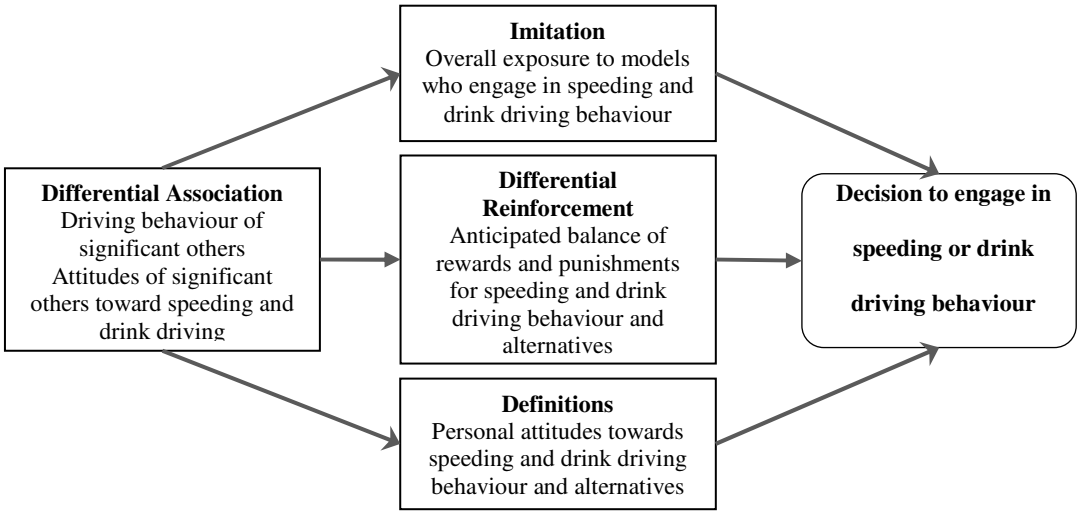

Figure 2.6. Social learning model of speeding and drink driving behaviour (Adapted from Watson, 2004b)

Akers and Sellers (2009) have noted that the wide variety of research utilising social learning theory has demonstrated strong support for the constructs contained within the theory, both individually and in combination. Despite the widespread use of social learning theory in general research, it has not been widely applied in the field of road safety. However, there is evidence that it is useful in explaining a variety of risky or illegal driving behaviours, including speeding (Fleiter & Watson,

2006), unlicensed driving (Watson, 2004a), and riding with a drinking driver (DiBlasio, 1988).

DiBlasio (1988) utilised Akers theory to investigate why young adolescents chose to ride with a drinking driver and found that differential association was the most important predictor. This research measured both the parental and peer influences and the results found that peer influence increased with age, suggesting that younger adolescents were influenced more by parents, and older adolescents were more strongly influenced by their peers. The importance of differential association was also demonstrated in research conducted with drivers who had been caught driving while unlicensed. Watson (2004a) found that differential association, including both normative and behavioural dimensions, definitions, and differential reinforcement were significant in predicting participants' frequency of driving unlicensed, continued driving after licence disqualification, and intentions to drive unlicensed in the future.

It has also been reported that 'significant others' can influence a driver's behaviour on the road including the presence of passengers, behaviour of other drivers, and the personal definitions of peers and family members (Fleiter et al., 2010; Fleiter et al., 2006; Haglund & Aberg, 2000; Regan & Mitsopoulos, 2001). In particular, Fleiter et al. (2006) found that the normative influence of family and friends, that is the extent to which significant others were perceived to approve of speeding, was significantly associated with more frequent speeding. Following on from this research, Fleiter, Lennon, and Watson (2010) conducted qualitative research to further explore the influence of others on an individual's speeding behaviour and found that passengers were associated with slower driving speeds; and driving alone was associated with driving faster than when others were in the

vehicle. Other drivers on the road were also reported as being influential with respondents reporting speeding in situations to keep up with the flow of traffic, and a general perceived pressure to drive faster. Among this group of respondents, it was also reported that social rewards were less common than social punishments.

While not explicitly testing social learning theory, other research provides support for the influence of others. In particular, research has found that young drivers whose parents had three or more crashes on record were 22 percent more likely to have had at least one crash than young drivers whose parents had no recorded crashes (Ferguson et al., 2001). Similarly, young drivers whose parents had three or more driving violations were 38 percent more likely to have had a driving violation on their record than young drivers whose parents had none. This finding provides some evidence to support the process of imitation as described in Akers' model, particularly the assertion that observational learning and models are particularly important in the acquisition of behaviour, i.e., when young drivers are learning to drive.

2.8.3 Personality perspectives

2.8.3.1 Sensation seeking

As discussed in the literature review, sensation seeking has been linked to both speeding (see section 2.5.1) and drink driving behaviour (see section 2.6.1). In the speeding literature, there has been a significant amount of research demonstrating the link between those who score high on measures of sensation seeking and exceeding the speed limit (Fleiter et al., 2006; Jonah, 1997; Jonah et al., 2001; Palamara & Stevenson, 2003; Tay et al., 2003; Tay et al., 2002; Zuckerman, 1994). Similarly, those high in sensation seeking have also been linked with high levels of reported driving after drinking (Fernandes et al., 2004; Jonah, 1997; Jonah et al., 2001).

While Akers' social learning theory encompasses a broad range of factors that influence behaviour, it does not explicitly account for the personality factors underpinning risk-taking behaviour. As noted by Zuckerman (1994) risk taking and sensation seeking are highly related concepts and those who are high on sensation seeking also tend to display a high disposition toward risky driving behaviours (Jonah, 1997; Palamara & Stevenson, 2003). Research has shown that individuals who are high in sensation seeking have a tendency to focus on the benefits of their risk taking behaviour, rather than the threat of, or actual punishment associated with their activities (Zuckerman, 1994). Sensation seeking has also been found to be higher in males, and for both sexes, changes over the lifespan whereby it increases until approximately the age of 16 and then declines (Zuckerman, 1994).

While the personality factors underpinning risk taking behaviour is not explicitly included within Akers' social learning theory, it has been argued that aspects of sensation seeking may be captured by the non-social rewards component of Akers' model (Akers, 1998; Wood, Gove, Wilson, & Cochran, 1997). For instance, an individual who scores high on measures of sensation seeking may be more likely to perceive risky behaviours as intrinsically rewarding than those who score low on measures of sensation seeking. As such, it is possible that a driver may perceive speeding or drink driving as being rewarding, due to the thrill and excitement associated with driving at high speeds or generally breaking the law.

2.8.3.2 Alcohol misuse

Alcohol consumption is considered to be one the strongest predictors of alcohol impaired driving (Berger & Snortum, 1986; Bingham et al., 2007; Schechtman et al., 1999) and has been shown to be associated with impulsive and risky driving behaviours (Fillmore et al., 2008). It is possible that individuals who

engage in drink driving behaviour may do so for a number of reasons. For instance, they may be the type of individual who generally engages in risky behaviour, but they may also may drink and drive due to alcohol addiction which make it difficult for them to separate their drinking and driving behaviour (Beirness et al., 1997). As noted earlier, persistent drink drivers tend to have a history of repeat "driving while intoxicated" (DWI) behaviour, and when detected, their BAC levels are also in the high range (i.e., ≥ .15%). It has been estimated that among fatally injured drinking drivers 62 percent had a BAC in excess of .15 percent, and 68 percent of injured drinking drivers were over .15 percent (Beirness et al., 1997).

The examination of alcohol misuse within this research utilises a general orientation toward problem drinking, rather than focusing solely on alcoholism or alcohol dependence. While these terms are often used interchangeably, it is important to differentiate between these concepts. Walitzer and Connors (1999) found that compared to alcoholics, problem drinkers have a shorter history of problem-drinking and typically have not experienced any major negative consequences as a result of their drinking. It was also noted by these researchers that problem drinkers have also generally not experienced severe alcohol withdrawal symptoms (e.g., delirium tremens). Thus, problem drinkers may include individuals who drink heavily, but do not meet the criteria for alcohol dependence. As such, their alcohol misuse may only impact their driving behaviour some of the time.

2.8.3.3 Type-A behaviour pattern

As noted earlier, individuals who are high in Type A behaviour pattern (TABP) are characterised as having a competitive need for achievement, a sense of time urgency, alertness, aggressiveness, and hostility (Nabi et al., 2005; Tay et al., 2003). As reported in section 2.5.1, the link between TABP and speeding has been explored

by researchers and it has been found to be associated with those who exceed the speed limit (Tay et al., 2003) and more generally associated with self-reported 'fast' driving (West et al., 1993). From a social learning perspective, it is likely that speeding may satisfy an intrinsic need within the individual e.g., thrill seeking, or practical needs such as needing to get from one place to another quickly (Hatfield & Job, 2006), thereby representing a non-social reward to the individual. In the case of drink driving, the link between this behaviour and TABP is not as conclusive. Some research has reported higher levels of TABP among those who reported drinking and driving (Perry & Baldwin, 2000), whereas others have indicated lower TABP among individuals who report regular alcohol consumption (Nabi et al., 2005).

2.8.4 Application of theoretical frameworks to speeding and drink driving behaviour

Both speeding and drink driving behaviour represent illegal driving behaviours. As such, deterrence principles should play an important role in discouraging drivers from engaging in either of these behaviours. However, this section has highlighted the limitations of deterrence theory to explain complex behaviours that have a strong social influence. It has also been argued by Akers' that deterrence theory represents a subset of social learning theory by incorporating the legal and enforcement environment in which illegal behaviours operate (Akers, 1990).

Akers' social learning theory has received strong research support as a whole, and for the individual constructs contained within the theory. Social learning theory is a comprehensive theory that takes into consideration factors that have been shown to influence the acquisition, performance, and maintenance of deviant and criminal behaviours. For this reason, social learning theory appears to be particularly appropriate for examining a broad range of deviant driving behaviours for many

reasons. Firstly, the constructs of differential association, imitation, definitions, and differential reinforcement include factors such as social, legal, and situational influences on behaviour. Secondly, driving is inherently a learned behaviour that is transferred from one individual to another through direct means, i.e. driver training, and indirect means by observing others driving behaviour. Finally, each of the behaviours reviewed in this research, speeding and drink driving, operates within an environment based on deterrence or enforcement principles.

While social learning theory encompasses both deterrence and social influences on behaviour, the literature review highlighted important intrinsic characteristics of the individual (e.g., sensation seeking, alcohol misuse, and Type-A behaviour pattern) that have been shown to be associated with both speeding and drink driving behaviour. Accordingly, the chosen theoretical framework was augmented to include the personality factors described above. Hence, this investigation of speeding and drink driving will examine the personal, social, and legal influences to explain why some drivers decide to comply with the regulatory limits, as well as why some drivers choose not to comply with these limits.

2.9 Research questions and hypotheses

The research questions underpinning this program of research were based on the findings of the literature review and theoretical framework provided by Stafford and Warr's Expanded Deterrence Theory, Akers' Social Learning Theory, and the other psychological perspectives identified above. The research questions and related hypotheses are documented below and a brief rationale is provided for each.

Research Question 1: What is the relationship between drivers' self-reported speeding and self-reported drink driving behaviour?

As discussed in the literature, there appears to be differences in how drivers view speeding and drink driving (see section 2.2.3). Much of the research conducted has investigated speeding and drink driving as stand-alone behaviours, however very few studies have examined whether these behaviours are related to one another and to what degree individuals comply with the regulatory limits set for each behaviour (see section 2.7). Thus, this research question relates to literature that suggests that a 'cluster' of high risk or illegal behaviours exist (Harrison et al., 1998; Watson, 2004a; Watson et al., 1996). Based on this suggestion, those individuals who are considered to be generally more deviant on the roads would be more willing to engage in a variety of illegal driving behaviours. As such, it is hypothesised that there will be a positive relationship between self-reported drink driving and self-reported speeding; see hypothesis one (referred to as H_1). In addition, the relationship between speeding and drink driving will be further explored to determine whether those who report driving when they may be over the legal alcohol limit are also more likely to speed at higher levels (H_{2a}) as well as speed more frequently in general (H_{2b}). Furthermore, given that drink driving and high-range speeding are generally viewed as a more deviant behaviours than low-range speeding, it is hypothesised that those who engage in more high level speeding will be more likely to report drink driving, than those who only engage in low level speeding (H_3).

H_1: There will be a significant positive association between self-reported speeding and self-reported drink driving.

H_{2a}: Participants who report engaging in drink driving behaviour will be more likely to report exceeding the speed limit at higher levels (e.g. by 10 kilometres per hour or more) than those who don't report drink driving.

H_{2b}: Participants who report engaging in drink driving behaviour, will report more frequent speeding at both low (e.g. up to 10 kilometres per hour over the limit) and high (e.g. 10 kilometres per hour or more above the limit) levels compared to those who don't report drink driving.

H_3: Participants who report frequently exceeding the speed limit by ten kilometres per hour or more will report more frequent drink driving behaviour than those who only report exceeding the speed limit by up to ten kilometres per hour.

Following on from hypothesis 3, the literature suggests that a large proportion of drivers hold the view that drink driving is an antisocial or abhorrent behaviour; whereas the speeding literature infers that exceeding the posted speed limit, or driving at speeds within a certain 'tolerance' is not perceived as speeding (Blincoe et al., 2006; Elliott, 1992a, 1992b; Ferguson et al., 1999; Fildes & Lee, 1993; Stradling et al., 2003). Thus, in addition to their being a positive relationship between these two behaviours, it is proposed that a drivers' level of compliance with the regulatory limits will differ for each of the behaviours. As such, the fourth hypothesis (H_4) is based on the contention that driving while over the legal BAC limit is less frequent among the general driving population than exceeding the posted speed limit.

H_4: There will be higher levels of compliance with regulatory limits set for drink driving than for regulatory limits set for speeding.

Research Question 2: To what extent are the personal, social, and legal factors influencing self-reported speeding and self-reported drink driving behaviour similar?

This research question explores the psychosocial factors related to self-reported speeding and drink driving behaviour to determine whether commonalities exist between the two behaviours. The hypotheses relate to the influence of both personality factors, as well as those related to the social environment. As noted in section 2.5.1, Type-A behaviour pattern has been found to be associated with those who exceed the speed limit (Nabi et al., 2005; West et al., 1993). Conversely, the relationship between Type-A behaviour pattern and self-reported drink driving has been shown to be more complicated. For instance, some research has reported that higher scores on measures of Type-A behaviour pattern were found among those who consumed high amounts of alcohol on a regular basis (Nabi et al., 2005), whereas other research (Perry & Baldwin, 2000) has reported no significant relationship between Type-A behaviour pattern and drink driving (see section 2.6.1). Accordingly, it is hypothesised Type-A behaviour pattern will have a stronger positive relationship with self-reported speeding than self-reported drink driving (H_5).

H_5: *There will be a stronger positive association between self-reported speeding and Type-A behaviour pattern, than the association observed between self-reported drink driving and Type-A behaviour pattern.*

The next personality factor reviewed in relation to self-reported speeding and drink driving behaviour is the role of alcohol misuse as measured by the AUDIT. While the AUDIT has proven to be a reliable predictor of driving while under the influence of alcohol (Bergman, Hubicka, Laurell, & Schlyter, 2000), the relationship between alcohol misuse and driving over the posted speed limit is not as clear. For instance, some research has reported a small proportion of offenders who were detected for speeding were also detected with BAC levels ranging from .06 to .07

(Hubicka, Laurell, & Bergman, 2008). It should be noted that these BAC levels do not necessarily constitute 'alcohol misuse'. In contrast, other research has reported a weak positive relationship between drink driving and speed behaviour (Schechtman et al., 1999). Therefore it is hypothesised that there will be a strong positive relationship between self-reported drink driving and AUDIT scores, but a weak positive association between self-reported speeding and AUDIT scores (H_6).

H_6: *There will be a strong positive association between self-reported drink driving behaviour and scores on the AUDIT, but a weak positive association between self-reported speeding and scores on the AUDIT.*

As noted in sections 2.5.1 and 2.6.1, sensation seeking has been shown to be higher among those who engage in a number of risk taking activities, including risky driving behaviours (Zuckerman, 1994). In the case of self-reported speeding, sensation seeking has been shown to be significantly associated with exceeding the speed limit, and racing other drivers (Arnett, 1994; Furnham & Saipe, 1993). It has also been reported in the literature that sensation seeking has a significant positive relationship with self-reported drink driving with greater quantities and frequency of alcohol consumption and self-reported driving after drinking being associated with higher levels of sensation seeking. As such, it is hypothesised that there will be a significant positive relationship between sensation seeking and both self-reported speeding and self-reported drink driving (H_7).

H_7: *There will be a significant positive association between sensation seeking and both self-reported speeding and self-reported drink driving.*

In relation to the social learning factors, it has been suggested in the literature that an individual is more likely to engage in a behaviour if they hold a favourable

personal definition (H_8), and associate with significant others who engage in the behaviour (H_9) and/or hold favourable definitions toward the behaviour (H_{10}).

$H_{8:}$ Both self-reported speeding and self-reported drink driving behaviours will be positively associated with holding favourable personal definitions toward each of the behaviours.

$H_{9:}$ Both self-reported speeding and self-reported drink driving behaviours will be positively associated with having friends and family who engage in each of the behaviours respectively.

$H_{10:}$ Both self-reported speeding and self-reported drink driving behaviour will be positively associated with having friends and family who hold favourable definitions toward each of the behaviours.

Research Question 3: Do psychological and social factors exert an influence on self-reported speeding and self-reported drink driving behaviour, over and above legal factors?

Historically, legislation and enforcement practices have relied on deterrence based countermeasures to reduce the incidence of illegal driving behaviours such as speeding and drink driving (Freeman & Watson, 2009; Harrison & Pronk, 1999; Homel, 1988; Ross, 1982; Watson et al., 1996). However, more recent research has demonstrated the influence of other psychological and social factors in explaining illegal driving behaviours, including holding favourable definitions toward a behaviour (Armstrong et al., 2005; Watson, 2004a); social rewards and punishments (Armstrong et al., 2005; Watson, 2004a); and the normative influence of family and friends definitions toward the behaviour and their actual behaviour (Fleiter et al., 2006; Watson, 2004a). The hypotheses relating to this research question explore the

broader psychological and social influences that influence self-reported speeding and self-reported drink driving behaviour over and above sociodemographic and legal factors (H_{11} and H_{12}).

H_{11}: A model encompassing psychological and social factors will better predict self-reported speeding behaviour than sociodemographic and legal factors alone.

H_{12}: A model encompassing psychological and social factors will better predict self-reported drink driving behaviour than sociodemographic and legal factors alone.

2.10 Chapter summary

This chapter has reviewed the different ways to define speeding and drink driving behaviour, and provided a definition for each of the behaviours to be used throughout this research. It was interesting to note that in the case of speeding there were differing views regarding what it means to speed e.g., technical, absolute or an enforcement tolerance, and relative definitions. While in relation to drink driving, it was common for drivers and practitioners to only discuss this behaviour in relation to a legal definition.

The prevalence of speeding and drink driving was also explored and it was reported that reductions in both behaviours have occurred in the last two decades through the implementation of targeted countermeasures (e.g., speed-related enforcement such as speed cameras; and RBT respectively). However, it was shown that among the fatalities recorded in Queensland in 2007/2008, alcohol was a contributing factor in an estimated 27 percent and speed in approximately 23 percent of fatalities. It was also noted in research conducted with known drink driving offenders that they had engaged in this behaviour more times than they had been

caught, highlighting the impact of punishment avoidance i.e., those who have performed an illegal behaviour and evaded detection (see section 2.6.3).

The influence of speed and alcohol on crash risk was also examined. It was found that it is well established that speed increases both crash risk and crash severity by reducing reaction time and stopping distance when the driver tries to avoid a collision. It was also reported that the risk of being involved in a casualty crash doubled for every five kilometre per hour increase in travelling speed (Kloeden et al., 1997). Similarly, alcohol was found to increase both crash risk and severity of the crash. For instance, a driver with a BAC of .06 percent was two times more likely to be involved in a crash and a driver with a BAC of .15 being 25 times more likely than a driver with a zero BAC.

This chapter has also reviewed the personal, social, legal, and situational factors that have been shown to influence a driver's decision to exceed the posted speed limit and to engage in drink driving behaviour. It also examined relevant theoretical perspectives, and recommended a framework for investigating speeding and drink driving behaviour. The purpose of reviewing the factors contributing to these behaviours and theoretical perspectives has been to allow for a systematic inquiry of the behaviours and to guide the development of countermeasures. Effective intervention can only occur through a better understanding of the factors that contribute to the behaviour.

Chapter Three: Method

3.1 Introduction

As outlined in section 1.2, the objective of the research was to compare the factors contributing to speeding and drink driving among Queensland drivers. However, prior to undertaking the main (quantitative) study, it was deemed important to ensure a basic understanding of the behaviours under review. This ensures that participants respond to the questions with a similar view of the behaviour and that variation between the participants is due to individual difference and not differences associated with the way the behaviour has been operationalised. This is particularly relevant for speeding and drink driving as there appear to be differences in how drivers think about these behaviours and their interpretation of the regulatory limits. For instance, with reference to speeding, do drivers consider exceeding the posted speed limit as 'speeding' or do they employ other considerations or reference points when personally defining this behaviour? Furthermore, how do drivers perceive 'drink driving' behaviour and what are the personal beliefs they hold regarding this behaviour? Do drivers in Queensland use legal definitions to determine whether an individual has engaged in drink driving behaviour or are their other considerations? Thus, a preliminary, pilot study was undertaken to inform the development of the questionnaire to be used in the main study. In particular, there was a need to ensure the clarity of constructs, the language commonly used by drivers in regard to speeding and drink driving behaviour, and the personal beliefs and orientation toward the two behaviours for use in the questionnaire.

A broad range of factors were explored in the development of the questionnaire including: personal characteristics of the driver, the social environment, and legal

implications of the two behaviours. The development of the questionnaire involved operationalising constructs from expanded deterrence theory (Stafford & Warr, 1993) and Akers' social learning theory (Akers, 1977; Akers & Sellers, 2009), as well as psychological perspectives relevant to speeding and drink driving behaviour (e.g., sensation seeking, alcohol misuse, and Type-A behaviour pattern). These perspectives provided the framework to conduct a systematic investigation of speeding and drink driving behaviour. Therefore, the purpose of this chapter is to document the process of developing the questionnaire through qualitative methods and is followed by a description of the methods employed in the main quantitative study.

3.2 Pilot study

3.2.1 Recruitment strategy

For this phase of the research, it was decided to recruit participants from Queensland Transport Licensing Centres (QTLC). Permission was obtained from Queensland Transport to utilise two of their licensing centres located in the Brisbane suburbs of Macgregor and Zillmere. In line with their guidelines, the interviewer was required to stand outside the customer service centres (approximately two metres from the entrance) in order to intercept drivers entering or departing the centre.

The licensing centres yielded only four interviews, which represented a response rate of approximately 14 percent. Unfortunately, it proved difficult to recruit participants entering or exiting a Queensland Transport Licensing Centre. Many individuals were accompanied by another person, making it impractical or difficult for them to be interviewed as the other person would have to wait for them; or if they were alone, the individual avoided eye contact with the researcher and quickly entered the customer service centre. As a consequence, in order to increase

the number of participants in this phase of the research, additional participants were recruited from the Queensland University of Technology (locations included the Gardens Point, Kelvin Grove, and Carseldine campuses). Permission was obtained from the University and the interviewer approached potential participants found in common areas, such as the cafeteria, outside the library, and computing laboratories. In comparison to the licensing centres, it proved easier to recruit participants across the three QUT campuses, with approximately 30 percent (n=7) agreeing to be interviewed. The interviewer noted that potential participants appeared to linger in common areas and were most likely employees or students of QUT. The reasons given by those who declined to participate included: not meeting the inclusion criteria of the research, e.g., only holding a learner driver's licence; not having time to be interviewed; or not interested in the research. Overall, the interview took approximately 30 minutes and all participants were offered one movie ticket voucher to compensate them for their time.

3.2.2 Participants

In total, there were 11 interviews conducted, with seven females and four males. Ages ranged from 17 to 74 (M = 28.73; SD = 16.88). Of the 11 participants, five held an open drivers licence, with the remainder holding provisional licences[3].

[3] Provisional licenses encompass the following types:

- P1 licence applies to those under 25 years of age, who obtained a provisional licence on or after 01/07/2007; have held a licence for less than one year from 01/07/2007; have not passed a Queensland Transport hazard perception test; are returning from a disqualification to a P1 type probationary or restricted licence where the offence occurred after 30 June 2007 and while they were under 25 years of age.
- P2 licence applies to those issued a P1 type provisional licence while 24 years of age or under, who completed the P1 stage and passed the Queensland Transport hazard perception test; provisional licence holders who were 25 years of age and older when they passed the practical driving test; P2 type provisional licence holders returning from a disqualification to a P2 type probationary or P2 type restricted licence, where at the time of the offence they were under 25 years of age; P1 type probationary licence holders who are progressing to a P2 type probationary or provisional licence who have held their P1 type licence for an accumulative one year period and have passed the Queensland Transport hazard perception test.

On average, participants reported that they had held their licence for approximately 10 years (*SD* = 13.71; *Mdn* = 4), and drove on average for 13.3 hours per week (*SD* = 10.31; *Mdn* = 10).

3.2.3 Materials

A semi-structured interview was developed utilising a guided theory approach, namely Akers' social learning theory (Akers, 1977; Akers et al., 1979) and Stafford and Warr's expanded deterrence theory (Stafford & Warr, 1993). The interviews explored the key constructs contained in both of these theories. Participants were asked both free response questions and Likert scale items. The decision to include Likert scale items was made to augment the free response questions and to determine the utility of scale scoring in the quantitative phase of this research. See appendix A for the interview questions.

The first part of the interview covered basic sociodemographic characteristics including licence type (e.g., learner, provisional, open etc); licence class (e.g., car, motorbike etc); and driving exposure variables, including how long they had held their licence. The second part was designed to elicit responses in relation to the two behaviours under review. The items exploring the dependent and independent variables are reproduced in Table 3.1.

3.2.4 Data analysis

Interview responses were analysed using a thematic analysis technique. Concepts were identified as themes if they were expressed with frequency, extensiveness, or intensity (Krueger, 1998). Previously coded transcripts were recoded when a new theme emerged. Discussions were held with the supervision team who were closely involved in the planning and design of the research in order to improve the validity and reliability of the author's coding.

3.2.5 Procedure

Ethical clearance was granted from the University Human Research Ethics Committee (Ethics Approval Number: 0700000858). In order to participate in this study, participants were required to have a current Queensland drivers licence (e.g., Provisional or Open) for any class of vehicle (e.g., car, truck, motorcycle), and drive a vehicle at least once per week. Participants were screened to ensure they met the inclusion criteria for the study. Each participant was interviewed using the questions found in Table 3.1, 3.2, and 3.4. Their responses are presented below.

3.2.6 Findings of pilot study

3.2.6.1 Definitions of speeding and drink driving

When undertaking questionnaire research it is important to ensure that the dependent variable or behaviour under review is defined in a consistent manner. This ensures that any variation between the participants is due to individual difference and not differences associated with the way the behaviour has been operationalised. While it is common among transport and road safety authorities to adopt a legal definition for illegal driving behaviours, there does not appear to be any uniformity in what is meant by 'speeding' or 'drink driving' across the general driving community. Therefore participants were asked to define what they understood to be speeding and drink driving[4]. The questions exploring the two dependent variables are reproduced in Table 3.1[5].

[4] It should be noted that the information contained in this section does not relate to the construct of Personal Definitions as outlined in Akers' Social Learning Theory, see section 2.8.2. Rather it focuses on the beliefs of participants as to what constitutes speeding and drink driving behaviour.

[5] In relation to drink driving there were two questions asked to determine if participants differentiated between driving 'over the limit' and driving after drinking some alcohol.

Table 3.1
Exploration of the prevalence and definitions relating to speeding and drink driving

Dependent variable	Questionnaire item
Speeding	Have you ever driven faster than the posted speed limit?
	How would you define speeding?
Drink driving	Have you ever driven a vehicle after drinking alcohol?
	Have you ever driven a vehicle when you believe you may have been over the legal limit of alcohol for your licence type?
	How would you define drink driving? *Prompt if the driver has not mentioned the legal BAC limit.*

In relation to speeding, the majority of participants defined speeding as exceeding the posted speed limit (n=9), whereas the other two participants held a different view. Specifically, one defined speeding as "probably ten kilometres over the speed limit" *(Female, 19 years old)*. It appeared that the participant was suggesting that if she did not exceed the posted speed limit sign by more than ten kilometres per hour, she did not consider this to be speeding. The second participant stated "don't think speeding is a major cause of accidents, it's more a lack of knowledge and skill that causes accidents, just take the motorways in Germany, they do huge speeds and they're alright" (Male, 35 years old).

In the case of drink driving, five participants mentioned the phrase "the limit" or ".05" to refer to the legal blood alcohol content (BAC) limit for drivers for an open class licence. There were several other themes that emerged from this question. For instance, some responses suggested that the participant held a negative view toward those who engage in drink driving behaviour (n=4), for example "It's stupid

and dangerous, drink driving and drugs, anything is really dangerous" *(Male, 35 years old)*; "Disgusting, other people who drink put lives at risk" *(Female, 38 years old)*; and "I think they are stupid" *(Female, 74 years old)*. Participants making these statements were asked to clarify whether they meant driving over the legal BAC limit or drinking *any* alcohol and driving. All participants indicated that their response to this question was made under the premise that drink driving means driving over the legal BAC limit for the class of licence held by particular drivers.

Another theme that emerged when discussing drink driving was the belief among some participants that a driver's skills are impaired when intoxicated. In particular, these participants appeared to be referring to drivers who are well over the legal BAC limit. Participant comments included: "When someone is intoxicated you shouldn't be driving" *(Female, 18 years old)*; "Being at the point when you know you have had too much" *(Female, 17 years old)*; "Any drinking is dangerous because it impairs recognition, diminished recognition really" *(Female, 38 years old)*; and "Once you've got the shakes it is just not on, ever" *(Male, 23 years old)*.

3.2.6.2 Self-reported speeding and drink driving behaviour

Among the independent variables explored were constructs contained within Stafford and Warr's (1993) expanded deterrence theory and Akers' social learning theory (Akers, 1977, 1990). The deterrence theory constructs will be discussed first and are presented in Table 3.2.

Table 3.2

Exploration of expanded deterrence theory constructs

Theoretical construct	Questionnaire item
Direct/indirect exposure punishment	Have you ever been caught for speeding and/or drink driving?
	Do you know anyone who has been caught for speeding and/or drink driving?
Perceived risk of apprehension	How likely it is that anyone would be caught for speeding and/or drink driving?
Personal knowledge of sanctions	What do you know about the penalties for speeding and/or drink driving?
Exposure to enforcement	How do you think the Police usually catch drivers who are speeding and/or drink driving?
Perceived risk of punishment	What do you think of the penalties for speeding and/or drink driving?
	Do you think they [penalties] fit the offence?
	How certain do you think it is that anyone would be caught and punished for speeding and/or drink driving?
	How severe are the penalties are for speeding and/or drink driving?
	How swift/immediate do you think the penalties are for speeding and/or drink driving?
Direct/ indirect exposure punishment avoidance	Do you know of any ways of avoiding getting caught for speeding and/or drink driving?
	Do you know of any ways to avoid being punished or "getting let off" for speeding and/or drink driving?

In relation to speeding, only one participant responded that they 'never' engaged in this behaviour. Another participant qualified their response by stating that they only purposely speed about two to three times per week, whereas unplanned speeding occurred every time they were in the car. The other responses ranged from

once (n=2)[6]; sometimes (n=2); couple of times per week (n=3); most of the times I drive (n=1); and every time I drive (n=1).

The reasons cited by the participants for speeding included being 'in a rush', 'in a hurry', 'running late', 'an emergency situation', 'wanting to get home faster', and 'boredom'. Most participants (n=7) indicated that they were more likely to speed on highways and major arterials (minimum of 80 kilometre per hour roads); whereas other respondents suggested that road type did not influence their speeding behaviour. Furthermore, five participants indicated that they did not speed when they were carrying passengers; whereas the remaining participants indicated the presence of family and friends was the governing factor.

Participants reported exceeding the speed limit by "up to 10 kilometres per hour" (n=5); "up to 15 kilometres per hour" (n=1; *Male, 23 years old*); "up to 30 kilometres per hour" (n=1, *Female, 38 years old*); and finally "on highways sometimes 120, 130, even 140 but that's very rare" (n=1, *Male, 35 years old*). Highway roads in Queensland generally have a speed limit of 100 or 110 kilometres per hour. Those who reported exceeding the speed limit were also asked to describe their thoughts and emotions when they speed, with responses including: 'worrying about hurting someone'; 'having a crash'; 'getting caught by the police'; 'doing something against the law'; 'thrilling'; and 'don't really think about it'.

3.2.6.3 Direct and indirect experience of punishment

Amongst the interviewees, five participants had been caught speeding, with the number of offences ranging from one to five over the course of their driving history. The reasons cited by these participants included not monitoring their speed, not observing speed limit signs, and running late. An interesting finding is that of these

[6] Please note that these two participants appeared to be indicating that they had sped once over the course of their driving history

five participants, two did not discuss the offence with their family and three did not discuss the offence with their friends. The other participants' comments suggested that they believed that their family and friends would be indifferent to the offence. For example comments included, "laughed, it was a stupid mistake" *(Male, 35 years old)*; "said it was my risk and my licence" *(Male, 32 years old)*; and, "bloody idiot, but didn't really care" *(Male, 23 years old)*.

In relation to drink driving, nine participants advised that they did not engage in this behaviour. However three participants admitted they were unsure whether they had accurately calculated the number of drinks they could consume and remain under the legal BAC limit for their licence type. Participants also questioned whether they were over the legal BAC limit the morning after a night of drinking. None of the participants admitted to having been caught for drink driving by the Police.

3.2.6.4 Direct and indirect punishment avoidance

The interviews examined ways in which drivers avoided being caught for speeding and drink driving. In relation to drink driving, the only notable strategy mentioned by participants was to take the "back roads" on the way home. Whereas the most common strategy mentioned in relation to speeding was to slow down at known speed camera locations. Further, there were more instances of participants avoiding being punished for speeding than for drink driving. However, given that nine of the 11 participants interviewed claimed that they did not drink and drive this is not a surprising finding. The most common method was to have someone else take the blame for a speed camera fine. In relation to drink driving, one participant

raised the subject of restricted licences[7] which can be issued to someone who requires the use of their vehicle for work. This suggests that this participant viewed this alternative penalty option as a way to avoid punishment for drink driving.

3.2.6.5 Perceived risk of apprehension, knowledge of sanctions and enforcement practices

On average, participants rated the risk of apprehension and punishment for both speeding and drink driving as five on a ten point Likert scale, with ten representing "very likely". The different penalties and detection methods cited by participants for each of the behaviours are listed in Table 3.3. Participants were also asked whether they believed the current penalties were commensurate with the community impacts of each offence. For speeding, four participants stated that the penalties should be harsher; while four participants thought the current penalties were sufficient. In the case of drink driving, five participants believed that the penalties should be harsher, particularly for repeat offenders. The other participants thought the current penalties were sufficiently severe to "act as a lesson" to those who are caught for drink driving.

[7] Drivers who have been disqualified from driving for either a drink or drug driving offence may apply for a restricted licence, which are commonly referred to as a 'work licence'. If a court grants an application for a restricted licence, the driver will be issued with an order directing that a restricted licence be issued during the period of disqualification subject to restrictions specified in the order.

Table 3.3

Participants' knowledge of the penalties for speeding and drink driving

Behaviour	Penalties	Detection methods
Drink Driving	Suspension of licence	Random breath test
	Lose licence when on a provisional licence	Erratic driving
	Fines	Police presence in high risk areas
	Demerit points	
Speeding	Demerit points	Speed cameras
	Fines	Speed gun
	Licence suspension for those speeding excessively	Police observation of drivers speeding on the road

3.2.6.6 Differential Association: Behavioural and normative dimensions

Table 3.4 describes the items explored in relation to the behavioural and normative dimensions of differential association. In relation to speeding, all but one participant agreed that they knew of family and friends who engaged in the behaviour. There also appeared to be a clear delineation between what the participants thought their family and friends thought of speeding. The difference between family and friends was highlighted in the following comment: "Friends are more concerned about losing their licence, whereas family is more concerned about safety" *(Female, 17 years old)*. In addition, two participants indicated that in their family, their father would hold a more favourable attitude than their mother, e.g., "Mum does [think there is something wrong with speeding], but dad doesn't think there is anything wrong with a bit over [the speed limit]" *(Female, 19 years old)*. It was also apparent from one participant that while their father would agree that speeding is wrong, that he "speeds all the time, contradicts himself really" *(Female, 18 years old)*, demonstrating that holding a certain belief does not always translate into congruent behaviour. In most instances, participants indicated that both their family and friends

would not hold favourable views towards them engaging in speeding behaviour. However, other responses indicated that while their family would disapprove, their friends would think it was bad luck to be caught for speeding.

In relation to drink driving, most participants mentioned that they had friends who had driven after drinking alcohol, e.g., "Know a few guy mates who do it, they don't drive drunk but have had a few" *(Female, 17 years old)* and "Do have a couple of mates who do it, generally they just have a few and then drive, so they're not drunk drunk" *(Female, 18 years old)*. However, one participant did state that some of her friends knowingly drive when they are over the legal limit for their licence type. She stated: "Couple of friends who have to get home from places, mostly boys, they are on their P's [provisional licence] so they are over the legal limit" *(Female, 19 years old).*

Table 3.4

Exploration of social learning theory constructs

Theoretical construct	Questionnaire item
Diff association: Normative	Do your family and friends think there is anything wrong with speeding and/or drink driving? Why?
Diff association: Behavioural	Do you know of many people who speed and/or drink and drive?
Personal definitions	How important do you think it is to obey road rules?
	What do you think of speeding and/or drink driving behaviours
Imitation	Participants were asked if they know of anyone who engages in both behaviours and their influence of these individuals. See Differential Association.
Differential reinforcement	What would your family/friends think if you were to speed and/or drink drive?
	Do you think there is anything wrong with speeding and/or drink driving?
	What kind of situations might encourage or discourage you from engaging in speeding and/or drink driving behaviour?
	Weighing up all of the outcomes of speeding and/or drink driving, do you think there are more good things or bad things?

All participants indicated that their family and friends would generally believe that drink driving is wrong. However, nine participants qualified their response, indicating that their family and friends believed that drink driving was dangerous, and that it carries a greater crash risk than speeding. In contrast, two participants followed up with responses such as: "they still drive over the limit, because they think they can handle it, and their place is just around the corner from where they usually drink" *(Male, 35 years old)*; and, "ultimately it comes down to how much they have drunk" *(Male, 23 years old)*. From these comments it appears that while the

participant's family and friends generally hold a negative view of drink driving, they justify or rationalise any instances of engaging in the behaviour as okay in certain circumstances, e.g., they believe their driving skills allow them to compensate for the impairment associated with consuming alcohol and driving. This is consistent with Akers assertion regarding the role of neutral definitions towards particular behaviours. Further, when participants were asked what their family and friends would think of them if they were to drink and drive, all participants responded with statements, such as: 'that I was an idiot'; 'they would be disappointed that I made that decision'; and 'they would lose confidence and trust in me'.

3.2.6.7 Personal definitions

In line with Akers construct of personal definitions, participants were asked whether they thought there was anything wrong with speeding (see Table 4.4). The responses to this question highlighted an important distinction that is common in the literature discussing the issue of speeding. Specifically, six participants responded with a definite yes, indicating that speeding was wrong. Furthermore, they cited reasons for this belief relating to the increased risk of having a crash associated with speeding and the potential to hurt others. Conversely, there were four participants who gave noncommittal or qualified responses that suggest that the moral considerations surrounding the issue of speeding are not as straightforward. For example, comments made by these participants included, "Depends, not a yes or no answer, depends on how high over, but I really should have more patience" *(Male, 35 years old)*; "Driving really recklessly, I have a problem with that, but a little over is okay" *(Female, 19 years old)*; "Yes, excessive speeding [is wrong] . . . don't see anything wrong in doing zero to twenty kilometres over, I know I can handle the speed limit, the posted speed limit is a guide, not an absolute" *(Male, 32 years old)*.

In relation to drink driving, all participants expressed the view that drink driving is wrong. When asked why, the reasons given described drink driving as 'dangerous' (n=4); 'putting lives at risk' (n=4); 'causing accidents' (n=2); 'causing impairment of reflexes and recognition of hazards' (n=2); and 'it is an illegal behaviour' (n=2).

3.2.6.8 Differential reinforcement

Participants were asked about the kind of situations that might inhibit or facilitate their decision to engage in speeding and drink driving behaviour (see Table 3.4). Participants' responses were classified into categories reflecting similar content. The categories are listed in Table 3.5. For each of the behaviours, it is apparent that there are different aspects of the theoretical constructs explored that are more salient than others. When reviewing the factors that influence an individual's decision to exceed the posted speed limit, it was found that speeding behaviour was more frequently associated with deterrence theory constructs, than the remaining social learning theory constructs. For instance, participants mentioned direct experience of punishment (e.g., getting caught for speeding), as well as the indirect experience of punishment (e.g., seeing other people experience punishment), as being inhibitory or discouraging factors. These factors were not mentioned in relation to drink driving. Participants also mentioned enforcement activities, suggesting that the risk of apprehension was an influencing factor on their speeding behaviour.

In relation to the social learning theory constructs, there were weak connections made between differential association and speeding behaviour. In particular, participants mentioned that knowing of others who had been detected for speeding would be a discouraging factor. However, when asked whether they knew

of others who engaged in speeding behaviour, participants were able to think of many individuals who did not regularly adhere to the posted speed limit.

In the case of drink driving, both social learning theory and deterrence theory constructs appeared important in understanding an individual's decision to engage in this behaviour. For instance, in relation to social learning theory, differential association, which concerns the influence of peers and family, appeared to be an important influence on an individual's attitude toward the behaviour. This was discussed by participants as acting as both a facilitating factor as well as an inhibitory factor.

Consistent with social learning theory and deterrence theory, differential reinforcement and direct punishment were relevant to drink driving behaviour. Specifically, participants mentioned both the penalties administered by authorities and the social consequences associated with the behaviour. It was noted that participants talked about the types of penalties associated with drink driving, levels of enforcement, and whether they believed the fines were appropriate or commensurate with the behaviour. These responses provide some insight into constructs contained within deterrence theory, including knowledge of punishment, and perceptions relating to the severity of punishment and risk of apprehension.

Participants also mentioned other factors when discussing both speeding and drink driving that are not explicitly captured by either social learning theory or deterrence theory. Among these factors were personality traits (e.g., thrill seeking), mood, time pressures, availability of alternative transport options and general driving conditions. However, it should be noted that thrill seeking, mood, and time pressure could be classified as non-social rewards for speeding as they satisfy an intrinsic need within the individual.

Table 3.5.

Factors influencing the participants' decisions to engage in future speeding and drink driving behaviour.

Theme	Speeding	Drink Driving
Consequences	✗	✗
Enforcement	✗	✗
Direct experience of punishment	✗	
Indirect experience of punishment	✗	
Penalties		✗
Driving conditions	✗	
Peer influence		✗ ✓
Targeted intervention		✗
Education		✗
Mental State	✗ ✓	✓
Time pressure	✓	
Emergency situation	✓	✓
Thrill	✓	
Alternative transport		✓

✓ = Encourage; ✗ = discourage

3.2.6.9 Implications of these findings for the pilot study

This pilot study explored the speeding and drink driving behaviour among a cohort of Queensland drivers. It also provided a basic understanding of the perceptions and beliefs held by drivers in relation to the two behaviours. While the majority of participants reported not engaging in either behaviour, they mentioned a small number of instances where they had engaged in both behaviours at some point, or knew of someone who had. This demonstrates that further investigation is warranted into the relationship between the two behaviours. For example, it remains unclear whether drivers are willing to engage in only speeding or only drink driving,

or are they willing to engage in both of these behaviours? This issue will be further explored in the quantitative phase of this research.

An interesting finding of the pilot study was highlighted when participants were asked to define speeding behaviour. Most of the participants defined speeding as any amount over the posted speed limit, however there were two participants who suggested that it was 10 kilometres over the posted speed limit or driving to the conditions of the road. This concept of 10 kilometres over the posted speed limit has been discussed in previous research as an 'enforcement tolerance' (Fildes et al., 2005; Fildes & Lee, 1993; Lahausse, van Nes, Fildes, Langford, & Keall, 2010). This is an important finding for the operationalisation of speeding for the main study; see section 3.3.2.2.

Furthermore, utilising social learning theory and deterrence theory has demonstrated that there are important factors that need to be considered when undertaking a comprehensive investigation of these behaviours. For instance, these findings suggest that the social environment in which both behaviours operate including those who people associate with and the social rewards and punishments associated with the behaviours are important. Also, current enforcement practices appear to play an important role in the action and maintenance of the two behaviours.

It was also highlighted in this phase of the research that other factors such as personality traits were considered to play an important role in differentiating between those who are willing to engage in the behaviours and those who are not. These included factors such as sensation seeking and a sense of time pressure which could be likened to Type-A behaviour pattern. It was also highlighted that for both behaviours other factors such as availability of alternative transport and road conditions were important. The discussion of these factors by participants supports

the theoretical framework that includes a combination of psychological, social, and legal factors to explain speeding and drink driving behaviour. It should be noted that while some more specific situational factors such as time pressures, driving conditions, or the occurrence of an emergency situation were mentioned by participants as exerting an influence on their decision to engage in speeding and/or drink driving behaviour, they were deemed to be outside the scope of the research and were not formally explored in the main study; see section 1.4.

3.3 Main study

The main quantitative phase of the research involved a cross-sectional survey of licensed drivers in Queensland. A full operationalisation of both Stafford and Warr's expanded deterrence theory and Akers' social learning theory along with a number of personality-related variables, was undertaken in order to fully explore the personal, social, and legal factors associated with these two behaviours. Overall, the aim of this study was to comprehensively review the factors contributing to each of the behaviours, in order to explore the similarities and differences in the factors that contribute to an individual's decision to exceed the posted speed limit and/or drive while over the legal BAC limit for their licence type.

3.3.1 Recruitment strategy

Given the difficulties associated with recruiting participants from the Queensland Transport Licensing Centres in the pilot phase of the research, it was decided to utilise the internet as a means of administering and deploying the questionnaire. The popularity of the internet as a means of accessing information, communicating, and undertaking commerce activities in an individual's daily life (Australian Bureau of Statistics, 2008), has led researchers to utilise online mediums to access different populations (Cook, Heath, & Thompson, 2000; Horswill &

Coster, 2001; Kaye & Johnson, 1999; Lewis, Watson, & White, 2009; Sue & Ritter, 2007). For instance, Lewis, Watson, and White (2009) conducted research to determine the equivalency of data obtained from an internet-based survey and a more traditional pencil and paper version. Overall, these authors found similar results on individual variables, however did note that the demographics for the internet sample appeared to be more diverse and more representative of the Australian population, as measured by Australian Bureau of Statistics data, than those recruited for the pencil and paper version.

Two social networking sites were utilised to deploy the questionnaire. The first was to utilise the Queensland University of Technology (QUT) online community noticeboard. QUT employs approximately 4,000 full time equivalent staff members. The noticeboard requires an individual to subscribe to the group to become a member and they can then post messages to the noticeboard and receive messages. At the time of posting the questionnaire, there were 901 members.

The second social networking site utilised to recruit participants was Facebook. Social networking sites such as Facebook have become increasingly popular online destinations (Hargittai, 2008). According to online hits and volume of web-related traffic statistics, Facebook is the second most popular website in the world (Redmond, 2010). Facebook describes itself as a social utility tool that allows individuals to communicate and share information, and it is estimated to have 400 million active users, with approximately 50 percent of the user base logging into Facebook on a daily basis (Redmond, 2010). Facebook pages allows research groups to create a presence on their website for free and users subscribe to certain pages by becoming a ‘fan’ of the page and can then share information with the research group

(Redmond, 2010). As such, Facebook was selected as one of the methods to advertise and enable access to the questionnaire study.

An additional sample was also obtained by accessing a student group via the School of Psychology and Counselling. Approvals were obtained from the School. The recruitment of students was conducted by attending lectures to invite participation and also posting an advertisement on the student noticeboard located at Carseldine. Students were directed to contact the researcher and had the choice of completing the online or hard copy version of the questionnaire.

3.3.2 Study Design

A cross-sectional design was employed with the participants providing responses to items relating to both behaviours under consideration. The content of the questionnaire was primarily informed by the results of the preliminary pilot study; however additional relevant concepts and items were also incorporated from the literature. The independent and dependent variables are discussed below.

3.3.2.1 Independent variables

As discussed in previous chapters, the questionnaire utilised a multi-theoretical framework to explore self-reported drink driving and self-reported speeding behaviours, as well as other salient constructs identified in both the questionnaire development phase and the literature review. The items in the questionnaire represent a full operationalisation of both theories. The independent variables were derived from expanded deterrence theory and social learning theory. The other independent variables operationalised in the questionnaire were sensation seeking, alcohol misuse, Type-A behaviour pattern, and various sociodemographic factors. See section 3.2.3 for full details of the constructs contained within each theory and a description of individual items utilised to measure these constructs.

3.3.2.2 Dependent variables

Speeding Behaviour: As highlighted in both the literature review (see section 2.2.1) and the pilot study (see 3.1.4.2), drivers appear to differentiate between speeding up to ten kilometres per hour over the posted speed limit and speeding ten kilometres or more over the posted speed limit. Thus, two items were utilised to determine the participant's level of compliance with posted speed limits. These items asked participants to indicate how frequently they exceeded the posted speed limit by each amount. Measurement was based on a question that is asked annually in a national community attitudes survey about road safety in Australia that has been conducted for the last 20 years by the Department of Infrastructure, Transport, Regional Development and Local Government (formerly the Australian Transport Safety Bureau) (Pennay, 2009). The items were also modelled on the work of Fleiter and colleagues (Fleiter & Watson, 2006; Fleiter et al., 2006). The items correspond to non-compliance low and non-compliance high speeding behaviour and are reproduced in Table 3.6.

Table 3.6

Speeding compliance label and question associated with each label

Compliance Label	Question
Non-Compliance Low	"In the past 6 months, how often did you drive up to 10km/hr above the posted speed limit?"
Non-Compliance High	"In the past 6 months, how often did you drive 10km/hr or more above the posted speed limit?"

The non-compliance low question represents an important distinction in the interpretation of posted speed limits among the general driving community. As described in the literature review (see sections 2.2.1 and 2.2.3) and the results from

the preliminary pilot study (see section 3.1.4.1), driving up to 10 kilometres above the posted speed limit arguably represents a *defacto* speed limit. As such, many drivers may not consider driving 10 kilometres over the posted speed limit to be illegal and believe that the posted speed limit is not enforced within this margin. In contrast, the non-compliance high category was intended to measure the extent of speeding above the *defacto* speed limit. Responses were scored using a Likert scale, where one denoted "never" and seven was equal to "most occasions".

It is important to note that while each of the items measured the frequency of a different aspect of speeding behaviour (e.g., driving up to 10 kilometres per hour over the posted speed limit and driving ten kilometres or more per hour over the posted speed limit); they were not designed to be used independently. In isolation, these items will not necessarily capture the full extent of speeding behaviour across the road network. Rather, they were designed to be used together as a composite measure of the frequency of speeding, as has been done in previous research (see Fleiter et al., 2010; Fleiter & Watson, 2006). In order to aid comparison with the drink driving variable, the responses on the composite variable were divided by the number of items; thus the scores ranged from one to seven, with higher scores denoting exceeding the posted speed limit more frequently.

Drink Driving Behaviour: Participants were asked to indicate how often in the past six months they had driven after drinking alcohol and may have been over the legal BAC limit for their licence type. The wording of this question was in line with the findings from the questionnaire pilot which suggested that drink driving is generally defined by Queensland drivers as driving over the BAC limit. Further, this question was also based on work conducted by Freeman and Watson (2009). They asked participants whether they had driven when they thought they were over the

legal limit in the last six months. However, in their study, the response scale was based on the number of times the participant had engaged in this behaviour. Given that the purpose of this study was to compare speeding and drink driving behaviour, it was decided to increase the comparability of responses by using the same Likert scale, where one denoted "never" and seven was equal to "most occasions".

3.3.3 Participants

A total of 547 Queensland drivers participated in this study, with a mean age of 32.23 (*SD* = 11.07) and a larger proportion of females (62.1%) than males (37.9%). Sociodemographic characteristics of the sample can be found in section 4.3.2, while the response rate is reported in section 4.3.1.

3.3.4 Materials

The questionnaire used in this phase of the research is reproduced in Appendix B along with the Participant Information sheet. The questionnaire drew on a variety of items and scales from other studies, as well as ones developed for this study. A summary of the key constructs and related items operationalised in the study is provided below. Seven-point scales were generally used, based on findings of studies examining optimal scale divisions (e.g., Diefenbach, Weinstein, & O'Reilly, 1993).

3.3.4.1Sociodemographic characteristics

A range of sociodemographic information was collected including age, gender, marital status, educational level, employment status, licence class and type, and driving exposure measured by the average number of hours driven per week. (Questions 1a–1j).

3.3.3.2 Deterrence theory constructs

The constructs contained within Stafford and Warr's (1993) expanded deterrence theory were operationalised according to the model outlined in Figure 2.4.

Many of the items contained within this section were modelled on the work of Watson (2004b) who examined deterrence constructs in relation to unlicensed driving. While Akers' argues that deterrence principles fit within the broader social learning theory model, it was decided to operationalise the deterrence constructs separately in order to measure the individual contribution of both legal and non-legal factors toward the measurement and prediction of self-reported drink driving and speeding. The items are described in Table 3.7.

3.3.4.3 Social Learning Theory Constructs.

The constructs contained within Akers Social Learning Theory (Akers, 1977, 1990) were operationalised according to the model outlined in Figure 2.5. Items were based on the work of Watson (2004b) in relation to unlicensed driving and Fleiter and colleagues in relation to speeding behaviour (Fleiter, 2010; Fleiter & Watson, 2006; Fleiter et al., 2006). Individual constructs and the related items are described in Table 3.8.

3.3.4.4 Person-related factors.

Sensation seeking. The Zuckerman-Kuhlmann Impulsivity Sensation Seeking Scale (Zuckerman, 2002) was selected as the measure for this research as it has been widely used in road safety research (Armstrong et al., 2005; Boufous et al., 2010; Fleiter et al., 2010; Whissell & Bigelow, 2003). Further, due to the length of the Zuckerman-Kuhlmann Impulsivity Sensation Seeking Scale (Zuckerman, 2002), only the *Impulsivity and Sensation Seeking* (ImpSS) scale was utilised in this research. The ImpSS scale has been found to be associated with those who are classified as high general risk takers, drinking behaviour, drug abuse and anti-social forms of behaviour (Zuckerman & Kuhlman, 2000). The ImpSS contains 19 items and describes a lack of planning and the tendency to act impulsively without thinking.

The ImpSS items are general in content and do not describe specific activities such as drinking or sex. Most can be described as experience seeking, or the willingness to take risks for the sake of excitement or novel experiences (Zuckerman, 2002). This scale has been validated in many countries and has demonstrated good generalisability across several cultures (Zuckerman, 2002). Zuckerman and Kuhlman (n.d.) normed their questionnaire on 2,969 college students at the University of Delaware and report a mean of 10.99 (*SD* = 3.87) for the impulsivity and sensation seeking scale; Cronbach's alpha for this scale was .77 for males and .81 for females. The 19 items in the ImpSS are reproduced in Question 22.

Alcohol consumption. In order to measure the participants degree of alcohol misuse, the Alcohol Use Disorders Identification Test (AUDIT) (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993) was included in the questionnaire. The AUDIT is a brief screening instrument developed for the World Health Organisation for the early detection of hazardous and harmful alcohol consumption. It has been used in a variety of clinical and community settings and has been reported to be more accurate than traditional screening questionnaires (Degenhardt, Conigrave, Wutzke, & Saunders, 2001). The AUDIT has proven to be a reliable predictor of risky drinking behaviour (Wells-Parker, Kenne, Spratke, & Williams, 2000; Wells-Parker, Williams, Dill, & Kenne, 1998) and driving while under the influence of alcohol (Bergman et al., 2000).

The Cronbach's alpha for the ten item scale has been reported as .65 among an Australian cohort who were recruited from primary care facilities consisting of general practices, and ambulatory care services. The 10 items making up the AUDIT are reproduced as Question 24. Responses to each question are scored from zero to four, which gives a maximum possible score of 40 (Babor et al., 2001). Clinical

research conducted using the AUDIT has demonstrated that among those diagnosed as having hazardous or harmful alcohol use, 92% had a score of eight or more on the AUDIT (Saunders et al., 1993). Babor et al. (2001) advise that a cut-off score of 10 will provide greater specificity in detecting those with hazardous alcohol use, however these authors warn that it could be at the expense of sensitivity.

Babor et al. (2001) also report comparisons made between AUDIT scores and alcohol problem severity and put forward guidelines for interpreting these scores in relation to degree of alcohol dependence. For instance, they argue that low alcohol dependence is representative of those who scored between eight and 15 on the AUDIT, and indicates individuals who require simple advice on how to reduce hazardous drinking behaviour; medium alcohol dependence is characterised by those who scored 16 to 19 on the AUDIT and suggest that these individuals require brief counselling and continued monitoring; and the high alcohol dependence group related to those who score 20 or above on the AUDIT and require further diagnostic evaluation for alcohol dependence.

Type-A Behaviour Pattern. The Bortner Rating Scale (Bortner, 1969) was chosen to assess the participants Type-A Behaviour Pattern (TABP) as it has been widely used in road safety settings (Elander, West, & French, 1993). The scale consists of 14 items, with participants asked to indicate on an 11-point scale where they believed they belong between two phrases placed at opposite ends of a continuum ranging from TABP to the absence of TABP. Responses on all 14 items were summed so that higher scores were associated with a higher likelihood of exhibiting TABP. The Cronbach's alpha for this scale have been reported to range from .53 to .68 (Edwards, Baglioni, & Cooper, 1990). The Bortner Rating Scale is reproduced in Question 23.

Table 3.7

Operationalisation of deterrence theory constructs

Theoretical Construct	Questionnaire Item	Response Scale
Direct exposure to punishment	Participants were asked to respond to single items asking whether they had ever been caught for drink driving (Q6a), and received a speeding ticket (Q6b).	Yes or No
Exposure to police enforcement.	Measured exposure to enforcement associated with drink driving (Q5c), speeding (Q5a, b), and enforcement aimed at deterring other illegal driving behaviours (Q5d, e).	1 = Not very often 7 = Very Often
Perceived Risk of Apprehension.	Five items were used to measure how likely it is to be random breath tested (Q8a), have their licence status checked (Q8e), be caught for speeding (Q8b), not wearing a seat belt (Q8c), or tailgating (Q8d).	1 = Very unlikely 7 = Very likely
Personal Knowledge of Sanctions.	Two items were asked to determine if the participant knew what the penalty was for first time offences versus those for two or more offences for each of the behaviours, see Question 10.	1 = Nothing at all 7 = A lot
Perceived risk of punishment.	Two items were asked to measure the perception of the certainty, severity, and swiftness of punishment for first time offences and two or more offences for each of the behaviours, see Question 13.	1 = Strongly disagree 7 = Strongly agree
Direct experience of punishment avoidance	Seven items were used to capture a variety of possible avoidance strategies that may be used by participants for each of the behaviours, see Question 11.	1 = Never 7 = Very often
Indirect exposure to punishment.	Measured using a single item asking the participant if their friends or family had ever been caught for drink driving, and speeding, see Question 7.	Yes, No, or Don't know
Indirect experience of punishment avoidance	Seven items were used to capture a variety of possible avoidance strategies that may be used by the participant's family and friends, see Question 12.	1 = None of them 7 = Most of them

Table 3.8

Operationalisation of social learning theory constructs

Theoretical Construct	Questionnaire Item	Response Scale
Differential association: Behavioural dimension	Six items were used to measure the drink driving and speeding behaviour of the participant's family, friends, and work colleagues or acquaintances; see Question 17.	1 = Not very often 7 = Always
Differential association: Normative dimension	Two items measured whether family and friends would be in favour of the participant complying with regulatory limits for speeding and drink driving, see Questions 18, 19.	1 = Not very often 7 = Very Often
Personal definitions.	Five items were used to measure the participant's general attitude toward obeying road rules, see Question 2. An additional 13 items were used for the behaviours to measure the participant's attitude toward drink driving and speeding; see Question 14.	1 = Strongly disagree 7 = Strongly agree
Differential reinforcement: Rewards	Instrumental rewards represent tangible or practical benefits associated with the behaviours, thereby encouraging the behaviour; see Questions 9a, 9h, 9i. Non-social rewards refer to positive intrinsic feelings associated with the behaviours; see Questions 9b, 9c, 9d, 9j, 9k, 9l. Rewarding reactions refer to the positive anticipated feedback from other people from engaging in the behaviour; Questions 20a, 20c, 21a, 21c.	1 = Strongly disagree 7 = Strongly agree
Differential reinforcement: Punishments	Non-social punishments refer to the negative intrinsic feelings associated with engaging in drink driving and speeding behaviour; Questions 9e, 9f, 9g, 9m, 9n, 9o. Punishing reactions refer to the negative feedback from other people that are associated with engaging in drink driving and speeding behaviour, Questions 20b, 20d, 21b, 21d. Social sanctions refer to anticipated negative events that may arise out of a specific behaviour e.g., losing your job, see Questions 20e, 20f, 21e, 21f.	1 = Strongly disagree 7 = Strongly agree
Imitation	Participants were asked to think back to when they began driving to indicate how much they based their own drinking and driving behaviour and choice of speed on the behaviour of associates, Question 15 & 16. See Fleiter (2010) for further information.	1 = Not at all 7 = A lot

3.3.5 Procedure

Ethical clearance was granted from the QUT University Human Research Ethics Committee. Participants were required to have a current Queensland drivers licence (e.g., Provisional or Open) for any class of vehicle (e.g., car, truck, motorcycle), and drive a vehicle at least once per week. Participants were screened to ensure they met the inclusion criteria for the study. The questionnaire was piloted in three waves to ensure the flow and readability of the items with a total of 17 participants (10 Female and 7 Males; mean age 26.75 years old (*SD* = 9.06); age range: 17 – 42). Participants were given the informed consent sheet and questionnaire with instructions to complete the questionnaire and provide feedback to the researcher on the clarity, flow of questions, as well as the time required to complete it. Comments from each of the pilots were discussed amongst the research team and appropriate action was taken to rectify any issues raised by participants. See Appendix B for final version of the questionnaire.

Once the questionnaire was finalised, it was distributed using the recruitment strategy outlined in section 3.2.1. Participants were invited to complete either an electronic or paper version of the questionnaire and were recruited through the use of two online social networking facilities; and the first year psychology student pool within QUT. The questionnaire took approximately 25 minutes to complete.

For the participants who completed the online version of the questionnaire, their responses were stored in a database. It was at the participants' discretion whether they provided contact information in order to be compensated for their time with one movie ticket voucher. Name and address information were recorded in a separate database to the questionnaire data and held in a secure location to ensure the confidentiality of participants responses. The participants who chose to complete the

paper version of the questionnaire received a $10 cash payment as compensation when they returned the questionnaire to the chief investigator. No name and address information was recorded for these participants.

3.3.6 Statistical analyses

A number of statistical analyses were required to test the study hypotheses. The main purpose of these analyses was to identify the factors that predict self-reported speeding and self-reported drink driving behaviour. A variety of theoretical perspectives were utilised to guide the examination of these behaviours, however it was not the intention of this research to explore the structural nature of these theories. Thus, it was decided to analyse the data utilising regression-based techniques rather than Structural Equation Modelling (SEM) techniques. Multiple regressions were used to examine the prediction of self-reported speeding. However, logistic regression was used for the drink driving dependent variable as the distribution of responses was skewed and it was necessary to recode it into a dichotomous variable to examine the factors that predicted driving after drinking (see section 4.4 for further discussion of this variable).

As described in Tabachnick and Fidell (2007, p. 123), in order to maintain power within multiple regression analyses, it is advisable to maintain a ratio of $N \geq 50 + 8m$ (where m was the number of IVs) when testing the multiple correlation and $N \geq 104 + 8m$ for testing individual predictors. This rule of thumb assumes a medium effect-size with a significance level of .05 and 80% power (*i.e.* $\beta = .20$). In the case of the logistic regression, the Nagelkerke R^2 was used to measure the strength of association for each model and to act as an analogue to R^2 in multiple regressions. While this statistic does not have the same variance interpretation as R^2 in linear regression, it is designed to approximate it (Tabachnick & Fidell, 2007, p. 460).

A number of variables were recoded to facilitate the regression analyses. For instance, marital status, education level, licence class and licence type were collapsed to make dichotomous variables. Specifically, marital status was recoded into a dichotomous variable to distinguish between participants who were single and those who were married, in a *de facto* relationship, divorced, or separated. Similarly, education was recoded into a dichotomous variable distinguishing between participants who had finished high school and/or achieved a TAFE or trade qualification versus those who completed a tertiary qualification such as Diploma, Bachelor degree, Masters, or Doctorate of Philosophy. For class of licence, the dichotomous categories included a 'car only' licence versus any other licence and included those who held a combination of car, motorbike, and heavy vehicle licenses (e.g., light rigid, medium rigid, heavy rigid, and heavy combination).

Categorical data were predominantly analysed using Chi-square (χ^2) tests for independence. Post-hoc analyses were undertaken within each variable using an adjusted standardised residual statistic ($\hat{e}$). The adjusted standardised residual indicates the relative difference between the observed and expected frequencies for a particular cell, adjusted for row and column totals. This statistic can be used to identify those cells with observed frequencies significantly higher or lower than expected. The strength of association between categorical variables was measured using the phi (ϕ) coefficient (for 2×2 tables); for continuous variables both parametric and non-parametric measures were utilised depending upon the distribution of the dependent variable (e.g., Pearson's *r* and Kendalls Tau-b respectively); and a modified Pearson's *r* was used to assess the relationship between dichotomous and continuous variables, referred to as the point-biserial correlation (r_{pb}).

Responses to the majority of items in this study were scored on a 7-point Likert scale. While this type of response scale is not strictly interval data, the data collected via the use of ratings scales were treated as such to facilitate the use of parametric tests (e.g., regression analyses). A significance level (α) of .05 was adopted for all tests of statistical significance, unless otherwise indicated. Reliability analyses were undertaken on the various scales used in the study using Cronbach's alpha. A summary of the scales and their Cronbach's alpha is provided in Appendix C.

3.4 Chapter summary

This chapter has detailed the method underpinning this research. It has documented the pilot study undertaken to inform the development of the questionnaire utilised within the main study. The pilot study specifically explored the operationalisation of constructs encompassing expanded deterrence theory, and social learning theory, as well as other psychological perspectives relevant to speeding and drink driving behaviour.

The pilot study comprised a series of semi-structured interviews conducted with Queensland drivers recruited from Queensland Transport Licensing Centres and QUT campuses. The interviews provided a basic understanding of the two behaviours under review and highlighted the importance of further investigating the relationship between speeding and drink driving. It was found that the theoretical framework encompassing psychological, legal, and social factors were important factors that should be taken into consideration for both speeding and drink driving. For instance, the associates of drivers and the perceived social rewards and punishments provide important information in determining a driver's personal definition (i.e., attitudes) toward each of the behaviours. The pilot study was also important as it demonstrated that the recruitment of participants from Transport

Licensing Centres was problematic and provided the opportunity to explore alternative methods for deploying the questionnaire within the main quantitative phase of this research.

The main study was designed to comprehensively examine the factors contributing to speeding and drink driving behaviour by utilising a theoretical framework that encompassed psychosocial and legal factors. As highlighted in the pilot study, it was necessary to develop dependent variable items that fully captured the nature of each of the behaviours. For instance, in the case of drink driving, one item was sufficient to characterise whether participants drove when they thought they may be over the legal BAC limit for their licence type. However, it was apparent from the interviews that speeding behaviour was defined in many different ways. Thus, two items were developed for the questionnaire to capture the belief that the posted speed limit is not necessarily the enforced speed limit. Also documented is the procedure for deploying the questionnaire via social networking sites.

Chapter Four: Results

4.1 Introduction

This chapter presents the results of the main study undertaken as part of this program of research. Included is a description of the data cleaning and assumption testing undertaken for the purpose of bivariate and multivariate analyses. The dependent and independent variables are also outlined, along with an explanation of how each variable was dealt with for the purpose of statistical analysis. Finally, the bivariate relationship between the dependent and independent variables is discussed first, followed by multivariate regression analyses, in order to test the study hypotheses.

4.2 Data Cleaning and assumption testing

The data collected from both paper and online questionnaires were analysed using the Statistical Package for the Social Sciences (SPSS) Version 17.0. Prior to exploring the data, the data was checked for accuracy, and the assumptions of univariate and multivariate analyses. It was noted for the item "On average, how many hours per week do you drive?", responses ranged from zero to 240. Four responses were identified as being above 80 hours, so it was decided to delete these responses but retain the cases.

A missing data analysis also revealed that there were four participants who had 20 percent or more of missing values across the questionnaire. As such, these four cases were deleted. Overall there were no scales in the questionnaire with more than ten percent of missing values. However, to maximise the number of participants included in regression analyses, a mean substitution was made for items measured on a Likert scale. No substitutions were made to the dependent variables or items asking participants for a yes or no response e.g., convicted of an offence. No other

corrections were made to the data.

For the self-reported frequency of speeding variable, inspection of standardised residual *z* scores revealed that there were no univariate outliers within this sample. Examination of residuals scatterplots also revealed that the assumptions of normality, linearity, and homoscedasticity were met. With the use of a $p < .001$ criterion for Mahalanobis distance, eight multivariate outliers were identified. Further analyses and inspection of the data were carried out to determine the cases differed from the rest of the sample. Responses across the sociodemographic and theoretical scale variables were examined in consultation with the sample means for each variable. Driving exposure was the only variable that had three participants whose responses fell three standard deviations from the mean. While the distribution of responses on this variable was positively skewed, no transformation was performed as it is possible for the number of driving hours to vary considerably between individuals.

Further examination was conducted on scale variables, which were computed from a number of items measured on a Likert scale. It was found that some participants responded with consistently high responses (e.g., all items had a response of seven) or consistently low responses (e.g., all items had a response of one). Deletion of these cases was also explored to determine whether this would resolve the issue of multivariate outliers. While the overall number of outliers was reduced, the issue was not completely resolved, thus the decision was made to retain these eight cases and proceed with further analysis of the data.

The internal reliability of the questionnaire scales was calculated using Cronbach's alpha, see Table 4.1. With the exception of the Bortner Type-A Behaviour Pattern scale[8], all scales were found to have strong internal reliability.

[8] Please see section 3.3.4.4 for further information on the internal reliability of the Bortner scale.

Further information relating to individual items can be found in Appendix C.

Table 4.1

Internal reliability of scales for deterrence theory, social learning theory, and person-related measures

Appendix Reference	Scale	Number of items	Cronbach's alpha
	Deterrence theory constructs		
C1	Exposure to speed related enforcement	2	.81
C2	Personal knowledge of drink driving sanctions	2	.91
C3	Personal knowledge of speeding sanctions	2	.76
C4	Perceived Risk of Apprehension	5	.8
C5	Perceived Risk of Punishment for Drink Driving – Certainty	2	.87
C6	Perceived Risk of Punishment for Drink Driving – Severity	2	.89
C7	Perceived Risk of Punishment for Drink Driving – Swiftness	2	.87
C8	Perceived Risk of Punishment for Speed - Certainty	2	.86
C9	Perceived Risk of Punishment for Speeding – Severity	2	.85
C10	Perceived Risk of Punishment for Speeding – Swiftness	2	.91
C11	Direct Punishment Avoidance – Drink Driving	7	.91
C12	Direct Punishment Avoidance – Speeding	7	.84
C13	Indirect Punishment Avoidance – Drink Driving – Family	7	.92
C14	Indirect Punishment Avoidance – Drink Driving – Friends	7	.92
C15	Indirect Punishment Avoidance – Speeding - Family	7	.89
C16	Indirect Punishment Avoidance – Speeding - Friends	7	.88

Appendix Reference	Scale	Number of items	Cronbach's alpha
	Social learning theory constructs		
C17	Personal definition toward Drink Driving	13	.70
C18	Personal definition toward speeding	13	.83
C19	Differential Association – Drink Driving – Normative Dimension – Friends	2	.74
C20	Differential Association – Drink Driving – Normative Dimension – Family	2	.79
C21	Differential Association – Speeding – Normative Dimension – Friends	2	.77
C22	Differential Association – Speeding – Normative Dimension – Family	2	.78
C23	Differential Reinforcement – Drink Driving – Rewards	6	.77
C24	Differential Reinforcement – Drink Driving – Punishments	9	.79
C25	Differential Reinforcement – Speeding – Rewards	7	.88
C26	Differential Reinforcement – Speeding - Punishments	9	.87
	Person-related measures		
C27	Zuckerman-Kuhlman Impulsivity and Sensation Seeking Scale	19	.85
C28	Bortner Type-A Behaviour Pattern Scale	14	.65
C29	AUDIT	10	.84

4.3 Preliminary analyses

4.3.1 Response Rate

A total of 546 participants completed the questionnaire. The electronic version of the questionnaire was sent to 1,101 email addresses and respondents chose to complete an online or paper version of the questionnaire. The email addresses are

separated into the following groups: a cohort of QUT first year psychology students (N = 210); and two social networking sites: Facebook (N = 200); and the QUT staff noticeboard (N = 901). Overall, 546 questionnaire responses were received, with 477 (87.4%) received in an online format, and 69 (12.6%) in a paper format. The overall response rate was 49.6%.

4.3.2 Sample characteristics

Table 4.2 reports the sociodemographic characteristics of the sample and significance testing undertaken for the four participant groups in this research. The recruitment of participants drew a cross section of Queensland drivers with ages ranging from 17 to 65 years old. It was found that there were significant age differences across the four recruitment groups. In relation to gender, it was observed that the sample differed significantly on this variable; with a larger proportion of females (61.8%). This was reflected across all of the groups except for the community sample who completed a paper version of the questionnaire.

It was also observed that there were no significant differences across the sample in relation to marital status, driving exposure, and the length of time the driver had held their licence. However, significant differences were found in relation to education level, with a higher proportion of those in the online community sample having completed secondary, tertiary, and postgraduate studies; whereas the paper community sample had completed a trade or TAFE qualification.

It was also found that in relation to licence type, participants differed across the four groups, with a higher proportion of the online community sample held an open drivers licence. Further, approximately 87 percent (n = 470) of participants held a car licence only, nine percent (n = 49) held both a car and motorbike licence, and two percent (n = 16) held a combination of car, motorbike, and heavy vehicle licenses.

Please note there were eight participants who did not answer this question. Three participants did not hold a car licence, but held a motorbike licence, or a light rigid vehicle licence. It was decided to delete these three cases from future analyses to generalise results to car licence holders. Given that no differences were found on key driving related variables (e.g., driving exposure or length of time held licence), the decision was made to analyse the sample as one group.

Table 4.2

Sociodemographic characteristics of the research sample

	Online: Students (n = 35)	Paper: Students (n = 29)	Online: Community (n = 437)	Paper: Community (n = 39)	Overall (N = 546)	Significance level
			Age			
Mean (SD)	25.54 (11.86)	28.1 (11.94)	33.07 (10.84)	31.85 (9.79)	32.23 (11.07)	F (3, 533) = 6.48, p< .001
			Gender			
Male	7 (*20%)*	5 (*17.2%)*	164 (*37.5%)*	29 (*72.5%)*	205 (*37.9%)*	χ^2 (3) = 30.48, p< .001
Female	28 (*80%)*	24 (*82.8%)*	273 (*62.5%)*	11 (*27.5%)*	336 (*62.1%)*	
			Marital Status			
Single	21 (*60.0%)*	12 (*41.4%)*	135 (*30.8%)*	12 (30%)	180 (*33.1%)*	χ^2 (9) = 19.18, n.s.
Married	5 (*14.3%)*	7 (*24.1%)*	175 (*39.9%)*	17 (*42.5%)*	204 (*37.6%)*	
De facto	8 (*22.9%)*	7 (*24.1%)*	98 (*22.3%)*	8 (*20%)*	121 (*22.3%)*	
Divorced	1 (*2.8%)*	3 *(10.4%)*	31 *(7.0%)*	3 (*7.5%)*	38 (*7%)*	
			Education Level			
Secondary	27 (*77.1%)*	17 (*58.6%)*	120 (*27.4%)*	18 (*45%)*	182 (*33.6%)*	χ^2 (9) = 70.41 p< .001
Trade/TAFE	3 (*8.6%)*	5 (*17%)*	61 (*13.9%)*	14 (*35%)*	83 (*15.3%)*	
Tertiary	4 (11.4%)	7 (24.1%)	193 (44.1%)	6 (15%)	210 (38.7%)	
Postgraduate	1 (2.9%)	-	64 (14.6%)	2 (5%)	67 (12.4%)	
			Driving Exposure (hours per week)			
Mean (SD)	7.76 (5.02)	10.02 (7.6)	8.54 (7.89)	11.55 (6.74)	8.78 (7.68)	F (3, 522) = 2.23, n.s.
			Length of time held licence (years and months)			
Mean (SD)	7.61 (8.31)	10.28 (9.68)	13.12 (9.92)	14.57 (9.59)	12.75 (9.17)	F (3, 323) = 2.28, n.s.
% Missing	49%	0%	45%	0%	39.8%	
			Licence Type			
Open	11 (*31.4%)*	15 (*51.7%)*	405 (*92.5%)*	35 (*87.5%)*	466 (*86.0%)*	χ^2 (3) = 114.45 p< .001
Provisional	22 *(62.8%)*	14 *(48.3%)*	33 (*7.5%)*	5 (*12.5%)*	74 (13.6*%)*	
Probationary	2 *(5.8%)*	-	-	-	2 (*.4%)*	

In order to compare the age and gender characteristics of the study sample with that of licensed drivers within Queensland, driver licensing data was obtained from the Department of Transport and Main Roads (DTMR). Figure 4.1 provides a visual comparison of the percentage of males and females across the DTMR age groups and the participants in the research sample. Significant differences were observed between the research sample and the Queensland driving population, with the research sample being younger χ^2 (11) = 345.67 p < .001, and predominantly female χ^2 (1) = 42.61 p < .001.

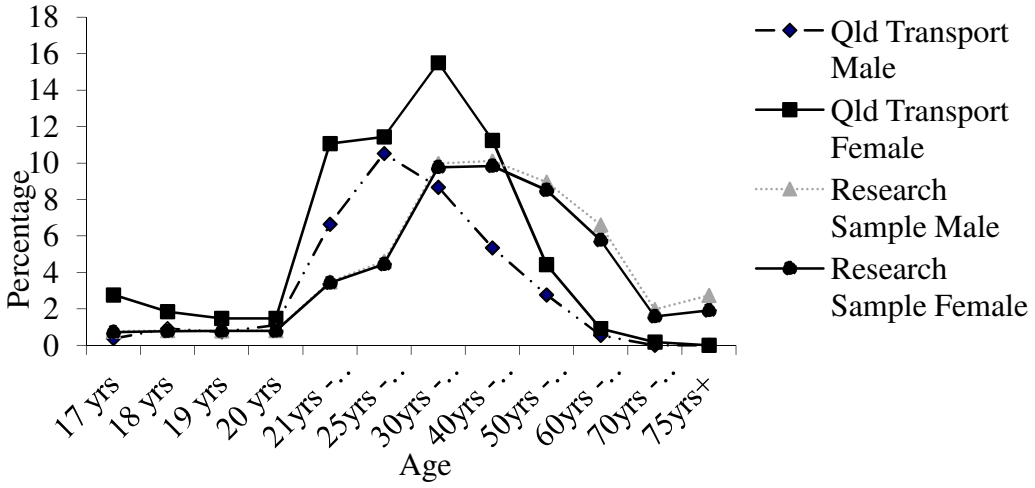

Figure 4.1. Age and gender comparison of the Department of Transport and Main Roads licensed drivers and the research sample.

4.4 Analysis of dependent variables

As explained in section 3.3.2.2, the self-reported frequency of speeding variable measured the frequency of speeding at two levels: exceeding the posted speed limit by 'up to 10 kilometres per hour' and '10 kilometres per hour or more '. Table 4.3 reports the mean and standard deviation for each item. Appendix D provides further information regarding the distribution of responses and percentages for the speeding dependent variables.

It was found that participants reported exceeding the posted speed limit more frequently by up to 10 kilometres per hour than by 10 kilometres or more per hour. The relationship between the speeding non-compliance low and non-compliance high constructs was also explored. It was found that there was a significant positive relationship between exceeding the posted speed limit by up to 10 kilometres per hour and 10 kilometres or more per hour ($r = .60$; $p < .001$). This suggests that those who infrequently engage in low-range speeding (i.e., up to 10 kilometres per hour) are also likely to infrequently engage in high-range speeding (i.e., 10 kilometre per hour or more); and those who frequently engage in low-range speeding are more likely to frequently engage in high-range speeding.

Table 4.3

Descriptive statistics for self-reported speeding items

Speeding Variable	*M (SD)*	Significance level
Self-reported frequency of speeding: Non-compliance low	4.23 (1.69)	$t = 27.31$, $p < .001$
Self-reported frequency of speeding: Non-compliance high	2.50 (1.58)	

Figure 4.2 shows the pattern of responding to the non-compliance low, and non-compliance high speeding variables. For the non-compliance low question, the pattern of responding was spread reasonably evenly across the seven point scale. Only 3.1% (n = 17) of the sample indicated that they "never" exceeded the posted speed limit by up to 10 kilometres per hour. In the case of the non-compliance high question, approximately 31.7% (n=173) of the sample indicated that they never drove 10 kilometres per hour or more above the posted speed limit. It was observed that this variable was positively skewed, however given that this item represents more

deviant speeding behaviour it is expected that participants would report lower frequencies. The pattern of responses for both questions across the non-compliance low and non-compliance high items suggest that most of the participants exceed the posted speed limit at least some of the time.

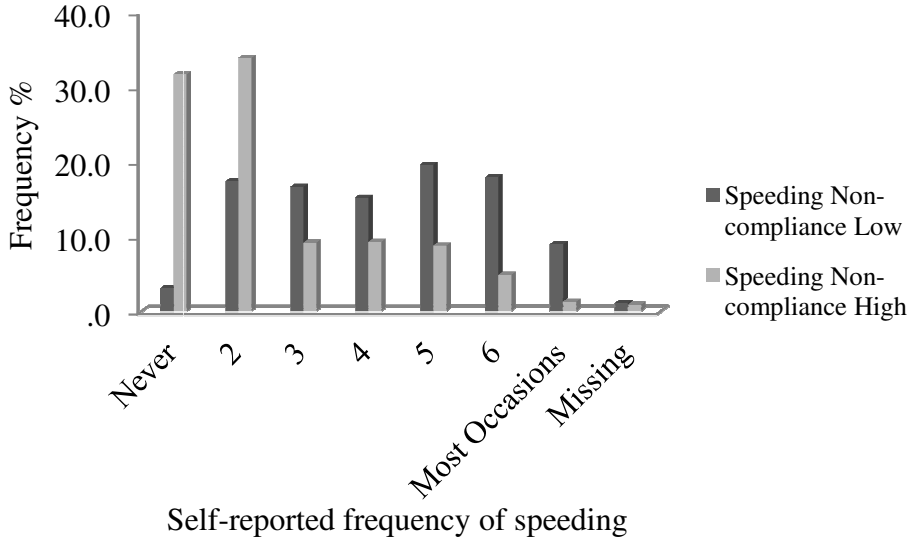

Figure 4.2. Comparison of participants self-reported frequency of exceeding the posted speed limit (N = 546).

For the purpose of multivariate analyses, a composite variable was created that represented a global measure of the frequency of speeding. The two non-compliance questions provide the means of differentiating between those who are willing to engage in more high-range speeding behaviour and those who are not. Therefore, a *global frequency of self-reported speeding* variable was created by summing participant responses and dividing their overall score by the number of items. Thus the response scale ranges from one to seven with higher scores reflecting exceeding the speed limit more frequently. As noted in section 3.3.2.2, this method is similar to the technique employed in the research conducted by Fleiter and Watson (2006) and Fleiter (2010). This variable had a mean of 3.36 (*SD* = 1.46).

The drink driving dependent variable was designed to measure the participant's

level of compliance with drink driving legislation in Australia. Participants were asked: *"In the past 6 months, how often did you drive after drinking alcohol but may have been over the legal BAC limit for your licence type?"* This variable had a mean of 1.6 (*SD* = 1.31). Examination of the distribution revealed a significant positive skew (see figure 4.3). Square root and logarithmic transformations were performed in an attempt to reduce the impact of skewness; however neither transformation technique was able to resolve this issue. Appendix D provides further information regarding the distribution of responses and percentages for the drink driving dependent variable.

It was observed that 71.2 percent (n = 389) of participants responded that they 'never' drove after drinking alcohol while they may have been over the legal BAC limit for their licence type. Thus, 27.3 percent (n = 149) of the sample responded between two and seven on the Likert scale where one equals never and seven most occasions[9]. This suggests that at some point during the past six months, these participants had driven at some point when they may have been over the legal BAC limit for their licence type.

[9] Please note that 1.5% of the sample did not respond to this question.

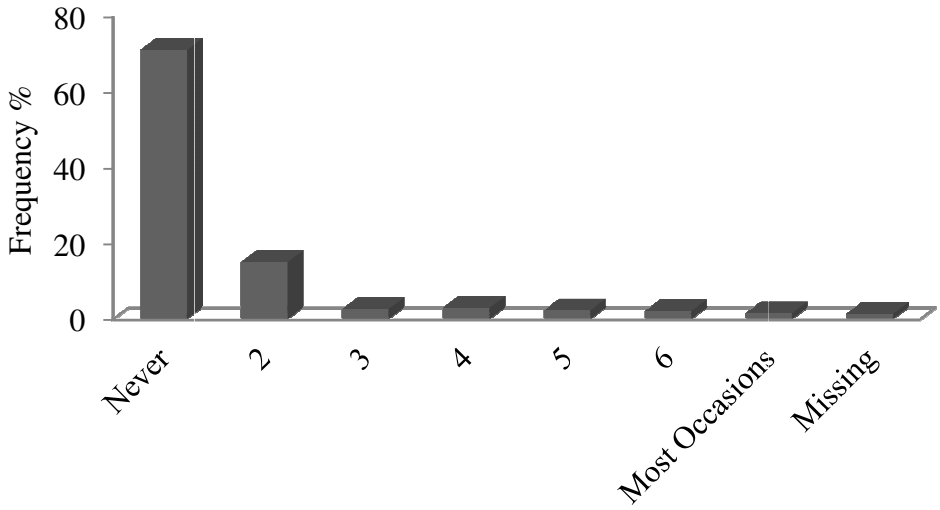

Figure 4.3. Frequency that participants drove when they may have been over the legal BAC limit for their licence type (N = 546).

For the bivariate analyses, the skewed nature of the drink driving dependent variable prompted the use of non-parametric measures of association. However, for the purposes of the regression analyses it was necessary to dichotomise the variable by dividing the participants into two groups. Group one was labelled *'Non-drink drivers'* and participants who responded 'never' were assigned to this group (n = 389). Group two were labelled *'Drink drivers'*, and comprised those participants who responded from two to seven on the seven-point Likert scale (n = 149). This latter group represented those drivers who indicated they had driven at some point during the past six months when they may have been over the legal BAC limit for their licence type.

In order to check the validity of the drink driving measure and dichotomisation of the distribution of drink driving responses, an analysis was undertaken to examine self-reported drink driving convictions of those who were categorised as a drink driver or not. The results found that these two groups differed significantly on their

drink driving convictions, with 57.1% of those who had been convicted being categorised as a drink driver compared with 42.9% who were classified as non-drinkers; χ^2 (1) = 9.89 p = .02 compared to 42.9% of those categorised as non-drink drivers.

4.5 Comparing self-reported speeding and drink driving behaviour

Bivariate correlation utilising Spearman's Rho was performed to explore the hypothesis (H_1) that there will be a positive relationship between self-reported frequency of speeding and self-reported frequency of drink driving. It was observed that there was a positive association between the global self-reported frequency of self-reported speeding and self-reported frequency of drink driving; r_s = .24, p < .001. This result indicates that as participant's frequency of speeding increases, so does their frequency of driving when they may be over the legal BAC limit for their licence type. However the strength of this association was not particularly strong.

In order to further examine the relationship between speeding and drink driving behaviour and test the first part of hypothesis 2 (H_{2a}) a cross-tabulation was conducted. For the purpose of conducting this analysis, participants were categorised into one of six categories based on their responses to the two items measuring self-reported speeding (i.e., up to 10 kilometres per hour over the posted speed limit and 10 kilometres per hour or more over the posted speed limit); and the one item measuring self-reported drink driving. More particularly, only those who responded that they 'never' engaged in drink driving and speeding (at any level) were classified into the 'Non-drinker/Do not speed' category; whereas the 'Non-drinker/Only speed up to 10 km/hr' category consisted of those who indicated that they 'never' engaged in drink driving behaviour and only exceeded the speed limit by up to 10 kilometres per hour. Therefore, underlying this categorisation is a proposed continuum of

deviance whereby speeding up to 10 kilometres per hour is not considered as being as deviant as speeding 10 kilometres per hour or more over the posted speed limit. See Appendix D and Table 4.4 for further information.

It can be seen in Table 4.4 that the participants in the two drink driving groups differed significantly on their self-reported speeding behaviour. It was observed that a relatively small proportion of both the drink drivers and the non-drink drivers reported not speeding. However, consistent with H_{2a}, a higher proportion of the drink drivers reported engaging in high-range speeding than the non-drink drivers.

Table 4.4

Cross-tabulation of speeding and drink driving behaviour (n = 533)[10]

	Do not speed n (%)	Only speed up to 10km/hr n (%)	Speed 10km/hr or more n (%)
Non-drink drivers	14 (3.6%)	**132 (34.0%)**	**242 (62.4%)**
Drink drivers	2 (1.4%)	**22 (15.2%)**	**121 (83.4%)**
χ^2 (2) = 21.61, p < .001; ϕ_c = .20, p < .001			

In order to test the second part of hypothesis two (H_{2b}) relating to the reported frequency of speeding among those participants who reported drink driving and those who did not, a series of independent samples *t* test were conducted (see Table 4.5). As hypothesised, it was found those in the non-compliant drink driving category reported more frequently exceeding the posted speed limit by both 'up to ten kilometres per hour'; and 'ten kilometres or more per hour'(as also reflected in the global frequency of speeding measure).

[10] Please note that the sample included in this table does not contain participants with missing data across all three dependent variables.

Table 4.5

Comparison of speeding behaviour by drink driving category (n = 533)

Speeding variable:	Drink driving		*t* test
	Non-drink drivers *M (SD)*	Drink drivers *M (SD)*	
Speeding non-compliance low	4.03 (1.69)	4.72 (1.54)	$t = -4.28$, $p < .001$
Speeding non-compliance high	2.27 (1.46)	3.10 (1.69)	$t = -5.23$, $p < .001$
Global frequency of self-reported speeding	3.15 (1.41)	3.91 (1.42)	$t = -5.53$, $p < .001$

In order to test hypothesis three relating to the drink driving behaviour of those who report frequently exceeding the speed limit by ten kilometres per hour or more compared to those who speed only at low levels, a Mann-Whitney U Test was performed. It was found that the groups were significantly different, $U = 22627.0$, $p < .001$. It was found that those in the 'Speed 10 kilometres per hour or more' group were more likely to engage in drink driving behaviour than those in the 'Only speed up to 10 kilometres per hour' group (see Table 4.6).

Table 4.6

Comparison of drink driving behaviour among those who exceed the posted speed limit (n = 533)

	Mean Rank (*n*)
Only speed 'up to 10 kilometres per hour over the posted speed limit'	224.43 (154)
Speed '10 kilometres per hour or more over the posted speed limit'	273.67 (363)

The fourth hypothesis explored whether participants differed on their level of compliance with the regulatory limits for speeding versus drink driving. It was found that the mean scores associated with the self-reported frequency of drink driving (M = 1.6, SD = 1.31) was significantly lower than it was for both measures of self-reported speeding (as reflected in the composite speeding measure). In other words, the participants reported more frequently speeding both up to 10 kilometres per hour over the posted speed limit and 10 kilometres or more per hour over the limit, than they reported drink driving (see Table 4.7).

Table 4.7

Comparison of participants compliance with speeding and drink driving regulatory limits (n = 533)[11]

		M	*SD*	*Significance level*
Pair 1	Speeding non-compliance low	4.22	1.68	$t = 30.77$, $p < .001$
	Drink Driving	1.60	1.31	
Pair 2	Speeding non-compliance high	2.49	1.57	$t = 11.73$, $p < .001$
	Drink Driving	1.60	1.31	
Pair 3	Global frequency of self-reported speeding	3.35	1.46	$t = 23.67$, $p < .001$
	Drink Driving	1.60	1.31	

4.6 Analysis of independent variables

Prior to testing the remaining hypotheses, a range of analyses were undertaken on the independent variables for descriptive purposes. The results of these analyses are presented below.

4.6.1 Personality-related measures

Table 4.8 reports the descriptive statistics for the personality measures: the AUDIT, the Zuckerman-Kuhlman Impulsivity and Sensation Seeking Scale, and the

[11] Please note that the sample included in this table does not contain participants with missing data across all three dependent variables.

Bortner Type-A Behaviour Pattern Scale. Based on the classifications provided in Babor et al. (2001), the AUDIT scores indicate that approximately 65.7% (n=357) of the participants were in the 'no alcohol dependence' group; 20.8% (n=113) in the 'low alcohol dependence' group; 3.3% (n=18) in the 'medium alcohol dependence group; and 2.8% (n=15) in the 'high alcohol dependence group on the AUDIT scale. It should be noted that 7.5% (n=41) of participants were unable to be classified on the basis of an incomplete response to all ten items in the AUDIT scale.

It was also found that the study sample displayed a lower level of sensation seeking as measured by Zuckerman-Kuhlman Impulsivity and Sensation Seeking Scale than the norms reported by Zuckerman (Zuckerman & Kuhlman, n.d.). However, the distributions were not significantly different from each other, t = -17.78, *n. s.* In relation to the Bortner Type-A Behaviour Pattern Scale, a similar technique as that employed by Nabi et al. (2005) was utilised to divide scores into low, intermediate, and high categories. It was found that 27.5 percent (N = 146) were classified as low (25^{th} percentile corresponding to scores ≤ 77); 46.9 percent as intermediate (scores 78 to 96); and 25.6 percent as high (75^{th} percentile corresponding to scores ≥ 97).

Table 4.8

Descriptive statistics for the person-related measures

Construct	N	Scale range	Mean	SD
AUDIT	503	0 – 40	6.2	5.22
Zuckerman-Kuhlman Impulsivity and Sensation Seeking Scale	516	0 – 19	6.63	4.59
Bortner Type-A Behaviour Pattern Scale	534	14 – 154	86.8	15.73

4.6.2 Deterrence theory constructs

This section discusses the results relating to the deterrence theory constructs and compares the responses relating to speeding and drink driving.

Direct exposure to punishment

Participants were asked whether they had ever been caught for speeding or drink driving. Table 4.9 reports the participants' direct experiences of punishment. As can be seen, most participants had not been detected for drink driving, whereas a greater proportion had received a speeding ticket.

Table 4.9

Participant mean responses for their self-reported experience of their direct exposure to punishment (n = 540)

Variable	Yes	No	Significance level
Have you ever been convicted of drink driving?	21 (3.9%)	519 (96.1%)	χ^2 (1) = 3.99 p < .05
Have you ever received a speeding ticket?	324 (60.0%)	216 (40.0%)	

Exposure to speeding and drink driving enforcement

This construct measures the participant's direct exposure to the enforcement related activities associated with speeding, and drink driving (see Table 4.10 for descriptive statistics). It was found that in the participant's perception, there appeared to be higher levels of Police activity targeting those who exceed the posted speed limit than Police conducting random breath testing.

Table 4.10

Descriptive statistics for the exposure to enforcement scales (n = 540)

Construct	Scale range	Mean	SD	Significance level
Exposure to speed related enforcement	1 – 7	4.07	1.53	$t = 14.37$, $p < .001$
Exposure to drink driving related enforcement	1 – 7	3.04	1.56	

Perceived Risk of Apprehension

In order to assess the participants' perceived risk of apprehension for illegal driving behaviours, five items were used to measure how likely it is that they would be random breath tested, have their licence checked, be caught for speeding, not wearing a seat belt, or tailgating. This scale had a mean of 16.9 (*SD* =5.91), on a scale of five to 35. Paired sample *t* tests were conducted to compare the risk of being detected for the different driving behaviours (see Table 4.11). A Bonferroni correction was made to control familywise error. Participants rated being caught for speeding higher than any of the other behaviours, followed by being random breath tested. Participants did not perceive any difference in the risk of being apprehended for not wearing a seat belt and having their licence checked.

Table 4.11
Comparison of the perceived risk of apprehension for illegal driving behaviours (n = 539)

Perceived risk of apprehension:		Mean	SD	Significance level
Pair 1	Caught for speeding	4.78	1.50	$t = 11.59$, $p < .001$
	Random Breath Tested	3.95	1.66	
Pair 2	Caught for speeding	4.78	1.50	$t = 25.72$, $p < .001$
	Caught not wearing a seat belt	3.02	1.67	
Pair 3	Caught for speeding	4.78	1.50	$t = 33.99$, $p < .001$
	Caught for tailgating	2.29	1.45	
Pair 4	Caught for speeding	4.78	1.50	$t = 24.13$, $p < .001$
	Licence status checked	2.87	1.67	
Pair 5	Random Breath Tested	3.95	1.66	$t = 12.18$, $p < .001$
	Caught not wearing a seat belt	3.02	1.67	
Pair 6	Random Breath Tested	3.95	1.66	$t = 21.92$, $p < .001$
	Caught for tailgating	2.29	1.45	
Pair 7	Random Breath Tested	3.95	1.66	$t = 13.97$, $p < .001$
	Licence status checked	2.87	1.67	
Pair 8	Caught not wearing a seat belt	3.02	1.67	$t = 12.42$, $p < .001$
	Caught for tailgating	2.29	1.45	
Pair 9	Caught not wearing a seat belt	3.02	1.67	$t = 1.94$, *n.s.*
	Licence status checked	2.87	1.67	
Pair 10	Caught for tailgating	2.29	1.45	$t = -8.73$, $p < .001$
	Licence status checked	2.87	1.67	

Personal Knowledge of Sanctions

This construct measured the participant's knowledge of sanctions or penalties associated with speeding and drink driving (see Table 4.12). Overall, participants rated their knowledge of speed related penalties higher, than they did for drink driving.

Table 4.12
Descriptive statistics for the personal knowledge of sanctions scales (n = 540)

Construct	Scale range	Mean	SD	Significance level
Personal knowledge of drink driving sanctions	2 – 14	6.42	3.98	$t = 9.97$, $p < .001$
Personal knowledge of speed-related sanctions	2 – 14	7.99	3.49	

Perceived risk of punishment

Paired sample *t* tests were conducted to determine if there were differences in the perceived certainty, severity, and swiftness of punishment for speeding and drink driving (see Table 4.13). Participants rated the perceived severity and swiftness of punishment for speeding higher than they did for drink driving. In contrast, participants rated the certainty of punishment higher for drink driving than they did for speeding.

Table 4.13
Comparison of participants perceived risk of punishment for speeding and drink driving (n = 540)

Perceived risk of punishment	Mean	SD	Significance level
Severity of punishment for drink driving	5.59	3.13	$t = -8.24$, $p < .001$
Severity of punishment for speeding	6.77	3.34	
Certainty of punishment for drink driving	11.03	3.19	$t = 2.94$, $p < .01$
Certainty of punishment for speeding	10.68	3.11	
Swiftness of punishment for drink driving	9.51	3.38	$t = -2.33$, $p < .05$
Swiftness of punishment for speeding	9.82	3.35	

Direct experience of punishment avoidance

In the area of speeding, participant's responses demonstrated that there were a number of avoidance strategies generally employed by drivers. For example, in

relation to speeding, the participants indicated that they used the following strategies more frequently: slowing down where they have regularly seen speed camera units in operation, driving more carefully, hitting their brakes when they see a speed camera unit, watching for other drivers flashing their lights to indicate that there is a police presence ahead on the road, and generally remaining watchful for police vehicles. In the case of drink driving, participants indicated that the most common method utilised to avoid being caught when they may have been over the legal limit was to take the back streets home, remain watchful for police vehicles, and driving more carefully. It was also interesting to note that participants indicated that they often had someone else drive when they thought they may be over the legal BAC limit. While this is not a punishment avoidance strategy, it demonstrates that drivers recognise that having someone else drive removes the possibility that they could be caught for drink driving. Consequently, this was classified as a compliance strategy. As shown in Table 4.14, it was found that participants reported utilising avoidance strategies more frequently for speeding than they did for drink driving.

Indirect experience of punishment avoidance

This construct measures the participants' indirect experience of punishment avoidance through their friends and family members' use of 'avoidance strategies' (see Table 4.14 for descriptive statistics). It is interesting to note that in the participants view, more friends than family members used other strategies to avoid being detected for drink driving. Compared to drink driving, participants reported that more of their friends and family members used a larger number of strategies to avoid being detected for speeding; and similarly, participants indicated that more of their friends than family members used strategies to avoid being caught for speeding. As shown in Table 4.14, it was noted that in the participant's perception, their friends and family employed avoidance strategies for speeding more frequently than they did

for drink driving. Furthermore, participants reported utilising avoidance strategies more frequently for speeding than they did for drink driving.

Table 4.14

Descriptive statistics for the direct and indirect punishment avoidance scales (n = 540)

Construct	Scale range	Mean	SD	Significance level
Direct Punishment Avoidance – Speed	7 – 49	26.45	9.30	$t = 23.88$, $p < .001$
Direct Punishment Avoidance – DD	7 – 49	16.49	10.16	
Indirect Punishment Avoidance – Speed – Friend	7 – 49	29.78	9.99	$t = 14.68$, $p < .001$
Indirect Punishment Avoidance – DD – Friend	7 – 49	23.67	11.87	
Indirect Punishment Avoidance – Speed –Family	7 – 49	27.43	10.59	$t = 16.88$, $p < .001$
Indirect Punishment Avoidance – DD – Family	7 – 49	19.97	11.23	

Indirect exposure to punishment

This variable was measured by single items asking the participant about their friends' and family members' driving history and specifically if they had ever been caught for speeding or drink driving. It is possible that participants will not always be aware of their friends and family members experience of punishment, therefore they were given the options of 'yes', 'no', or 'do not know'. Inspection of the responses across the three categories revealed that the 'do not know' category contained less than 10 percent of responses, therefore for the purpose of future analyses, the 'no' and 'do not know' categories were collapsed. It can be seen in Table 4.15 that participants reported that more of their friends and family members' had received a speeding ticket, than been convicted of drink driving.

Table 4.15

Participants exposure to family and friends who have been convicted of drink driving and speeding offences (Indirect exposure to punishment) (n = 543).

	Yes	No / Do not know	Significance level
Have any of your friends:			
been convicted of drink driving?	34.6%	65.4%	χ^2 (1) = 23.93, p < .001
received a speeding ticket?	85.6%	14.4%	
Have any of your family:			
been convicted of drink driving?	22.8%	77.2%	χ^2 (1) = 21.58, p < .001
received a speeding ticket?	78.3%	21.7%	

4.6.3 Social Learning theory constructs

This section discusses the descriptive statistics relating to the social learning theory variables. These constructs were operationalised for both speeding and drink driving behaviour and are discussed below.

Differential association

This construct has both a behavioural and normative dimension. The behavioural dimension measured the degree to which those they associated with complied with the regulatory limits set for speeding and drink driving. Table 4.16 provides a comparison of the behavioural dimension of differential association. It was found that participants indicated that their friends and family members engaged in more frequent speeding than drink driving behaviour. In addition, it was also observed that participants indicated that their family engaged in less frequent speeding behaviour than their friends. Similarly, this pattern was also observed in the case of drink driving.

Table 4.16

Comparison of participants' perception of friends', and family members' compliance with the regulatory limits for speeding and drink driving (n = 540)

		Mean	SD	*t* test
Pair 1	Speeding behaviour – Friends	3.81	1.41	$t = 15.79$, $p < .001$
	Drink driving behaviour – Friends	2.67	1.75	
Pair 2	Speeding behaviour – Family	3.36	1.44	$t = 16.37$, $p < .001$
	Drink driving behaviour – Family	2.17	1.63	
Pair 3	Speeding behaviour – Friends	3.81	1.41	$t = 8.194$, $p < .001$
	Speeding behaviour – Family	3.36	1.44	
Pair 4	Drink driving behaviour – Friends	2.67	1.75	$t = 7.271$, $p < .001$
	Drink driving behaviour – Family	2.17	1.63	

The normative dimension of differential association measured the participants' perception of the definitions held by family and friends toward speeding and drink driving[12] or how accepting they are of the behaviour (see Table 4.17 for descriptive statistics). Paired samples *t* test revealed that there were significant differences in the participants' perception of family and friends attitude toward speeding versus drink driving, suggesting that these individuals hold a more favourable view of speeding than they do for drink driving. It was also found that in the participants' view, friends held more favourable views toward speeding behaviour than the participant's family members. Similarly, there were also significant differences in the participant's perception of family and friends definitions toward drink driving, with friends holding more favourable definitions than the participant's family members.

[12] Please note that items were measured on a scale of two to 14.

Table 4.17

Comparison of differential association normative dimension scales (n = 540)

		Mean	SD	*t* test
Pair 1	Speeding – Normative – Friends	6.65	3.34	$t = 22.53$, $p < .001$
	Drink driving – Normative – Friends	3.66	2.41	
Pair 2	Speeding – Normative – Family	4.81	2.98	$t = 16.02$, $p < .001$
	Drink driving – Normative – Family	2.95	2.03	
Pair 3	Speeding – Normative – Friends	6.65	3.34	$t = 13.61$, $p < .001$
	Speeding – Normative – Family	4.81	2.98	
Pair 4	Drink driving – Normative – Friends	3.66	2.41	$t = 7.38$, $p < .001$
	Drink driving – Normative – Family	2.95	2.03	

Personal definitions

The personal definitions construct measures the attitudes, rationalisations, and moral beliefs of participants toward speeding and drink driving behaviour (see Table 4.18 for descriptive statistics). In relation to speeding, some interesting patterns were observed on individual items. For instance, participants appeared to indicate that harsher penalties should be introduced for those who exceed the speed limit (M = 4.02; SD = 1.87); however support was also given to statements suggesting that it is okay to exceed the speed limit so long as you drive to the conditions of the road (M = 4.12; SD = 1.98) . Another interesting dichotomy was observed whereby participants appeared to endorse the statement that 'drivers should always stick to the speed limit' (M = 4.87; SD = 1.87); as well as supporting the statement 'everybody drives faster than the speed limit once in a while' (M = 5.23; SD = 1.78).

Table 4.18

Descriptive statistics for personal definitions scales (n = 540)

Construct	Scale range	Mean	SD	*t* test
Personal definitions toward speeding	13 – 91	44.64	13.65	$t = 17.13$, $p < .001$
Personal definitions toward drink driving	13 – 91	33.81	9.03	

Similar items were used to measure the participant's personal definitions toward drink driving. It was found that participants thought it was okay to drive after drinking 'one or more alcoholic drinks, but remain under the legal BAC limit'. It is interesting to note that that the following items were rated highly by participants: 'I would find it inconvenient to catch public transport after drinking alcohol'; 'I would find it too expensive to catch a taxi after drinking alcohol', and 'I would feel unsafe catching public transport after drinking alcohol'. A paired samples *t* test was conducted to compare participants' personal definitions toward speeding and drink driving. It was found that there were significant differences between the definitions for speeding and drink driving, with participants holding more favourable views toward exceeding the speed limit, than they did for drink driving.

Differential reinforcement

This construct describes the overall balance of factors that reinforce and punish our actions (See Table 4.19 for descriptive statistics). Results relating to the factors that are anticipated to reinforce speeding and drink driving will be discussed first and then the results linked to factors that are proposed to inhibit or punish speeding and drink driving.

Reinforcements: Participants were asked if they thought their family and friends would respect them for: driving over the speed limit; and driving while over

the legal BAC limit for their licence type. It was found that there were significant differences in the perceived level of rewards from family and friends for speeding and drink driving behaviour, with speeding being rated as more acceptable than drink driving.

Punishments: The items relating to punishment related to both what the participant thought would be the social punishments arising out of their behaviour, as well as those that would come from the work environment. It was found that there were significant differences between the perceived social punishments arising out of engaging in these two behaviours, with drink driving being rated higher than speeding.

Table 4.19

Descriptive statistics for the scales relating to differential reinforcement (n = 540)

Construct	Scale range	Mean	SD	*t* test
Differential Reinforcement – Speed – Reward	2 – 14	4.11	2.40	$t = 13.49$, $p < .001$
Differential Reinforcement – DD – Reward	2 – 14	2.82	1.88	
Differential Reinforcement – Speed – Punish	6 – 42	27.94	7.75	$t = -21.56$, $p < .001$
Differential Reinforcement – DD – Punish	6 – 42	34.92	5.87	

Imitation

This construct asked participants to indicate how much they based their speeding and drink driving behaviour on the behaviour of friends, family members, closest friend or partner, and other drivers on the road. A repeated measures ANOVA was performed to compare the influence of the four groups on both speeding and drink driving behaviour (see Table 4.20 for descriptive statistics and *t* test results). In relation to speeding, it was found that there were no significant

differences among the four groups, suggesting that speeding behaviour was influenced by a broad range of exemplars. In contrast, it was found there were significant differences among the four groups in relation to drink driving. Post-hoc tests revealed that family members and the participant's closest friend or partner were more influential than friends or other drivers on the participants' drink driving behaviour. Post-hoc *t* tests revealed that there were no significant differences between the participant's family members or closest friend/partner, indicating that these two groups of exemplars had equal importance on the participant's decision to drive over the legal BAC limit when they first began driving[13].

Table 4.20

Descriptive statistics and comparison of measures of imitation for drink driving and speeding behaviour (N = 540)

	Friends	Family	Closest friend / Partner	Other Drivers
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*
Drink driving	3.01 (2.29)	3.72 (2.54)	3.5 (2.44)	2.78 (2.13)
		F (3, 537) = 36.47, p .001		
Speeding	3.13 (2.15)	3.44 (2.29)	3.33 (2.16)	3.49 (2.01)
		F (3, 537) = 2.32, *n.s.*		

4.7 Bivariate relationship between dependent and independent variables

The following section examines the relationship between the dependent and independent variables operationalised in the study. In doing so, it tests hypotheses five through to 10.

Sociodemographic factors

Table 4.21 summarises the bivariate correlations between self-reported frequency of speeding for the non-compliance low, non-compliance high, and

[13] Please note all responses were measured on a scale ranging from 1 to 7. Post hoc *t* test included a Bonferroni correction to control for familywise error.

composite variables; self-reported frequency of drink driving; and the sociodemographic variables operationalised in the study. With regard to speeding, the correlations that were of interest was a negative, albeit weak, association observed for age, with younger drivers more likely to report more frequent speeding over the posted speed limit; and the length of time a driver had held their licence, suggesting that those who had held their licence for a shorter period of time engaged in more frequent speeding behaviour. In the case of drink driving, there was a weak positive association observed between gender and self-reported frequency of drink driving, with males more likely to report driving when they may be over the legal BAC limit for their licence type.

Table 4.21

Bivariate correlations between self-reported frequency of speeding, self-reported frequency of drink driving and sociodemographic factors

Variables	**Drink Driving[1.]**	**Speeding Non-Comp Low**	**Speeding Non-Comp High**	**Speeding Composite**
Gender	.20***	.14**	.12**	.14**
Age	-.09**	-.2***	-.12**	-.19***
Marital Status (Single vs. Married / Defacto / Divorced / Separated)	-.14**	.04	-.04	.02
Education Level (High school/Trade or TAFE Qualification vs. University Qualification	.01	-.01	-.04	-.03
Employment Status (Yes vs. No)	-.04	.04	.08	.07
Drove for work purposes (Yes vs. No)	-.01	-.02	.07	.02
Average number of driving hours/week	-.03	.04	.09*	.07
Licence Type (Open versus provisional licence holders)	-.03	.06	.01	.04
Length of time held licence (years and months)	-.04	-.18**	-.10	-.15**

* p < .05; ** p < .01; *** p < .001

1. Correlation calculated by Spearman's Rho.

Person-related factors

Table 4.22 summarises the bivariate correlations between the Zuckerman-Kuhlman Impulsivity Sensation Seeking scale, AUDIT, and Bortner Type-A Behaviour Pattern scale and self-reported frequency of speeding for the non-compliance low, non-compliance high, and composite variables; and self-reported frequency of drink driving. In relation to self-reported frequency of speeding, there was a moderate correlation observed between all three speeding variables and the Zuckerman-Kuhlmann Impulsivity and Sensation Seeking Scale. This indicates that as speeding frequency increases, impulsivity and sensation seeking scores also increase.

In the case of drink driving, it was observed that the AUDIT had a moderate positive association with self-reported frequency of drink driving, indicating that the frequency of driving while over the legal limit was associated with higher scores on the AUDIT scale. It was also found that there was a weak positive association between the Zuckerman-Kuhlmann Impulsivity and Sensation Seeking Scale and the self-reported frequency of drink driving, indicating that those who drove more frequently when they may have been over the legal limit were more likely to have a higher impulsivity and sensation seeking score.

Overall, it was found that the correlation between Type-A behaviour pattern and self-reported frequency of speeding, albeit weak, was stronger than that observed for self-reported frequency of drink driving. In relation to alcohol misuse, there was a stronger association between the AUDIT and self-reported frequency of drink driving than for self-reported frequency of speeding. It was also found that there was a positive relationship between the Zuckerman-Kuhlman Impulsivity and Sensation

Seeking scale and self-reported frequency of speeding, and self-reported frequency of drink driving.

Table 4.22

Bivariate correlations between self-reported frequency of speeding, self-reported frequency of drink driving and person-related factors

Variables	**Drink Driving[1.]**	**Speeding Non-Comp Low**	**Speeding Non-Comp High**	**Speeding Composite**
Alcohol Use Disorder Identification Test (AUDIT)	.33***	.11*	.19***	.17***
Zuckerman-Kuhlmann Impulsivity & Sensation Seeking Scale	.20***	.28***	.31***	.33***
Bortner Type-A Behaviour Pattern Scale	.08**	.14**	.11*	.15**

* p < .05; ** p < .01; *** p < .001
1. Correlation calculated by Spearman's Rho.

Classical deterrence theory constructs

Table 4.23 summarises the bivariate correlations between the two dependent variables and classical deterrence theory constructs. In relation to speeding, weak to moderate correlations were found between the composite variable and direct exposure to punishment for speeding, personal knowledge of speeding related enforcement practices, and the perceived severity of being punished for speeding offences. It was found that the construct relating to the direct exposure to punishment, that those who had received a speeding ticket reported engaging in speeding behaviour more frequently. This relationship is not surprising given that the more an individual speeds the more likely they are to be caught engaging in this behaviour. In the case of drink driving, a weak correlation was observed between this behaviour and direct exposure to punishment for drink driving, personal knowledge of drink driving enforcement practices, and the perceived severity of drink driving punishments. However, all these correlations were relatively weak.

Table 4.23

Bivariate correlations between self-reported frequency of speeding, self-reported frequency of drink driving, and classical deterrence theory constructs

Variables	**Drink Driving[1].**	**Speeding Non-Comp Low**	**Speeding Non-Comp High**	**Speeding Composite**
Direct exposure to drink driving punishment (Yes/No)	.14*	-	-	-
Direct exposure to speeding punishment (Yes/No)	-	.19***	.24***	.24***
Direct exposure to general punishment (Yes/No)	.03	-.02	.01	.01
Exposure to police drink driving enforcement	.06	-	-	-
Exposure to police speeding enforcement	-	.09*	.08	.1*
Exposure to police general enforcement	.04	.02	.06	.04
Personal knowledge of drink driving enforcement practices	.15**	-	-	-
Personal knowledge of speeding enforcement practices	-	.14**	.08	.13**
Perceived risk of punishment – Certainty	.02	.03	-.01	.01
Perceived risk of punishment – Severity	.22**	.19***	.18***	.21***
Perceived risk of punishment – Swiftness	.03	.03	.01	.02
Perceived risk of apprehension	-.02	-.04	.01	-.02

* p < .05; ** p < .01; *** p < .001
1. Correlation calculated by Spearman's Rho.

Expanded deterrence theory constructs

Table 4.24 summarises the bivariate correlations between the two dependent variables and the additional expanded deterrence theory constructs. In relation to the three speeding variables, moderate correlations were found with direct exposure to punishment avoidance, and indirect exposure to punishment avoidance experienced by both friends and family. In the case of drink driving, a moderate correlation was

observed for direct exposure to punishment avoidance, and a weak association for indirect exposure to punishment avoidance experienced by friends.

Table 4.24

Bivariate correlations between self-reported frequency of speeding, self-reported frequency of drink driving, and expanded deterrence theory constructs

Variables	**Drink Driving[1.]**	**Speeding Non-Comp Low**	**Speeding Non-Comp High**	**Speeding Composite**
Direct exposure to punishment avoidance: DD	.43**	-	-	-
Direct exposure to punishment avoidance: speeding	-	.44***	.41***	.48***
Friends				
Indirect exposure to punishment for DD	.17***	-	-	-
Indirect exposure to punishment avoidance: DD	.21***	-	-	-
Indirect exposure to punishment for speeding offences	-	.13**	.03	.09*
Indirect exposure to punishment avoidance: speeding	-	.3***	.25***	.31***
Family				
Indirect exposure to punishment for DD	.13**	-	-	-
Indirect exposure to punishment avoidance: DD	.19***	-	-	-
Indirect exposure to punishment for speeding	-	.13**	.05	.10*
Indirect exposure to punishment avoidance: speeding	-	.29***	.24***	.30***

* p < .05; ** p < .01; *** p < .001
1. Correlation calculated by Spearman's Rho.

Social learning theory constructs

Table 4.25 summarises the bivariate correlations between the two dependent variables and Akers' social learning theory constructs. For the three measures of self-reported frequency of speeding, moderate positive correlations were found with constructs relating to personal definitions; the behavioural dimension of differential

association for friends; and a negative association for the anticipated punishments associated with speeding behaviour (i.e., differential reinforcement construct). In the case of drink driving, a moderate correlation was observed in relation to the personal definitions held by participants and the self-reported frequency of driving while the participant may have been over the legal BAC limit for their licence type.

Table 4.25

Bivariate correlations between dependent variables and social learning theory constructs

Variables	**Drink Driving**	**Speeding Non-Comp Low**	**Speeding Non-Comp High**	**Speeding Composite**
Personal Definitions	.34***	.45***	.37***	.46***
Differential Association: Normative – Friends	.26***	.27***	.19***	.26***
Differential Association: Normative – Family	.24***	.21***	.21***	.24***
Differential Association: Friends Non-compliance Beh.	.22***	.34***	.29***	.35***
Differential Association: Family Non-compliance Beh.	.19***	.27***	.25***	.29***
Imitation of friends	.17***	.14**	.09*	.13**
Imitation of family	.04	.15***	.12**	.16***
Imitation of closest friend or partner	.08	.13**	.13**	.15**
Imitation of other drivers on the road	.13**	.10*	.05	.09*
Differential Reinforcement: Rewards	.26**	.23***	.21***	.25***
Differential Reinforcement: Punishments	-.22**	-.34***	-.27***	-.34***

*p < .05; ** p < .01; *** p < .001

1. Correlation calculated by Spearman's Rho.

4.8 Predictors of self-reported speeding and self-reported drink driving

4.8.1 Multivariate relationships between self-reported speeding, legal, person-related, and psychosocial factors

Hierarchical multiple regression was undertaken in order to explore hypothesis 11, which concerned the relationship between sociodemographic, legal and psychosocial factors and the self-reported frequency of speeding. In order to assess whether psychosocial factors provide a better explanation of self-reported frequency of speeding than sociodemographic and legal factors alone, the variables were entered in two blocks with the sociodemographic and legal factors entered first, followed by the psychosocial factors.

Three separate regression analyses were undertaken to determine whether there were differences among the predictors for speeding up to 10 kilometres per hour (i.e., non-compliance low measure), 10 kilometres or more per hour (i.e., non-compliance high measure), and for the global self-reported speeding measure. The hierarchical regression results will be discussed for each of the models; however the individual regression tables for the non-compliance low and non-compliance high measures are reported in Appendix E and Appendix F, respectively.

The first regression utilised the speeding non-compliance low measure as the dependent variable to determine the predictors of those who self-report speeding up to 10 kilometres per hour over the posted speed limit. The first block included sociodemographic[14] and legal factors, as captured by expanded deterrence theory, and was found to significantly predict lower levels of self-reported frequency of speeding, F (13, 451) = 10.70, p <.001 (R^2 = .24, Adjusted R^2 = .21). The second block included both the person-related factors, e.g., AUDIT, ZKISS, and Bortner

[14] It should be noted that the combination of missing data across the other sociodemographic factors dramatically reduced the potential sample size, hence it was decided to only include age and gender among the sociodemographic factors.

Type-A Behaviour Pattern, and psychosocial factors, as captured by Akers' social learning theory. The addition of the second block was found to significantly predict lower levels of self-reported frequency of speeding F (27, 437) = 8.04, $p < .001$, and accounted for 33 percent of the variance in self-reported frequency of speeding scores (Adjusted $R^2 = .29$).

The significant predictors identified within this model were noted across the sociodemographic, legal, and psychosocial factors. Among the sociodemographic factors, age was found to be a significant predictor of exceeding the posted speed limit by up to 10 kilometres per hour [$\beta = -.11$, $p < .01$, $sr^2 = .01$]. Within the legal factors, it was observed that direct exposure to punishment was a significant predictor [$\beta = .12$, $p < .05$, $sr^2 = .01$], with those who received a speeding ticket more likely to report speeding up to 10 kilometre over the posted speed limit. It was also found that direct punishment avoidance was a significant predictor [$\beta = .23$, $p < .001$, $sr^2 = .03$], with those who experienced higher levels of punishment avoidance reporting speeding more frequently up to 10 kilometre per hour over the posted speed limit.

In relation to the personality-related factors, it was found that the AUDIT was a significant predictor [$\beta = -.10$, $p < .05$, $sr^2 = .01$], with higher scores on the AUDIT associated with less frequent speeding up to 10 kilometres per hour over the posted speed limit. It was also found that the Zuckerman-Kuhlman Impulsivity and Sensation Seeking scale was a significant predictor [$\beta = .11$, $p < .05$, $sr^2 = .01$], suggesting that those with higher levels of sensation seeking reported more frequently exceeding the posted speed limit by up to 10 kilometres per hour. The additional social learning factors found to significantly predict speeding up to 10 kilometres per hour over the posted speed limit included: personal definitions held by

the individual toward speeding [$\beta = .26$, $p < .001$, $sr^2 = .03$]; the behavioural dimension of differential association for friends [$\beta = .13$, $p < .05$, $sr^2 = .01$]; and the imitation of friends speeding behaviour when the participant began driving [$\beta = .13$, $p < .05$, $sr^2 = .01$].

The second regression utilised the speeding non-compliance high measure as the dependent variable to determine the predictors of those who self-report speeding 10 kilometres or more per hour over the posted speed limit. The first block included sociodemographic and legal factors, and was found to significantly predict higher levels of self-reported frequency of speeding, F (13, 451) = 9.21, p <.001 ($R^2 = .21$, Adjusted $R^2 = .19$). The second block included both the person-related factors, and psychosocial factors. The addition of the second block was found to significantly predict higher levels of self-reported frequency of speeding F (27, 437) = 7.35, $p <$ .001, and accounted for 31 percent of the variance in self-reported frequency of speeding scores (Adjusted $R^2 = .27$).

Within the overall model, significant predictors were noted across the legal and psychosocial factors. Among the legal factors, it was observed that direct exposure to punishment significantly predicted those who indicated that they exceeded the posted speed limit by 10 kilometres or more per hour [$\beta = .19$, $p < .001$, $sr^2 = .03$], with those who received a speeding ticket more likely to report more frequent speeding over the posted speed limit. It was also found that direct punishment avoidance was a significant predictor [$\beta = .20$, $p < .001$, $sr^2 = .02$], with those who experienced higher levels of punishment avoidance exceeding the speed limit more frequently.

In relation to the personality-related factors, it was found that the Zuckerman-Kuhlman Impulsivity and Sensation Seeking scale was a significant predictor of

exceeding the speed limit by 10 kilometres or more per hour [$\beta = .18$, $p < .001$, $sr^2 = .02$], suggesting that those with higher levels of sensation seeking reported more frequently exceeding the posted speed limit. The additional social learning factors found to significantly predict exceeding the speed limit by 10 kilometres or more per hour included personal definitions held by the individual toward speeding [$\beta = .13$, $p < .05$, $sr^2 = .01$]; the normative dimension of differential association for friends [$\beta = -.16$, $p < .05$, $sr^2 = .01$]; the behavioural dimension of differential association for family members [$\beta = .16$, $p < .01$, $sr^2 = .01$]; and anticipated punishments, with a reduction in exceeding the speed limit by 10 kilometres or more per hour when participants perceive there to be a higher level of punishments arising out of this behaviour [$\beta = -.14$, $p < .05$, $sr^2 = .01$].

The third regression utilised the composite, global measure of self-reported speeding, see Table 4.26. The first block included sociodemographic[15] and legal factors, as captured by expanded deterrence theory, and was found to significantly predict self-reported frequency of speeding, F (13, 451) = 12.91, p <.001 ($R^2 = .27$, Adjusted $R^2 = .25$). The second block included both the person-related factors, e.g., AUDIT, ZKISS, and Bortner Type-A Behaviour Pattern, and psychosocial factors, as captured by Akers' Social Learning Theory. The addition of the second block was found to significantly predict self-reported frequency of speeding F (27, 437) = 10.08, $p < .001$, and accounted for 38 percent of the variance in self-reported frequency of speeding scores (Adjusted $R^2 = .35$).

Within the overall model, significant predictors were noted across the sociodemographic, legal, and psychosocial factors. Among the sociodemographic factors, age was found to be a significant predictor of self-reported frequency of

[15] It should be noted that the combination of missing data across the other sociodemographic factors dramatically reduced the potential sample size, hence it was decided to only include age and gender among the sociodemographic factors.

speeding, with younger drivers reporting more frequent speeding over the posted speed limit [β = -.10, $p < .05$, sr^2 = .01]. Within the legal factors, it was observed that direct exposure to punishment significantly predicted self-reported frequency of speeding [β = .17, $p < .001$, sr^2 = .03], with those who received a speeding ticket more likely to report more frequent speeding over the posted speed limit. It was also found that direct punishment avoidance was a significant predictor of self-reported frequency of speeding [β = .24, $p < .001$, sr^2 = .05], with those who experienced higher levels of punishment avoidance reporting more frequent deviant speeding.

In relation to the personality-related factors, it was found that the Zuckerman-Kuhlman Impulsivity and Sensation Seeking scale was a significant predictor of self-reported frequency of speeding [β = .16, $p < .001$, sr^2 = .03], suggesting that those with higher levels of sensation seeking reported more frequently exceeding the posted speed limit. The additional social learning factors found to significantly predict self-reported frequency of speeding included personal definitions held by the individual toward speeding [β = .22, $p < .01$, sr^2 = .03]; the normative dimension of differential association for friends [β = -.13, $p < .05$, sr^2 = .01]; the behavioural dimension of differential association for family members [β = .13, $p < .05$, sr^2 = .01] and having friends [β = .12, $p < .05$, sr^2 = .01] who do not comply with posted speed limits; and anticipated punishments, with a reduction in self-reported frequency of speeding when participants perceive there to be a higher level of punishments arising out of exceeding the posted speed limit [β = -.13, $p < .05$, sr^2 = .01].

Table 4.26

Hierarchical multiple regression analysis of the global self-reported frequency of speeding as a function of demographics, deterrence theory, social learning theory and person related factors (N=465)

	M	*SD*	*B*	*SE*	β	sr^2	R^2	*Adj*R^2	Δ R^2
Self-reported frequency of speeding	3.36	1.43							
Block 1: Sociodemographic and legal factors									
Gender			.07	.13	.02				
Age	32.02	10.99	-.01	.01	-.10*	.01			
Direct exposure to punishment			.50	.13	.17***	.03			
Personal knowledge sanctions	8.02	3.48	-.02	.02	-.06				
Perceived risk of apprehension	16.84	5.78	.00	.01	-.01				
Perceived risk punish: certainty	10.69	3.04	.01	.02	.01				
Perceived risk punish: severity	6.80	3.32	-.01	.02	-.02				
Perceived risk punish: swiftness	9.82	3.29	.00	.02	-.01				
Direct punishment avoidance	26.46	9.33	.04	.01	.24***	.05			
Indirect exposure to speed punishment – friends			- .20	.16	-.05				
Indirect exposure to speed punishment – family			- .01	.15	.00				
Indirect punish avoid: friend	29.86	9.98	.00	.01	-.02				
Indirect punish avoid: family	27.30	10.71	.00	.01	.01		.27***	.25	
Block 2: Person-related and Psychosocial factors									

	M	*SD*	*B*	*SE*	β	sr^2	R^2	$Adj R^2$	ΔR^2
AUDIT	6.25	5.15	-.02	.01	-.06				
Bortner Type-A Behaviour Pattern	87.12	15.58	.00	.00	.02				
Z-K Impulsivity SS	6.72	4.57	.05	.01	.16***	.03			
Personal definitions – speed	45.04	13.76	.02	.01	.22***	.03			
Differential Assoc – norm. – friends	6.66	3.35	-.06	.02	-.13*	.01			
Differential Association – norm. – family	4.79	2.99	-.01	.02	-.01				
Differential Association – behav.– friends	3.86	1.41	.12	.06	.12*	.01			
Differential Association – behav. – family	3.40	1.41	.13	.05	.13*	.01			
Imitation – friend	3.13	2.15	.05	.04	.08				
Imitation – family	3.44	2.29	.00	.04	.00				
Imitation – partner	3.33	2.16	-.03	.05	- .05				
Imitation – other drivers	3.49	2.01	-.03	.03	-.05				
Anticipated Rewards	4.09	2.36	-.04	.03	-.06				
Anticipated Punishments	27.95	7.73	-.02	.01	-.13*	.01	.38***	.35	.11***

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

It should be noted that the direction of the relationship observed between self-reported speeding and the normative dimension of differential association for friends is contrary to that predicted by social learning theory. Specifically, social learning theory would predict that more frequent speeding would be associated with having family and friends who hold positive personal definitions toward speeding. It was found that at the bivariate level, the relationship between these variables supported that theoretical proposition (i.e., a positive association, $r = .26$, $p < .001$). However,

in the current regression, the relationship was in the opposite direction; this occurrence suggests that negative suppression has occurred within the model (Conger, 1974; Maasen & Bakker, 2001).

There has been considerable discussion regarding the definition, identification, and interpretation of a variety of suppressor effects (see Maasen & Bakker, 2001). Despite the debate regarding suppression effects, a suppressor variable is commonly defined as an independent (predictor) variable that increases the predictive power of other independent variables by removing irrelevant variance in other independent variables (Henard, 1998). A suppressor can be identified by observing its impact on the beta weights of other independent variables. The presence of suppression can lead to the relationship between variables appearing smaller than they are, or in the opposite direction (Maasen & Bakker, 2001).

Tzelgov and Henik (1991) argue that identifying suppressor variables is not a simple task, whereas identifying those variables that are suppressed is generally easier. In the current analysis, the change of sign noted in the beta weights suggests that the normative dimension of differential association for friends is the suppressed variable. In order to identify the variable or group of variables influencing differential association, exploratory regression analyses were undertaken. These analyses suggested that personal definitions toward speeding, the behavioural dimensions of differential association, and anticipated punishments were acting to suppress the influence of the normative dimension of differential association. This result will be discussed further in the next chapter.

4.8.2 Multivariate relationships between self-reported drink driving, legal, person-related, and psychosocial factors

Sequential logistic regression was undertaken to test hypothesis 12, which examined the relationship between sociodemographic, legal and psychosocial factors associated with self-reported frequency of drink driving[16], see Table 4.27. In order to assess whether psychosocial factors provide a better explanation of self-reported frequency of drink driving than sociodemographic and legal factors alone, the variables were entered in two blocks with the sociodemographic and legal factors entered first, followed by the psychosocial factors.

The first block encompassed sociodemographic[17] and legal factors, as operationalised by expanded deterrence theory. It was found that this group of variables significantly predicted self-reported frequency of drink driving, χ^2 (14) = 118.94, p <.001, Nagelkerke R^2 = .33. The second block entered both the person-related factors, e.g., AUDIT, ZKISS, and Bortner Type-A Behaviour Pattern, and psychosocial factors, as captured by Akers' Social Learning Theory. The second block of variables was found to be significant, χ^2 (28) = 179.66, p< .001. In addition the Nagelkerke R^2 was significantly higher for the full model encompassing person, legal, and social factors than the sociodemographic and legal factors model (47 percent versus 33 percent); indicating a stronger association between the full model and self-reported frequency of drink driving.

Within the final model there were several predictors that were found to significantly predict self-reported frequency of drink driving. For instance, among the legal factors, two variables were found to significantly predict self-reported

[16] Logistic regression was selected as the drink driving dependent variable was dichotomised to resolve issues with the distribution of scores.

[17] It should be noted that the combination of missing data across the other sociodemographic factors dramatically reduced the potential sample size, hence it was decided to only include age and gender among the sociodemographic factors.

frequency of drink driving, these included direct punishment avoidance and indirect experience of punishment through a family member. The experience of direct punishment avoidance was found to significantly predict self-reported frequency of drink driving ($p < .001$), and was associated with an increased likelihood [1.08 times, 95% C.I. = 1.04 to 1.11] of being categorised into the *'Non-compliant'* drink driving group. It was also found that having a family member convicted of drink driving was associated with an increased likelihood [2.30 times, 95% C.I. = 1.19 to 4.45] of being categorised into the *'Non-compliant'* drink driving group.

Of the three person-related factors entered into the model, only the Bortner Type-A Behaviour Patter scale and the AUDIT scale were found to be significant predictors of self-reported frequency of drink driving. Specifically, on the Bortner Type-A Behaviour Pattern scale, increased scores were associated with an increased likelihood [1.03 times, 95% C.I. = 1.01 to 1.05] of being categorised into the *'Non-compliant'* drink driving category. In the case of the AUDIT scale, it was found that increased scores were associated with an increased likelihood [1.11 times, 95% C.I. = 1.05 to 1.18] of being categorised into the *'Non-compliant'* drink driving category. Among the social learning factors, it was found that favourable personal definitions held by the individual toward drink driving significantly predicted self-reported frequency of drink driving [1.07 times, 95% C.I. = 1.03 to 1.11]; and the normative dimension of differential association reflecting the definitions held by the participant's friends towards drinking [1.18 times, 95% C.I. = 1.00 to 1.38].

Table 4.27

Sequential logistic regression analysis of self-reported frequency of drink driving as a function of sociodemographic, deterrence theory, social learning theory, and person related factors (N=462)

	B	S.E.	Wald	O.R.	95% C.I. O.R. Lower	Upper
Block 1: Sociodemographic and legal factors						
Gender:						
Female (referent)				1.00		
Male	.37	.31	1.42	1.44	.79	2.62
Age	.00	.01	.08	1.00	.97	1.02
Direct exposure to punishment	-1.02	.67	2.35	.36	.10	1.33
Exposure to DD enforcement	- .03	.11	.09	.97	.78	1.19
Personal knowledge of DD sanctions	.01	.04	.14	1.01	.94	1.09
Perc risk of punishment: severity	.06	.05	1.59	1.06	.97	1.16
Perc risk of punishment: certainty	.07	.06	1.29	1.07	.95	1.21
Perc risk of punishment: swiftness	- .01	.05	.02	.99	.89	1.10
Perceived risk of apprehension	- .05	.03	2.63	.95	.90	1.01
Direct punishment avoidance	.07	.02	19.98***	1.08	1.04	1.11
Friends convict DD *(Referent: No)*	.26	.30	.78	1.30	.73	2.32
Family convict DD *(Referent: No)*	.83	.34	6.08*	2.30	1.19	4.45
Indirect punishment avoidance – family	- .01	.02	.25	.99	.96	1.03
Indirect punishment avoidance – friends	- .02	.02	1.19	.98	.95	1.02
Block 2: Person-related and Psychosocial factors						
Bortner Type-A Behaviour Pattern	.03	.01	7.00**	1.03	1.01	1.05
AUDIT	.11	.03	12.09**	1.11	1.05	1.18
Z-K Impulsivity Sensation Seeking	.03	.03	0.74	1.03	.96	1.10
Personal definitions – DD	.07	.02	13.33***	1.07	1.03	1.11
Diff Assoc: normative – friends	.16	.08	3.98*	1.18	1.00	1.38
Diff Assoc: normative – family	- .07	.09	.59	.93	.78	1.11
Diff Assoc: non-comp beh friend	- .05	.10	.24	.95	.78	1.16
Diff Assoc: non-comp beh family	.09	.10	.84	1.10	.90	1.34
Imitation – friend	.01	.09	.01	1.01	.85	1.20
Imitation – family	- .05	.09	.26	.96	.80	1.14
Imitation – partner	.01	.11	.02	1.01	.82	1.25
Imitation – other drivers	.06	.08	.58	1.06	.91	1.24
Anticipated rewards	.13	.09	1.83	1.13	.95	1.36
Anticipated punishments	.00	.03	.00	1.00	.95	1.06
Constant	-8.66	1.87	21.54	.00		

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

4.8.3 Multivariate relationships between self-reported speeding, self-reported drink driving, legal, person-related, and psychosocial factors

For exploratory purposes, it was decided to conduct an additional logistic regression analyses to identify what factors distinguished between those participants who reported never engaging in either drink driving or speeding, compared to those who reported engaging in both behaviours, thus representing a high-risk group, see Table 4.28. In order to conduct this analysis it was necessary to identify two groups of participants based on their responses to questions regarding their drink driving and speeding behaviour. The first group (n = 339, 72.7%) were those who responded that they 'never' drove when they may have been over the legal BAC limit and did not exceed the posted speed limit by 10 kilometres per hour or more. It should be noted that this group includes those who indicated that they may have exceeded the posted speed limit by up to 10 kilometres per hour. However, as discussed in section 2.2.1, many drivers believe that there is an enforcement tolerance with regard to speed limits and therefore exceeding the posted speed limit by this amount does not constitute non-compliance with law. The second group (n = 127, 27.3%) were those who indicated that they may have driven when they were over the legal BAC limit and engaged in any level of speeding behaviour. The categorisation of participants into these groups was undertaken to contrast the factors contributing to more deviant road use (i.e., both drink driving and speeding), compared with more compliant driving behaviour. Please note that expanded deterrence theory and social learning theory were operationalised for both speeding and drink driving behaviour, thus both sets of predictors were utilised in this analysis.

The first block encompassed sociodemographic and legal factors, as operationalised by expanded deterrence theory. It was found that this group of

variables significantly predicted higher levels of deviant self-reported speeding and drink driving behaviour, χ^2 (25) = 125.77, p <.001, Nagelkerke R^2 = .34. The second block entered both the person-related factors, and psychosocial factors, as captured by Akers' Social Learning Theory. The second block of variables was found to be significant, χ^2 (50) = 73.69, p< .001. In addition the Nagelkerke R^2 was significantly higher for the full model encompassing person, legal, and social factors than the sociodemographic and legal factors model (51 percent versus 34 percent), indicating a stronger association between the full model and higher levels of deviant self-reported speeding and drink driving behaviour.

Within the final model there were several predictors that were found to significantly predict higher levels of deviant self-reported speeding and drink driving behaviour. For instance, the experience of direct punishment avoidance for both speeding and drink driving was found to be significant. However it was noted that direct punishment avoidance for speeding was associated with a decreased likelihood [O.R. = .95, 95% C.I. = .90 to 1.00] of being categorised into the more deviant speeding and drink driving group. In the case of drink driving, direct punishment avoidance was associated with an increased likelihood [O.R. = 1.10, 95% C.I. = 1.06 to 1.15] of being categorised into the more deviant speeding and drink driving group. It was also found that having a family member convicted of drink driving was associated with an increased likelihood [O.R. = 2.32, 95% C.I. = 1.13 to 4.75] of being categorised into the more deviant speeding and drink driving group.

Of the three person-related factors entered into the model, only the Bortner Type-A Behaviour Patter scale and the AUDIT scale were found to be significant predictors of higher levels of deviant self-reported speeding and drink driving behaviour. Specifically, on the Bortner Type-A Behaviour Pattern scale, increased

scores were associated with an increased likelihood [1.03 times, 95% C.I. = 1.01 to 1.05]; and on the AUDIT scale, it was similarly found that increased scores were associated with an increased likelihood [1.12 times, 95% C.I. = 1.05 to 1.19] of being categorised into the more deviant speeding and drink driving group. Among the social learning factors, it was found that favourable personal definitions held by the individual toward speeding [1.04 times, 95% C.I. = 1.00 to 1.08] and drink driving behaviour [1.06 times, 95% C.I. = 1.02 to 1.11] both increased the likelihood of being categorised into the more deviant speeding and drink driving group.

Table 4.28

Sequential logistic regression analysis of self-reported frequency of speeding and drink driving as a function of sociodemographic, deterrence theory, social learning theory, and person related factors (N=466)

	B	S.E.	Wald	O.R.	95% C.I. O.R. Lower	Upper
		Block 1				
Sociodemographic factors						
Gender:						
Female (referent)				1.00		
Male	0.20	0.36	0.31	1.22	0.60	2.47
Age	-0.01	0.02	0.46	0.99	0.96	1.02
Legal Factors – Speeding						
Direct exposure to punishment	0.32	0.36	0.82	1.38	0.69	2.77
Exposure to enforcement	-0.02	0.06	0.14	0.98	0.88	1.09
Personal knowledge of sanctions	0.02	0.05	0.19	1.02	0.92	1.14
Perc risk of punish – severity	-0.02	0.05	0.13	0.98	0.89	1.08
Perc risk of punish – certainty	0.10	0.08	1.67	1.11	0.95	1.29
Perc risk of punish– swiftness	-0.04	0.07	0.31	0.96	0.84	1.10
Perceived risk of apprehension	-0.04	0.03	1.33	0.96	0.91	1.03
Direct punishment avoidance	-0.05	0.03	4.48*	0.95	0.90	1.00
Friend convict speed *(Referent: No)*	0.69	0.52	1.75	2.00	0.72	5.56
Family convict speed *(Referent: No)*	-0.25	0.42	0.37	0.78	0.34	1.76
Indirect punishment avoidance – family	0.01	0.03	0.29	1.02	0.96	1.07
Indirect punishment avoidance – friends	-0.04	0.03	1.86	0.96	0.90	1.02
Legal Factors – Drink driving						
Direct exposure to punishment	-1.10	0.72	2.33	0.33	0.08	1.37
Exposure to enforcement	0.00	0.12	0.00	1.00	0.79	1.26
Personal knowledge of sanctions	0.00	0.05	0.00	1.00	0.91	1.09

	B	S.E.	Wald	O.R.	95% C.I. O.R. Lower	Upper
Perc risk of punishment – severity	0.04	0.05	0.53	1.04	0.94	1.16
Perc risk of punishment – certainty	0.02	0.07	0.07	1.02	0.88	1.18
Perc risk of punishment – swiftness	0.03	0.06	0.19	1.03	0.91	1.16
Direct punishment avoidance	0.10	0.02	21.86***	1.10	1.06	1.15
Friends convicted DD *(Referent: No)*	0.27	0.33	0.69	1.31	0.69	2.50
Family convicted DD *(Referent: No)*	0.84	0.37	5.28*	2.32	1.13	4.75
Indirect punishment avoidance – family	-0.03	0.02	1.33	0.97	0.93	1.02
Indirect punishment avoidance – friends	0.01	0.02	0.11	1.01	0.96	1.06
Block 2:						
Person-related factors						
Bortner Type-A Behaviour Pattern	0.03	0.01	7.98**	1.03	1.01	1.05
AUDIT	0.11	0.03	11.66**	1.12	1.05	1.19
Z-K Impulsivity Sensation Seeking	0.02	0.04	0.26	1.02	0.95	1.09
Psychosocial factors – Speeding						
Personal definitions	0.04	0.02	5.00*	1.04	1.00	1.08
Diff Assoc – normative – friends	0.03	0.07	0.26	1.04	0.91	1.18
Diff Assoc – normative – family	0.05	0.07	0.55	1.05	0.92	1.21
Diff Assoc – non-compliance beh friend	-0.12	0.16	0.64	0.88	0.65	1.20
Diff Assoc – non-compliance beh family	0.17	0.16	1.19	1.19	0.87	1.61
Imitation – friend	0.05	0.12	0.19	1.05	0.84	1.32
Imitation – family	0.04	0.11	0.10	1.04	0.83	1.29
Imitation – partner	0.01	0.13	0.01	1.01	0.79	1.31
Imitation – other drivers	0.04	0.10	0.15	1.04	0.86	1.25
Anticipated rewards	0.02	0.09	0.06	1.02	0.86	1.21
Anticipated punishments	0.04	0.03	1.45	1.04	0.98	1.11
Psychosocial factors – DD						
Personal definitions	0.06	0.02	9.65**	1.06	1.02	1.11
Diff Assoc – normative – friends	0.12	0.09	1.66	1.13	0.94	1.36
Diff Assoc – normative – family	-0.12	0.11	1.21	0.89	0.72	1.10
Diff Assoc – non-compliance beh friend	-0.02	0.12	0.03	0.98	0.78	1.23
Diff Assoc – non-compliance beh family	0.05	0.12	0.21	1.05	0.84	1.33
Imitation – friend	-0.02	0.11	0.06	0.98	0.79	1.20
Imitation – family	-0.05	0.11	0.21	0.95	0.76	1.18
Imitation – partner	-0.02	0.13	0.02	0.98	0.76	1.26
Imitation – other drivers	0.06	0.09	0.48	1.07	0.89	1.28
Anticipated rewards	0.12	0.11	1.19	1.13	0.91	1.39
Anticipated punishments	-0.03	0.03	0.78	0.97	0.91	1.04
Constant	-10.59	2.22	22.83	0.00		

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

4.9 Chapter summary

This chapter has presented a quantitative examination of a broad range of factors contributing to self-reported frequency of speeding and self-reported frequency of drink driving. Included within the theoretical framework were psychological, legal, and social factors associated with these two behaviours. The aim of the research was to determine the relationship between the two behaviours and whether there were any similarities or differences in the factors that contribute to a driver's decision to engage in either speeding or drink driving.

The chapter has examined both the bivariate relationship between the theoretical constructs and the behaviours under review. Further, it has also documented a series of regression analyses investigating the factors that predict self-reported speeding, self-reported drink driving, and those who are willing to engage in both behaviours. In relation to self-reported speeding, three separate multiple regressions were undertaken to look at the predictors associated with speeding up to 10 kilometres per hour, speeding 10 kilometres per hour or more, and for a measure of global self-reported frequency of speeding. A full discussion of these results will follow in Chapter Five.

Chapter Five: Discussion

5.1 Introduction

The findings discussed in this thesis represent a comprehensive examination of the wide range of factors that may influence a driver's decision to exceed the posted speed limit and to drive while over the legal BAC limit in Queensland. This section provides a review of the findings and the level of support for the individual hypotheses and research questions.

5.2 Support for hypotheses

This section presents the research hypotheses outlined in section 2.9. The discussion focuses on the level of support found for each hypothesis and the implications for the research questions.

$H_{1:}$ *There will be a significant positive association between self-reported speeding and self-reported drink driving.*

This hypothesis received qualified support. There was a significant, yet weak, positive association observed between self-reported speeding and self-reported drink driving. This result suggests that as the participant's frequency of exceeding the posted speed limit increases, so does their frequency of driving when they may be over the legal BAC limit for their licence type. The weak correlation between these two behaviours suggests that there are only a relatively small proportion of drivers who are willing to engage in both speeding and drink driving behaviour. It is possible for these individuals that high risk or illegal behaviours occur in 'clusters'; that is, if a driver is prepared to engage in one high risk behaviour then they are willing to engage in other high risk behaviours. However, for the majority of drivers,

their speeding and drink driving behaviour does not appear to be strongly related, suggesting that they are two separate behaviours.

It was also noted that the correlation observed in the current investigation (r_s = .23, p < .001) was stronger than that recorded by Shinar, Schectman, and Compton (2001) (r_s = .14, p <.001). However, it is possible that this could be due to differences in the operationalisation of the dependent variables in each of the studies. For instance, the questions asked in the current investigation were designed to capture explicitly illegal speeding and drink driving behaviour, whereas the questions posed by Shinar and colleagues (2001) asked participants to respond to driving behaviours that are arguably less deviant e.g., how often do you drive at or below the speed limit?; and, if you ever drink alcoholic beverages, how often do you drive after drinking? While the correlation between these two behaviours represents an interesting way to characterise the behaviours, this result is perhaps better understood by looking at the behaviours at an individual level, see H_2.and H_3 below.

H_{2a}: *Participants who report engaging in drink driving behaviour, will be more likely to report exceeding the speed limit by 10 kilometres per hour or more.*

H_{2b}: *Participants who report engaging in drink driving behaviour, will be more likely to report exceeding the speed limit by up to 10 kilometres per hour and 10 kilometres per hour or more above the limit.*

H_3: *Participants who report frequently exceeding the speed limit by ten kilometres per hour or more will also report more frequent drink driving behaviour than those who only report exceeding the speed limit by up to ten kilometres per hour.*

The results provided support for this group of hypotheses. In relation to H_{2a} and H_{2b} it was found that the drink drivers were more likely to report engaging in high-level speeding (i.e. more than 10 kilometres per hour or more over the speed limit), as well as more frequent speeding at both low and high levels, than the non-drink drivers. It was also found that those who reported engaging in more high level speeding (i.e., 10 kilometres or more per hour), were more likely to report drink driving than those who reported exceeding the posted speed limit at lower levels (i.e., up to 10 kilometres per hour over the posted speed limit). It should be noted that no conclusions can be drawn regarding whether the behaviours occurred at the same time. However, these findings suggest that Drink drivers could generally be considered to display more deviant driving behaviour than Non-drink drivers.

$H_{4:}$ There will be higher levels of compliance with regulatory limits set for drink driving than for regulatory limits set for speeding.

Comparisons of the frequency of engaging in non-compliant drink driving and speeding behaviour provided support for this hypothesis. It was found that participants reported more frequently exceeding the speed limit by both 'up to 10 kilometres per hour' (M = 4.22, SD = 1.68), and by '10 kilometres or more per hour' (M = 2.49, SD = 1.57) (and hence also for the global speeding measure; M = 3.36, SD = 1.46), than driving while over the legal BAC limit for their licence type (M = 1.6, SD = 1.31) (see Table 4.7). These differences were also demonstrated in the distribution of responses to the questions regarding the frequency of engaging in speeding or drink driving behaviour. For instance, responses to the drink driving variable was highly skewed, demonstrating that the majority of the sample did not engage in drink driving behaviour; whereas the responses to the speeding variable

were more evenly spread across the non-compliance low and non-compliance high speeding questions (see section 4.4). It was also noted that there was a strong correlation between non-compliance low and non-compliance high constructs (r = .60, $p < .001$), suggesting that the more frequently an individual speeds up to 10 kilometre per hour over the posted speed limit, the more likely they are to exceed the posted speed limit by 10 kilometres per hour or more. This again highlights that there appears to be an underlying continuum of deviance.

$H_{5:}$ *There will be a stronger positive association between self-reported speeding and Type-A behaviour pattern, than the association observed between self-reported drink driving and Type-A behaviour pattern.*

The results provided qualified support for this hypothesis. A weaker positive association was found between Type-A behaviour pattern and self-reported drink driving (r_s = .13, $p < .01$) than that observed between Type-A behaviour pattern and the global self-reported speeding measure (r = .15, $p < .01$). However, in real terms the difference between the two correlations is marginal.

The weak association observed between self-reported drink driving and Type-A behaviour pattern was expected as the evidence relating to the link between drink driving, alcohol consumption, and TABP is mixed (Nabi et al., 2005; Perry & Baldwin, 2000). While support was found for this hypothesis overall, the strength of the relationship of Type-A behaviour pattern and self-reported speeding was not as strong as previous research would suggest. For instance, the Pearson product-moment correlation coefficient between self-reported speed and the Bortner Type-A Behaviour pattern has been reported to range from .24 (Tay et al., 2002) and .27 (West et al., 1993). It is important to note that this result should be interpreted with

caution as the reliability statistic for this scale was poor (see section 4.2 for further information).

$H_{6:}$ *There will be a strong positive association between self-reported drink driving behaviour and scores on the AUDIT, but a weak positive association between self-reported speeding and scores on the AUDIT.*

The results from this study provided support for this hypothesis. Specifically, there was a strong positive association between drink driving and the AUDIT scale ($r_s = .33$, $p < .001$) adding further support for the wealth of research outlining the link between the these items (Bergman et al., 2000; Wells-Parker et al., 2000; Wells-Parker et al., 1998). As a comparison, research among recidivist drink drivers has demonstrated that approximately 48 percent (Freeman, Liossis, Schonfeld, Sheehan et al., 2005), 70 percent (Bergman et al., 2000), and 80 percent (Conley, 2001) were classified as being alcohol dependent. It was interesting to note that approximately 27 percent of drivers in the current investigation were classified as being alcohol. In the case of self-reported speeding, there was a weak positive association between the global self-reported speeding measure and alcohol misuse ($r = .17, p < .001$).

$H_{7:}$ *There will be a significant positive association between sensation seeking and both self-reported speeding and self-reported drink driving.*

This hypothesis was supported with both self-reported speeding ($r = .33, p < .001$) and self-reported drinking driving ($r_s = .2, p < .001$) recording a significant positive association with the Zuckerman-Kuhlman Impulsivity Sensation Seeking Scale. These findings are similar to previous research which has recorded correlations ranging from .23 to .40 across measures of speeding and drink driving

(Jonah, 1997; Tay et al., 2002). Further, Jonah et al. (2001) noted that those who score high on measures of sensation seeking were more likely to say that they drove 120 kilometres per hour or more on a highway, drive when they thought they were over the legal BAC limit, and that they could drink five or more drinks before their driving ability was impaired. It is interesting to note that the correlation between sensation seeking and all the self-reported speeding measures was stronger than that observed between sensation seeking and drink driving.

$H_{8:}$ *Both self-reported speeding and self-reported drink driving behaviour will be positively associated with holding favourable definitions toward each of the behaviours.*

The results provided support for this hypothesis. There was a positive association found for self-reported speeding (r = .46) and self-reported drink driving (r_s = .34) and holding favourable definitions toward each of the behaviours. This is in line with previous research demonstrating the link between definitions (i.e., attitude or orientation) and driving behaviours such as speeding and drink driving (Beck, 1981; Bingham et al., 2007; Blincoe et al., 2006; Fernandes et al., 2004; Fleiter & Watson, 2006; Harrison et al., 1998). It was interesting to note that there was a stronger association observed between all three self-reported speeding measures and personal definitions, than that observed for self-reported drink driving. Upon closer inspection of the relationship between this construct and the speeding dependent variables, it was noted that the association differed based on the level of deviant speeding. For instance, the relationship was stronger for the non-compliance low, i.e., up to 10 kilometres per hour over the posted speed limit (r = .45) and the global frequency of speeding variables (r = .46), than the non-compliance high

variable, i.e., 10 kilometres or more per hour over the posted speed limit (r = .37). It is possible that this finding is related to the existence of a 'speed paradox' reported by Fleiter and Watson (2006). Specifically, they found that while 66 percent of participants in their study agreed that exceeding the speed limit was not worth the risks associated with the behaviour, 58 percent also reported a preference to exceed the speed limit in a 100 kilometre per hour zone. This demonstrates that there appears to be a is a considerable amount of variability when it comes to drivers attitude toward exceeding the posted speed limit at different levels, i.e., up to 10 kilometres per hour and 10 kilometres per hour or more.

H_9: *Both self-reported speeding and drink driving behaviours will be positively associated with having friends and family who engage in each of the behaviours respectively.*

The research findings provided support for this hypothesis. This hypothesis was answered by reviewing the findings from two different constructs within the questionnaire. Firstly, the construct of indirect exposure to punishment, asked participants about how many of their family or friends had either received a speeding ticket or been convicted of drink driving. It was found that there was a significant positive association between self-reported drink driving and friends and family who had been convicted of drink driving. Similarly, on this construct, a significant positive association was found between self-reported speeding and having family or friends who had received a speeding ticket.

The second construct relates to the behavioural dimension of differential association, which asked participants to rate how often family or friends drive over the posted speed limit, and drive while over the legal BAC limit for their licence

type. As stated above, this construct provided support for self-reported drink driving with significant positive associations observed for friends, and family. This result indicates that participants who have family and friends who drive more frequently while they may be over the legal BAC limit were more likely to engage in drink driving themself. In the case of speeding for this construct, a moderate positive association was found between the global self-reported speeding measure and having friends or family who drove more frequently over the posted speed limit; providing support for hypothesis five.

$H_{10:}$ *Both self-reported speeding and drink driving behaviour will be positively associated with having friends and family who hold favourable definitions toward each of the behaviours.*

This hypothesis was supported. Moderate positive associations were found between the normative dimension of differential association and self-reported drink driving and self-reported speeding. This result reflects previous research that has reported that an individual is more likely to engage in a behaviour when they associate with 'significant others' who hold a favourable attitude toward the behaviour (Bingham et al., 2007; Fleiter et al., 2010; Fleiter et al., 2006).

H_{11}: A model encompassing psychological and social factors will better predict self-reported speeding behaviour than sociodemographic and legal factors alone.

This hypothesis was supported. It was observed that the model encompassing psychological, social, sociodemographic, and legal factors accounted for more variance in self-reported speeding than sociodemographic and legal factors alone. The hierarchical regression results reported in section 4.8.1 indicate that there were a number of variables that were significantly associated with self-reported speeding. For instance, the results suggest that self-reported speeding is more strongly associated with younger drivers and that a combination of psychological, legal, and social factors influence speeding behaviour.

Specifically, among the legal factors, it was interesting to note that both direct experiences of punishment and punishment avoidance were associated with an increase in self-reported speeding behaviour. The result relating to experiences of punishment is contrary to the tenets of classical deterrence theory, however is similar to findings reported by Fleiter and Watson (2006). One possible explanation relates to what Piquero and Pogarsky (2002) refer to as the 'emboldening' effect of punishment. In their view, there are a number of ways to understand these results. For instance, they suggest that this outcome could be considered from the perspective of a 'self-serving' bias. As such, the individual engages in biased decision making that leads them to believe that they are above average in their driving ability, and ultimately more skilled at avoiding detection. Another way to interpret the positive relationship between prior punishment and speeding behaviour is that for some people the punishment associated with speeding which they eventually experience is less than what they had originally anticipated. As such, the experience of punishment only serves to 'embolden' them (Piquero & Pogarsky, 2002). Indeed,

research has suggested that those who speed regularly, and/or by large amounts, come to view legal punishments as an inconvenience, rather than a deterrent. Hence, the nexus between legal punishment and behaviour appears to be quite complex.

A second possible explanation for this relationship could be that occasional episodes of apprehension and punishment may not act as an effective deterrent when the experience of punishment avoidance is high (Fleiter & Watson, 2006; Stafford & Warr, 1993). Previous research has demonstrated the link between certainty of apprehension and the perceived likelihood of being detected and reduced speeding behaviour (Hatfield & Job, 2006; Stafford & Warr, 1993; Watson et al., 1996). However, the influence of punishment avoidance on the certainty of punishment may lead drivers to believe that they are immune from apprehension and punishment, even though they may have experienced them on occasion.

Together, the results suggest that many of the drivers in this sample have not been sufficiently deterred in a manner which is consistent with the fundamental principles of deterrence. It has been argued that speed countermeasures such as speed cameras are only effective for those who are detected by them or know of others who have been detected (Australian Transport Council, 2005). However it is difficult to convince drivers that there is a high probability of detection when the experience of punishment avoidance is high. This could largely occur because the opportunity to speed occurs every time one drives, and speed choice is not only dependent upon personal or social factors, but may also be influenced by situational factors. It appears under these conditions that there is a greater likelihood of illegal behaviours unless the driver is constantly vigilant. This perceived lack of being detected is particularly concerning when authorities rely on increasing sanctions and penalties to increase compliance with the posted speed limit. Hatfield and Job

(2006) have argued that the value of sanctions and penalties is dramatically reduced when drivers underestimate their chances of being caught. Thus, it could be argued that deterrence fails due to insufficient enforcement, weak penalties, and a high experience of punishment avoidance.

In relation to the psychological factors, it was found that sensation seeking was a significant predictor of self-reported speeding. Not surprisingly given the wealth of research linking sensation seeking with faster driving speeds (Fleiter et al., 2006; Jonah, 1997; Jonah et al., 2001; Palamara & Stevenson, 2003; Whissell & Bigelow, 2003), this study found that those who reported engaging in higher levels of self-reported speeding were more likely to have higher scores on the Zukerman-Kuhlman Impulsivity Sensation Seeking Scale.

Among the social learning factors measured in relation to self-reported speeding, this research found similar factors to be significantly associated with speeding as those reported in the published research on the subject. For example, holding more a favourable *definition* toward speeding was found to be associated with increased levels of speeding behaviour. This result is supported by previous research (Lawpoolsri et al., 2007; Manderson et al., 2004; Tay et al., 2002).

It was also found that both the normative and behavioural dimensions of differential association were associated with self-reported speeding. However, it was noted for the normative dimension that participants reported speeding less frequently when friends held more favourable personal definitions toward speeding. This finding is contrary to the expected relationship between speeding and favourable personal definitions of family and friends toward speeding (e.g., Fleiter et al., 2006). As identified in section 4.8.1, the change of sign found in the beta weight for this variable suggested that negative suppression was present within the regression

model. It was also noted in this section that there has been considerable debate regarding the definition, identification, and interpretation of suppression effects (Conger, 1974; Maasen & Bakker, 2001; Tzelgov & Henik, 1991). However, in an attempt to understand the processes underlying this effect, a series of exploratory regression analyses were undertaken and found that personal definitions, the behavioural dimensions of differential association, and anticipated punishments were acting to suppress the influence of the normative dimension of differential association on the speeding dependent variable. When taken together, these findings suggest that this group of variables are tapping an underlying orientation of the individual and their associates toward speeding.

Another possible explanation for the result is the difference between attitude and behaviour. For instance, it is common for drivers to agree with statements suggesting that drivers should comply with the posted speed limit, but then self-report engaging in the behaviour; Fleiter and Watson (2006) refer to this as the 'speed paradox'. As such, it was found on the behavioural dimension that the frequency of speeding was positively associated with the participant's perception that their family and friends engaged in speeding. When taken together, the direction of the results for the normative and behavioural dimensions of differential association, suggest that there is a complex relationship occurring between these constructs and the dependent variable. It was also noted that the frequency of self-reported speeding behaviour was reduced when the participant perceived a higher level of punishments arising out of speeding behaviour. It should be noted this construct measured legal, social, and non-social punishments.

H_{12}: A model encompassing psychological and social factors will better predict self-reported drink driving behaviour than sociodemographic and legal factors alone.

This hypothesis was supported. It was observed that there was a stronger association for the model encompassing psychological, social, sociodemographic, and legal factors than sociodemographic and legal factors alone. The sequential logistic regression results reported in section 4.8.2 indicate that there were a number of variables that were significantly associated with self-reported drink driving behaviour. For instance, the results suggest that self-reported drink driving was strongly associated with a combination of psychological, legal, and social factors.

For instance, among the legal factors, only direct punishment avoidance and indirect experience of punishment of family members' significantly predicted self-reported drink driving behaviour. The salience of direct punishment avoidance has been demonstrated in other research, with Freeman and Watson (2006) reporting that this construct exerted the greatest influence on self-reported drink driving behaviour. Furthermore, Piquero and Pogarsky (2002) found that personal and vicarious punishment avoidance experiences were positively related to offending behaviour. However, the finding that the participant's indirect exposure to punishment was a significant, positive predictor of self-reported drink driving would again appear contrary to the tenets of classical deterrence theory. As explained in the previous section, similar findings have been reported for personal punishment experiences by Piquero and Pogarsky (2002) and Fleiter and Watson (2006).

Thus, the finding from this study that indirect experiences of punishment through a family member being convicted of drink driving is predictive of self-reported drink driving behaviour is perhaps related to research suggesting that

punishment experiences appear to encourage rather than discourage offending behaviour (Piquero & Pogarsky, 2002). Alternatively, the finding relating to the influence of indirect experiences of punishment may more meaningfully be interpreted from a social learning perspective than through deterrence theory. For example, from a social learning perspective, higher exposure to vicarious punishment would be consistent with associating with others who engage in speeding. Hence, this variable has a strong overlap with the behavioural dimension of differential association. Interpreted from this perspective it would not be surprising that individuals who report drink driving are more likely to associate with others who engage in the behaviour and who have thus been detected and punished for the behaviour in the past. This explanation is also consistent with the finding that the behavioural dimension of differential association was not a significant predictor of drink driving. It is possible that the variance that would otherwise be explained by this variable was better captured by the vicarious exposure to punishment variable, thereby masking the influence of the behavioural dimension of differential association.

In relation to the psychological factors measured in this study, the Type-A behaviour pattern and alcohol misuse were found to significantly predict self-reported drink driving behaviour. It was not surprising that higher levels of alcohol misuse, as measured by the AUDIT scale, were associated with an 11 percent increase in the likelihood of falling into the *'Non-compliant'* drink driving group. In particular, research has demonstrated the link between alcohol consumption and impulsive and risky driving (Fillmore et al., 2008) and the role of alcohol dependence and alcohol misuse in collision risk (Mann et al., 2010).

As outlined in section 2.5.1, the relationship between Type-A behaviour pattern and drink driving has received mixed support. It was found among this cohort of drivers, TABP was shown to increase the likelihood that the participant had driven when they may have been over the legal BAC limit for their licence type. However, given the internal reliability issues documented, this result should be interpreted with caution.

Interestingly, among the social learning factors found to be predictive of drink driving behaviour, only personal definitions and the normative dimension of differential association were significant. In looking more closely at the results for the personal definitions constructs, those who held a favourable attitude toward drink driving were seven percent more likely to have driven when they may have been over the legal limit. Further, it was found that having friends who held a favourable view (i.e., normative dimension of differential association) of drink driving behaviour was associated with an 18 percent increase in the likelihood of the participant engaging in this behaviour.

5.3 Implications for the research questions

The main study provided information to assist in addressing the three research questions outlined in section 2.9. The contribution of the results to each question will be discussed separately. The first research question was concerned with assessing the relationship between drivers' self-reported speeding and self-reported drink driving behaviour. It was found that there was a weak association between speeding and drink driving and further exploration of the relationship suggested that those who engage in drink driving behaviour exceed the posted speed limit more frequently both at low levels (i.e., up to 10 kilometres per hour over the posted speed limit) and high levels (i.e., 10 kilometres per hour or more over the posted speed

limit) than those who do not engage in this behaviour. Nonetheless, it was interesting to note that the drink drivers reported more frequent low level speeding (i.e., up to 10 kilometres per hour over the posted speed limit) than high level speeding (i.e., '10 kilometres or more over the posted speed limit').

It can also be argued that the drivers in the current investigation do not interpret the regulatory limits for speeding and drink driving in the same way. This research defined both speeding and drink driving behaviour using a legal definition. The responses to the two dependent variable questions revealed that participants reported a higher frequency of engaging in speeding (both at low and higher levels) than drink driving behaviour. Thus, a greater proportion of drivers reported complying with the legal BAC limits set for their licence type, than those who complied with the posted speed limit.

There are a number of explanations for the differences observed in the self-reported frequency of these two behaviours. For instance, it is possible that a social desirability bias could exist in relation to drink driving. A second possibility relates to the perceived differences in the social acceptability of speeding (see section 2.5.1) and drink driving (see section 2.61.), drivers do not interpret the regulatory limits for each of the behaviours in the same way. Despite the increased rate of injury and crash risk associated with speeding and alcohol, driver's perceive drink driving behaviour to be more deviant than speeding behaviour. A third possibility is that drivers perceive the enforcement of speeding to be less effective than for drink driving, based on their direct and vicarious experiences of punishment and punishment avoidance for the two behaviours. These differences in social acceptability and enforcement were both highlighted in research published by Elliott (1992a) (see section 2.7).

The issues surrounding the perceived enforcement tolerance have been a recurring theme both in the published literature on speeding behaviour, as well as in both the pilot study and the main study. The results of this research have highlighted that a higher proportion of participants are willing to engage in low level speeding (i.e., up to 10 kilometres per hour over the posted speed limit) and that they engage in the behaviour more frequently than higher levels of speeding (i.e., 10 kilometres or more per hour over the posted speed limit) (see Table 4.3). Thus, these results suggest that exceeding the posted speed limit is more widespread than drink driving. However, within the cohort of drivers in this research, those who engaged in more deviant behaviour (i.e., drink driving) were more willing to engage in high-range speeding (i.e., 10 kilometres or more over the posted speed limit). While no conclusion can be made about whether the individual is performing both behaviours at the same time, these results demonstrate that those who are willing to engage in one illegal driving behaviour are more likely to engage in a second illegal driving behaviour.

The second research question sought to examine whether there were similarities between the personal, social, and legal factors influencing self-reported speeding and self-reported drink driving behaviour. Among the sociodemographic factors examined, it was found that younger drivers were significantly more likely to engage in speeding behaviour, whereas none of the sociodemographic factors were found to significantly predict this drink driving behaviour. In relation to the personal factors, sensation seeking was more strongly related to exceeding the posted speed limit than either Type-A behaviour pattern or alcohol misuse; and alcohol misuse was more strongly related to self-reported drink driving than either Type-A behaviour pattern or sensation seeking. This suggests that the individual

characteristics or traits associated with speeding and drink driving behaviour are distinct, providing further evidence that among the general driving population, these behaviours are not always engaged in by the same individuals.

With regard to the social learning theory factors, it was found that there was a positive relationship between the individual holding favourable personal definitions toward both speeding and drink driving behaviour and the extent to which they reported engaging in the two behaviours. It was also observed that at the bivariate level the relationship between speeding, drink driving, and having family and friends who had been punished for exceeding the posted speed limit was positive. This suggests that the behavioural dimension of differential association may be influential for both speeding and drink driving. Similarly, positive associations were observed between self-reported speeding and drink driving behaviour and having family and friends who engage in either speeding or drink driving. This is an interesting finding as it highlights the differences in how experiences of punishment are perceived for different behaviours. Specifically, social learning theory would predict, associating with others who engage in a particular behaviour is positively related to engaging in that behaviour; and indirect experience of punishment for a specific behaviour would be negatively associated with engaging in that behaviour. However, these results suggest that this proposed relationship occurs in relation to speeding, but not in the case of drink driving. Possible reasons for differences observed between speeding and drink driving, could be that individuals who engage in drink driving behaviour may be more deviant in general and are less concerned with being detected and punished or have become more adept at avoiding detection and punishment; or driving while under the influence of alcohol may be part of a general lifestyle whereby it is difficult for the individual to separate these two behaviours.

The third research question relates to the influence of psychological and social factors, over and above legal factors, on self-reported speeding and drink driving behaviour. In relation to self-reported speeding, the regression results demonstrate that self-reported frequency of speeding was influenced by a combination of legal, psychological, and social factors. However, the results do suggest that the current regime of deterrence based enforcement practices need to be strengthened in order to sufficiently deter drivers from speeding. For example, drivers who had a low perceived risk of apprehension and perceived certainty, severity, and swiftness of punishment (see Table 4.13); and when coupled with a high level of punishment avoidance, it arguably reinforces the driver's perception that they are immune from detection and punishment. An important aspect of these findings is the social environment in which behaviour occurs, and for this group of drivers their own definitions toward speeding and those held by their family were an important source of normative behaviour. As would be predicted by social learning theory, greater anticipated social sanctions or punishments for speeding decreased the self-reported frequency of speeding. Thus, it could be argued that while the principles underpinning the current deterrence based speed management practices are sound, they are not being sufficiently operationalised to deter the majority of drivers from exceeding the speed limit, particularly in the 'up to 10 kilometres per hour' above the speed limit range.

In relation to self-reported drink driving, the regression results demonstrate that drink driving behaviour is also influenced by a combination of legal, psychological, and social factors. For instance, among the legal factors, experiences of direct punishment avoidance and indirect experiences of punishment increased the likelihood that the individual had driven when they may have been over the legal

BAC limit for their licence type. It appears that having family members who had been convicted of drink driving, coupled with high levels of punishment avoidance serve to encourage the behaviour. In relation to the social factors, the individual's personal definitions were important in explaining their frequency of engaging in drink driving behaviour and the perceived social rewards.

These results demonstrate that the constructs of differential association and differential reinforcement contained with social learning theory play a vital role in explaining how personal definitions toward a specific behaviour are acquired and reinforced for the individual. It could also be argued that while the current regime of RBT is effective in deterring most drivers from engaging in drink driving behaviour, that further enhancements could be made to RBT practices to decrease experiences of punishment avoidance and increase the number of direct and indirect punishment experiences.

While not explicitly expressed as a hypothesis, an exploratory regression analysis was conducted to determine which combination of person, legal, and social factors predicted those who were willing to engage in both speeding and drink driving behaviour. The identification of participants who engage in both speeding and drink driving behaviour arguably differentiates those who are willing to engage in higher levels of deviant driving behaviour. The regression model entered all the relevant speeding and drink driving constructs and found that direct punishment avoidance of speeding and drink driving, as well as personal definitions toward both behaviours significantly predicted engaging in the two behaviours. However, it was interesting to note that while experiencing higher levels of punishment avoidance toward drink driving was more likely to increase the behaviour, the opposite relationship was found for experiences of punishment avoidance for speeding. It is

unclear why this relationship would exist, however the process by which participants were classified does not imply that participants were engaging in both behaviours at the same time. As such, it is difficult to determine the degree to which the behaviours occur together, and therefore how the experience of punishment for the individual behaviours may interact when the criterion variable is a combination of speeding and drink driving behaviour.

While it can be seen from the results discussed above that the lack of punishment for a particular behaviour is important, the findings relating to the role of personal definitions was not surprising. Personal definitions encompass concepts relating to the individuals attitudes, rationalisations, moral beliefs, and orientations toward a specific behaviour that are developed through processes relating to differential reinforcement and imitation of exemplars. Thus, this construct could be likened to a higher order construct that encapsulates a broad range of beliefs and arguably reinforces the apparent overlap between high-risk behaviour like speeding and drink driving.

In terms of how to deter drivers from engaging in speeding and drink driving behaviour, the results highlight important differences between the behaviours. For example, it appears that for participants it was direct experiences of punishment and punishment avoidance that were more salient in the individual's decision to exceed the posted speed limit; whereas in the case of drink driving it was a combination of direct experience of punishment avoidance and indirect punishment. It was also found that participants perceived there to be higher levels of enforcement targeting speeding than drink driving (see Table 4.11). Consequently, a possible explanation for this finding is that drivers believe that there are higher levels of enforcement targeting speeding behaviour; therefore drivers have higher levels of personal

experience with punishment and punishment avoidance for speeding. In contrast, drivers do not perceive that there is the same level of enforcement, e.g., RBT, aimed at catching drink drivers. As such, it is possible that some participants have driven while they believe they may be over the legal BAC limit for their licence type and not been detected (i.e., experienced instances of punishment avoidance). It is also possible that some of their family and friends may have also avoided being detected for drink driving behaviour (i.e., vicarious punishment avoidance).

While the mechanisms may be slightly different, it appears that a higher level of enforcement targeting speeding and drink driving behaviour may help to reduce both personal and vicarious levels of punishment avoidance experienced by drivers. However, it is essential that this enforcement is conducted in a rigorous manner and is as unavoidable as possible (as suggested by Homel, 1988) to reduce the likelihood of punishment avoidance. This would increase the number of times drivers are detected for each behaviour and strengthen the relationship between the performance of the behaviour and being punished for the behaviour; thereby suggesting to drivers that they are not immune from punishment or that instances of punishment are not due to being 'unlucky'.

Another difference observed between the behaviours is in relation to the ratio of the perceived social sanctions and/or legal punishments versus the social rewards associated with speeding and drink driving behaviour. It was observed that in the case of speeding that the lack of social punishments was predictive of the participant's decision to exceed the posted speed limit; whereas neither of these constructs was predictive of drink driving behaviour. In the case of speeding, the role of social punishments are a salient issue in deciding to exceed the posted speed limit or not, therefore if the individual perceives that there will be no social

ramifications associated with their behaviour then they are willing to engage in this behaviour. This demonstrates that any future work relating to interventions or countermeasures for speeding will need to increase the perceived unacceptability of speeding in order to promote compliance among the driving community.

This research also demonstrated the importance of the personal definitions of the individual and their associates in relation to speeding. This illustrates that further work needs to be done in terms of changing the attitude of drivers toward speeding, in particular this was highlighted earlier in relation to the findings relevant to research question one, which examined the relationship between speeding and drink driving. A much higher proportion of the sample was willing to engage in speeding behaviour, than those who were willing to engage in drink driving. In this regard, there appears to be a complex relationship between behaviour and attitude, whereby if a person engages in a behaviour they will hold a favourable attitude to the behaviour; and if they hold a favourable attitude to the behaviour they are more likely to engage in the behaviour (Elliott, 1992a; Stradling et al., 2003) .

It was noted that the behavioural dimension of differential association was not found to significantly predict self-reported drink driving behaviour. This construct has been discussed in the literature as being a central component of social learning theory and an important predictor of illegal behaviours (DiBlasio, 1988; Fleiter et al., 2006; Haglund & Aberg, 2000; Watson, 2004a). It makes intuitive sense that an individual is more likely to engage in a specific behaviour when they associate with those who hold favourable definitions toward the behaviour and engage in that behaviour (see section 3.5.2 for further information). Therefore, while the personal definitions (i.e., attitudes) of the participant's friends toward drink driving was predictive of their behaviour; the behaviour of their friends was not. However, it is

possible that the influence of this variable was masked by the influence of the vicarious exposure to punishment variable. As noted in the discussion of the findings relating to H_{12}, exposure to others who had been punished for drink driving (i.e., vicarious punishment) was a significant, positive predictor of self reported drink driving. Hence, it is possible that many of the associates of the drink drivers in this sample had previously been detected, thus capturing much of the variance in the model that would have been otherwise explained by the behavioural dimensions of differential association.

5.4 Strengths and limitations of the study

In order to aid the interpretation of results, it is important to acknowledge the strengths and limitations of this research. In compiling the literature review relating to speeding and drink driving, there were no studies that specifically compared these two behaviours utilising a comprehensive framework encompassing both criminological and psychosocial factors. Hence, one of the key strengths of this research is the use of expanded deterrence theory, social learning theory, and additional psychological constructs to examine both speeding and drink driving behaviour. It is important to note that the purpose of the research was not to examine the general utility of these theories to explore speeding and drink driving; thus, it is acknowledged that other theories may individually have greater utility to explain both of these behaviours. For instance, among the social cognitive theories, both the theory of planned behaviour and theory of reasoned action have been widely utilised to explore both speeding and drink driving behaviour. However, in this first study to compare these two high risk behaviours, it was decided to utilise social learning theory which not only takes into account the individual and their associates, but also

the reinforcers and punishers, both social and non-social i.e., penalties and sanction, associated with engaging in a specific behaviour.

Furthermore, participants were asked to respond to questions regarding both speeding and drink driving, therefore it was possible to review the relationship between these two behaviours at an individual level. Nonetheless, this study features limitations which should be kept in mind when interpreting the results.

It should be noted that among this cohort of drivers there was a higher percentage of females and younger drivers than that observed in the general driving population (see section 4.3.2). Further, in terms of the level of deviance observed amongst participants in relation to self-reported speeding and drink driving behaviour, it was reported in section 4.5 that a higher percentage of participants admitted to exceeding the posted speed limit than engaging in drink driving behaviour. It is possible that participants may perceive there to be less social stigma associated with speeding than for drink driving, i.e., social desirability bias; or that a large proportion of this cohort did not engage in drink driving behaviour. Prevalence figures for drink driving provide some indication of how similar the sample is to the general driving population. For instance, RBT figures suggest that approximately one percent of drivers are caught for drink driving (Department of Transport and Main Roads, 2010b); whereas other studies have indicated that approximately 40 percent of their sample had reported engaging in drinking and driving behaviour (Watson & Freeman, 2007); see section 2.3.2 for further information.

Another possible explanation of the differences observed between speeding and drink driving could relate to the way the dependent variables were operationalised. For instance, in relation to speeding, it was noted in the pilot study that “unplanned speeding occurred every time they were in the car”. This raises the

issue of unplanned versus purposive speeding behaviour. Furthermore, while the influence of situational factors was outside the scope of this research, it is acknowledged that the reasons for speeding are often attributed by some individuals to situational influences impacting on their decision at the time the illegal action, (i.e., exceeding the posted speed limit) occurred. It would also be interesting to conduct a similar investigation of drink driving behaviour, to differentiate between deliberate and non-intentional instances of drink driving.

It is also acknowledged that while the structure of the response scales used for the dependent measures was based on previous research which included both the number of points utilised on the Likert scale and labelling of 'anchor' points on the scale. It is possible that the psychometric properties of the questionnaire could have been improved by developing a response scale where all intervals were labelled. For instance, on the Likert scale of one equals "never" and seven equates to "most occasions", there could have been some variability in how the numbers two to six were interpreted. Participants could circle the number two, which could have been interpreted as a frequency which is 'more' than "never" or could indicate that they had engaged in drink driving on two separate occasions. Also without labels applied to each number along the Likert scale, it is uncertain whether participants interpreted the intervals in a similar manner. It is recommended that future research is conducted to explore this issue further to determine whether it improves both the reliability and validity of the dependent variables.

Another recognised limitation of questionnaire research is the reliance on self-report data and participants accurately recalling information. As such, it is possible that the participant's actual behaviour may be under- or over-reported. In an attempt to limit the effect of this issue, the dependent variable questions were limited to the

"past six months". It is acknowledged that the selection of this time period may have been inappropriate for the speeding dependent variable given that for many drivers this is a behaviour that is undertaken on a regular basis, therefore to ask them to characterise their speeding behaviour for the past six months could be problematic. However, in order to increase the comparability of drink driving with speeding, it was decided to keep the 'unit of measurement' the same across the behaviours. As this was the first direct comparison of speeding and drink driving behaviour, it is suggested that further work be conducted to develop dependent variables that address these concerns regarding memory effects.

In addition, it should also be noted that the imitation construct contained within social learning theory required participants to recall information from when they first started driving about influential exemplars. This is potentially a complicated notion to conceptualise and report accurately. Further, the average length of time participants had held their licence was approximately 12 years, with the highest response being 47 years; thus it may be difficult for these participants to recall this information. Despite this limitation, these questions provide some insight into who the participant believes has been influential in providing examples of speeding and drink driving behaviour.

5.5 Implications for road safety

This program of research suggests that speeding behaviour is more prevalent than drink driving among the driving population. Importantly, it has also confirmed that those who engage in drink driving behaviour engage in more frequent high-range speeding behaviour. The current research found that approximately one-quarter of drivers were prepared to engage in higher levels of deviant behaviour. It was also apparent from the regression analyses undertaken that that the current

regime of deterrence based enforcement practices are not sufficient to influence an individual's decision to engage in speeding and/or drink driving behaviour. In particular, higher levels of enforcement targeting each of the behaviours are required to increase the driver's perceived likelihood of apprehension and punishment.

It has been argued by other researchers (Elliott, 2008; Harrison, 1998) that deterrence theory has limited application in changing illegal behaviours due to the inherently complex nature of human behaviour. However, it is the proposition of this research that while the deterrence principles underpinning drink driving and speed enforcement may be sound, the current regime of enforcement activities and penalties has not been sufficient to change driver behaviour, particularly in relation to speeding. In relation to penalties, it was found that among this cohort of drivers that they rated perceived severity of punishment associated with speeding higher than they did for drink driving. This seems counter-intuitive given that drink driving is more likely to result in licence loss. However, when taken in context of the sample only 21 participants had been convicted of drink driving; hence the experience of the sanction was limited across the group. In contrast, 60% (n = 324) of the sample had received a speeding ticket. Therefore, this construct measures the participants' views of the severity of punishment associated with speeding and drink driving and not the objective difference between receiving a speeding fine and losing one's licence.

More particularly, it has been argued that changes made to increase the perceived likelihood of being detected, and decrease the chances of avoiding detection, would have a flow-on effect on changing behaviour via social learning principles. For example, each driver would know more people who have been detected for both speeding and drink driving and have less experience in avoiding detection (i.e., differential association); this would have an influence on the personal

definitions (e.g., attitudes or orientation toward speeding and drink driving) of the individual and their associates; which in turn would determine the ratio of social rewards and punishments for each behaviour (i.e., differential reinforcement) if current enforcement strategies could be enhanced. Thus, it is the contention of this research that the current regime of enforcement practices need to be further examined to identify those which appear to encourage less compliance with speed limit up to 10 kilometres per hour over the posted speed limit, i.e., perceived enforcement tolerances. It could be argued that due to the pervasive nature of speeding, that a staged approach is required to first change the individuals personal definitions toward lower levels of speeding, which in turn will provide the platform to change behaviours toward higher levels of speeding.

Another implication of this research is that there is a need to increase the perceived unacceptability of speeding to promote compliance by changing driver attitudes (i.e., personal definitions) toward the behaviour. For instance, the role of social sanctions and punishments was highlighted as a predictive factor of self-reported speeding. In addition, the link between favourable personal definitions of the individual, as well as those held by family and friends toward speeding provides further evidence that social sanctions would be an avenue that should be pursued to increase the perceived unacceptability of the behaviour.

While this research has provided further insight into the relationship between speeding and drink driving behaviour, it has not examined the extent to which drivers may engage in both speeding and drink driving at the same time. Thus, it is recommended that future research explore this issue further, as well as the link between self-report data and traffic offence histories. This type of research would provide the opportunity to investigate the relationship of speeding and drink driving

behaviour with other illegal driving behaviours. It would also allow questions to be answered relating to the nexus between those who experience punishment (i.e., sanctions) and subsequent offending behaviour? A final recommendation for future research would be to examine the situational factors that have been shown to influence speeding and drink driving behaviour.

5.6 Concluding comments

As highlighted at the beginning of this research, there appears to be distinct differences in how speeding and drink driving are perceived by the driving community. This was further illustrated by the findings of this research which demonstrated that compliance with the regulatory limits was much higher for drink driving than it was for speeding particularly for low range speeding. Thus, while speed limits are a fundamental component of speed management practices in Australia, compliance varies considerably across the driving population. In addition, the findings relating to deterrence theory suggest that while the principles underpinning the current regime of deterrence based countermeasures may be sound, current enforcement practices do not appear sufficient to adequately deter the large majority of the population from either drink driving or speeding. Therefore, it is suggested that future research should focus on determining the most appropriate method to enhance current enforcement practices in order to increase the perceived likelihood of apprehension and decrease experiences of punishment avoidance.

In terms of future research, it is also important to further examine the degree of overlap between speeding and drink driving behaviour and the common and unique factors that contribute to each. In particular, future work in this area needs to identify ways to enhance speed management practices to increase the deterrent effect of these countermeasures. A high priority in this area will be examining the likely

effect on speeding behaviour of reductions in speed enforcement tolerances. In addition, speeding has shown itself to be a pervasive and persistent behaviour, therefore it would also be useful to examine why road safety authorities have been successful (to some degree) in convincing drivers of the dangers of drink driving, but not those associated with speeding. In conclusion, the challenge for road safety practitioners will be to change driver attitudes (i.e., personal definitions) so that speeding and drink driving are viewed by drivers as equally unacceptable and risky behaviours.

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Appendices

Appendix A:

Semi-structured interview for preliminary study

PARTICIPANT INFORMATION for QUT RESEARCH PROJECT	
"A comparison of the factors contributing to illegal road user behaviours"	
Research Team Contacts	
Chief Investigator:	**Principal Supervisor:**
Kerrie Livingstone, Masters Scholar	Barry Watson, Associate Professor
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Email: k3.livingstone@qut.edu.au	Email: b.watson@qut.edu.au

Description

This project is being undertaken as part of a Masters project for Kerrie Livingstone. The project is funded by the Faculty of Health and the Centre for Accident Research and Road Safety – Queensland (CARRS-Q). The data obtained during this project will be only accessible by the Chief Investigator and Research Team.

The purpose of this project is to compare the factors contributing to the decision to drink and drive, use illicit drugs and drive, and exceed posted speed limits amongst Queensland road users. It is proposed that this study will compare the similarities and differences between these behaviours to determine why road users may engage in any one of these road user behaviours and inform the development of future road safety countermeasures to make Queensland roads safer.

The research team requests your assistance to help the Chief Investigator better understand the personal, social, environmental, and legal factors that are perceived by Queensland road users to contribute to the behaviours of drink driving, illicit drug use and driving, and speeding.

Participation

To participate in this study, you must have a current Queensland drivers licence (Provisional or Open) for any class of vehicle (e.g., car, truck, motorcycle) and drive a vehicle at least once per week. As such, you will need to be at least 17 years of age to participate in this research.

Participation in this project is voluntary. If you do agree to participate, you can withdraw your participation at any time during the interview without comment or penalty. Once the interview has been completed, the researcher will not be able to identify your specific response and therefore it will not be possible to withdraw your specific responses from the overall responses written on the interview form.

Please advise the interviewer if you have a prior connection or relationship with them or any of the investigators listed above. In the event of a prior relationship, you can choose to either withdraw your participation, or arrangements can be made for you to be interviewed by a different interviewer. Your decision to participate will in no way impact upon your current or future relationship with QUT (for example your grades).

Your participation will involve an interview with a QUT researcher and will involve a time commitment of approximately 30 minutes from each participant. The interview will take place either at the time you have been approached or you can provide your first name and a contact telephone number for the researcher to conduct a telephone interview. Name and contact information will be destroyed as soon as follow-up has been initiated. Your participation will be completely anonymous. This method will

ensure anonymity and preclude access by subpoena or court order to information gained under the promise of confidentiality.

To compensate you for the time you have invested in the interview, you will receive one adult movie ticket for Birch Carroll and Coyle.

Expected benefits

It is expected that this project may indirectly benefit you through the development of safer road practices. However, this project may have more of a direct benefit to road safety practitioners and policy makers by providing information to understand and develop road safety interventions for drink driving, illicit drug use and driving, and speeding.

Risks

There are no risks beyond normal day-to-day living associated with your participation in this project. You are instructed to only disclose a level information you are comfortable with providing, and therefore you are in control of your own personal level of disclosure. If at any time during the interview you would like to withdraw your participation you may do so without penalty.

However, if you experience feelings of anxiety or nervousness in relation to anything you have revealed during the interview, QUT provides for limited free counselling for research participants of QUT projects, who may experience some distress as a result of their participation in the research. Should you wish to access this service please contact the Clinic Receptionist of the QUT Psychology Clinic on 3138 4578. Please indicate to the receptionist that you are a research participant.

Confidentiality

All comments and responses are anonymous and will be treated confidentially. The names of individual persons are not required in any of the responses. Informed consent will be gained verbally from you to ensure your anonymity and preclude access by subpoena or court order to information gained under the promise of confidentiality.

Consent to Participate

Due to the nature of the project a verbal consent mechanism will be used.

Questions / further information about the project

Please contact the research team members named above to have any questions answered or if you require further information about the project.

Concerns / complaints regarding the conduct of the project

QUT is committed to researcher integrity and the ethical conduct of research projects. However, if you do have any concerns or complaints about the ethical conduct of the project you may contact the QUT Research Ethics Officer on 3138 2340 or ethicscontact@qut.edu.au. The Research Ethics Officer is not connected with the research project and can facilitate a resolution to your concern in an impartial manner.

Interview Form

A comparison of the factors that contribute to illegal road user behaviours

Date: _____

Location: _____

Gender: Male/Female

Age:_____

Licence Type:
- Open
- P2 Provisional
- P1 Provisional
- Learner
- Probationary
- Restricted

Licence Class:

RE	Motorbike (small)
R	Motorbike (any)
C	Car
LR	Light Rigid
MR	Medium Rigid
HR	Heavy Rigid
HC	Heavy Combination
MC	Multi-combination

How long have you held a licence? *(first one)*_____

On average, how many hours per week would do you drive a motor vehicle?
(Include both private and work use) _____

_____

Highest level of education attained:	Completed	Ongoing
Finished part or all of high school		
Trade or TAFE qualification		
Tertiary qualification e.g. degree or diploma		
Postgraduate tertiary qualification e.g. PhD/Masters		

How important do you think it is to obey road rules? Why?

How would you define drink driving? *Prompt if have not mentioned legal BAC, ask what it is for their license type.*

Do you ever drive a vehicle after drinking alcohol?

- *Times?*
- *How long ago?*
- *Purpose of trips?*
- *Whose vehicle/s?*
- *Passengers? Age?*
- *How does it make you feel?*

Do you ever drive a vehicle after drinking when you believe you may have been over the legal limit of alcohol for your licence type?

- *Times?*
- *How long ago?*
- *Purpose of trips?*
- *Whose vehicle/s?*
- *Passengers? Age?*

Have you ever been caught for drink driving? If yes:

- *How many times?*
- *When?*
- *What were the circumstances?*
- *What does your family think of you being caught?*
- *What do your friends think of you being caught?*

Thinking about your driving over the next six months:

- What kind of situations or circumstances might discourage you from drink driving?
- What kind of things would encourage you to drink drive?

Do you think there is anything wrong with drink driving? Why?

Do you know of many people who drink drive?

What is their relationship to you?

Do your family or friends think there is anything wrong with drink driving? Why?

What would your family and friends think if you were to drink and drive? Why?

How would you define speeding?

Do you ever drive faster than the posted speed limit?

- *Times/frequency?*
- *Purpose of trips or Reason?*
- *Type of road? (e.g. suburban vs. highway)*
- *Whose vehicle/s?*
- *Passengers? Age?*
- *How fast/how much by?*
- *How does it make you feel?*

Have you ever been caught for speeding? If yes:

- *How many times?*
- *When?*
- *What were the circumstances?*
- *What does your family think of you being caught?*
- *What do your friends think of you being caught?*

Thinking about your driving over the next six months:

- What kind of situations or circumstances might discourage you from speeding?
- What kind of things would encourage you to speed?

Do you think there is anything wrong with speeding? Why?

Do you know of many people who speed?

What is their relationship to you?

Do your family or friends think there is anything wrong with speeding? Why?

What would your family and friends think if you were to speed? Why?

What do you know about the penalties for: ***(What are they?)***

- Drink driving?
- Speeding?

On a scale of 1 to 10, with 10 being very likely, how likely it is that anyone would get caught for:

Drink Driving	Unlikely	1 2 3 4 5 6 7 8 9 10	Likely	Don't Know
Speeding	Unlikely	1 2 3 4 5 6 7 8 9 10	Likely	Don't Know

On a scale 1 to 10, with 10 being very certain, how certain do you think it is that anyone would be caught and punished for:

Drink Driving	Uncertain	1 2 3 4 5 6 7 8 9 10	Certain	Don't Know
Speeding	Uncertain	1 2 3 4 5 6 7 8 9 10	Certain	Don't Know

On a scale 1 to 10, with 10 being very severe, how <u>severe</u> do you think the penalties are for:

Drink Driving	Not Severe	1 2 3 4 5 6 7 8 9 10	Severe	Don't Know
Speeding	Not Severe	1 2 3 4 5 6 7 8 9 10	Severe	Don't Know

On a scale 1 to 10, with 10 being very swift, how <u>swift/immediate</u> do you think the penalties are for:

Drink Driving	Not Swift	1 2 3 4 5 6 7 8 9 10	Swift	Don't Know
Speeding	Not Swift	1 2 3 4 5 6 7 8 9 10	Swift	Don't Know

What do you think of the penalties for drink driving, and speeding? *If not covered, prompt for do you think the penalties fit the offence?*

How do you think the Police usually catch drivers who are:

- Drink driving?
- Speeding

Do you know of any ways of avoiding getting caught for:

- Drink driving? If yes, have you or anyone else successfully used any of these strategies?
- Speeding? If yes, have you or anyone else successfully used any of these strategies?

Do you know of any ways to avoid being punished or "getting let off" for:

- Drink driving? If yes, have you or anyone else successfully used any of these strategies?
- Speeding? If yes, have you or anyone else successfully used any of these strategies?

Can you imagine a situation where it might be useful/practical/convenient to:

- Drink drive?
- Speed?

What bad things can happen if you drink drive, or speed? (other than sanctions and penalties)

- Drink drive?
- Speed?

Weighing up all of the outcomes of drink driving, overall do you think there are more good things than bad things? Why?

Weighing up all of the outcomes of speeding, overall do you think there are more good things than bad things? Why?

Appendix B:

Quantitative questionnaire for main study

PARTICIPANT INFORMATION for QUT RESEARCH PROJECT	
"A comparison of the factors contributing to illegal road user behaviours"	
Research Team Contacts	
Chief Investigator:	**Principal Supervisor:**
Kerrie Livingstone, Masters Scholar	Barry Watson, Associate Professor
Phone: 07 3138 4545	Phone: 07 3138 4955
Email: k3.livingstone@qut.edu.au	Email: b.watson@qut.edu.au

Description

This project is being undertaken as part of a Masters project for Kerrie Livingstone. The project is funded by the Faculty of Health and the Centre for Accident Research and Road Safety – Queensland (CARRS-Q). The data obtained during this project will be only accessible by the Chief Investigator and Research Team.

The purpose of this project is to compare the factors contributing to the decision to drink and drive, use illicit drugs and drive, and exceed posted speed limits amongst Queensland road users. It is proposed that this study will compare the similarities and differences between these behaviours to determine why road users may engage in any one of these road user behaviours and inform the development of future road safety countermeasures to make Queensland roads safer.

The research team requests your assistance to help the Chief Investigator better understand the personal, social, environmental, and legal factors that are perceived by Queensland road users to contribute to the behaviours of drink driving, illicit drug use and driving, and speeding.

Participation

To participate in this study, you must have a current Queensland drivers licence (Provisional or Open) for any class of vehicle (e.g., car, truck, motorcycle) and drive a vehicle at least once per week. As such, you will need to be at least 17 years of age to participate in this research.

Your participation will involve completion of a questionnaire. Participation in this project is voluntary and anonymous. If you do agree to participate, you can withdraw your participation prior to returning the completed questionnaire, however once you have submitted the questionnaire it will not be possible for you to withdraw as your specific response will not be identifiable. This method will ensure anonymity and preclude access by subpoena or court order to information gained under the promise of confidentiality.

Please advise the researcher who is collecting completed questionnaires if you have a prior connection or relationship with them or any of the investigators listed above. In the event of a prior relationship, you can choose to either withdraw your participation by not returning the questionnaire; or you can request a reply paid envelope to ensure your individual response cannot be attributed to you when your questionnaire is returned. Your decision to participate will in no way impact upon your current or future relationship with QUT (for example your grades).

Expected benefits

It is expected that this project may indirectly benefit you through the development of safer road practices. However, this project may have more of a direct benefit to road safety practitioners and policy makers to understand and develop road safety interventions for drink driving, illicit drug use and driving, and speeding.

Risks

There are no risks beyond normal day-to-day living associated with your participation in this project. You are also instructed to only disclose a level information you are comfortable with providing, and therefore you are in control your own personal level of disclosure. If at any time during the discussion you would like to withdraw your participation you may do so without penalty.

However, if you experience feelings of anxiety or nervousness in relation to anything you have revealed during the interview, QUT provides for limited free counselling for research participants of QUT projects, who may experience some distress as a result of their participation in the research. Should you wish to access this service please contact the Clinic Receptionist of the QUT Psychology Clinic on 3138 4578. Please indicate to the receptionist that you are a research participant.

Confidentiality

All comments and responses are anonymous and will be treated confidentially. The names of individual persons are not required in any of the responses.

Consent to Participate

The return of the completed questionnaire is accepted as an indication of your consent to participate in this project.

Questions / further information about the project

Please contact the researcher team members named above to have any questions answered or if you require further information about the project.

Concerns / complaints regarding the conduct of the project

QUT is committed to researcher integrity and the ethical conduct of research projects. However, if you do have any concerns or complaints about the conduct of the project you may contact the QUT Research Ethics Officer on 31382340 or ethicscontact@qut.edu.au. The Ethics Officer is not connected with the project and can facilitate a resolution to your concern in an impartial manner.

Questionnaire

A comparison of the factors contributing to illegal road user behaviours

The purpose of this research is to compare the factors contributing to the decision to drink and drive, and exceed posted speed limits amongst Queensland road users.

You will be asked a variety of questions relating to drink driving, and speeding including the type of police enforcement practices and penalties associated with each of these behaviours.

You are reminded that all the information you provide
will be kept strictly confidential, and there are no right or wrong answers.

For the purposes of this questionnaire, the following definitions will be used:	
"Drink Driving"	is defined as driving over the legal blood alcohol content (BAC) limit for the type of licence held by the driver
"Speeding"	is defined as exceeding (by any amount) the posted speed limit sign of any road

1. Please complete the following demographic information

a. Gender:	☐ Male ☐ Female
b. What is your current age:	_____ years
c. Marital status:	☐ Married ☐ Single ☐ De facto/have a partner ☐ Divorced ☐ Widowed ☐ Separated
d. What is the highest level of education you have completed: ***Please tick only ONE***	☐ Finished part or all of high school ☐ Trade or TAFE qualification ☐ Tertiary qualification e.g. degree or diploma ☐ Postgraduate tertiary qualification e.g. PhD/Masters
e. Do you have a job at the moment?	Yes / No ***If no, skip to question 1g.*** If yes, what do you do?_____
f. Do you need to drive for your job? *e.g. taxi/bus driver, plumber, technician*	Yes / No
g. On average, how many hours per week do you drive?	____hours per week *(Write a number)*

h. Licence class: ***Please tick all that apply***	☐ Car (C) ☐ Motorbike (RE/R) ☐ Light Rigid (LR) ☐ Medium Rigid (MR) ☐ Heavy Rigid (HR) ☐ Heavy Combination (HC)
i. How long have you held a licence: – *Only motor vehicle licences* – *does not include periods of licence suspension/disqualification*	_____ years _____ months
j. Licence type: ***Please tick only ONE***	☐ Open ☐ Provisional (prior to current system) ☐ P2 Provisional ☐ P1 Provisional ☐ Probationary ☐ Restricted

2. How strongly do you agree with the following statements. *Please circle the number that best sums up your answer.* **Obeying road rules:**	Strongly disagree			Neither agree or disagree			Strongly agree
a. . . .ensures the safety of all road users.	1	2	3	4	5	6	7
b. . . .prevents road crashes.	1	2	3	4	5	6	7
c. . . .is not that important.	1	2	3	4	5	6	7
d. . . .keeps traffic flowing smoothly.	1	2	3	4	5	6	7
e. . . .makes roads safer in general.	1	2	3	4	5	6	7

3. This question asks you about drink driving *Please circle the number that best sums up your answer.* **In the past 6 months:**	Never						Most Occasions
a. How often did you **<u>drive after drinking</u>** alcohol but may have been over the legal BAC limit for your licence type?	1	2	3	4	5	6	7

4. This set of questions asks you about speeding **Please circle the number that best sums up your answer.** **In the past 6 months:**	Never						Most Occasions
a. How often did you drive **up to 10 km/hr** above the posted speed limit?	1	2	3	4	5	6	7
b. How often did you drive **10 km/hr or more** above the posted speed limit?	1	2	3	4	5	6	7

5. How often do you see the Police doing the following things on the road *Please circle the number that best sums up your answer.*	Not very often						Very often
a. Operating speed cameras	1	2	3	4	5	6	7
b. Conducting other speed radar operations, e.g. speed guns	1	2	3	4	5	6	7
c. Conducting Random Breath Testing	1	2	3	4	5	6	7
d. Pull over a driver	1	2	3	4	5	6	7
e. Attend a traffic crash	1	2	3	4	5	6	7

6. The following questions ask about your driving history. *For each question, please circle either Yes or No.* *For all Yes responses:* – *please write the number of times you have been convicted of each offence, and;* – *please tick any penalties received as a result of the offence.*	**Number of Offences**	**Demerit Points**	**Fines**	**Licence Disqualification**	**Licence Suspension**	**Prison Sentence**
a. Have you ever been convicted of drink driving? **Yes / No**	___	☐	☐	☐	☐	☐
b. Have you ever received a speeding ticket? **Yes / No**	___	☐	☐	☐	☐	☐
c. Have you ever been caught for any other traffic offences? (excluding parking offences) **Yes / No**	___	☐	☐	☐	☐	☐

7. The following questions ask you about the driving history of your friends and family.

For each question, please circle either Yes (Y), No (N), or Don't Know (DK)

Have any of your friends and family:	**Friends**	**Family**
a. . . . been convicted of drink driving?	Y / N / DK	Y / N / DK
b. . . . received a speeding ticket?	Y / N / DK	Y / N / DK

8. How likely do you think the following things are?

Please circle the number that best sums up your answer.

	Very unlikely						Very likely
a. Getting Random Breath Tested by the police?	1	2	3	4	5	6	7
b. Getting caught by a speed camera / radar if you were speeding?	1	2	3	4	5	6	7
c. Getting caught if you were not wearing a seat belt?	1	2	3	4	5	6	7
d. Getting caught for tailgating by the police?	1	2	3	4	5	6	7
e. Having your licence checked by the police?	1	2	3	4	5	6	7

9. How strongly do you agree with the following statements. *Please circle the number that best sums up your answer.*	Strongly disagree						Strongly agree
The following questions relate to drink driving:							
a. I think it would be more convenient to drive while over the legal BAC limit for my licence type than to use other forms of transport.	1	2	3	4	5	6	7
b. I would get a thrill driving while over the legal BAC limit for my licence type.	1	2	3	4	5	6	7
c. I would get a great sense of achievement from being able to control the vehicle while over the legal BAC limit for my licence type.	1	2	3	4	5	6	7
d. I would feel good driving while over the legal BAC limit for my licence type.	1	2	3	4	5	6	7
e. I would feel bad driving over the legal BAC limit for my licence type.	1	2	3	4	5	6	7
f. I would feel anxious driving over the legal BAC limit for my licence type.	1	2	3	4	5	6	7
g. I would feel guilty about driving over the legal BAC limit for my licence type.	1	2	3	4	5	6	7
The following questions relate to speeding:							
h. I think it would be more convenient to speed than not to speed.	1	2	3	4	5	6	7
i. I think I can save time by driving above the speed limit.	1	2	3	4	5	6	7
j. I would get a thrill driving over the speed limit.	1	2	3	4	5	6	7
k. I would get a great sense of achievement from being able to control the vehicle while driving over the speed limit.	1	2	3	4	5	6	7
l. I would feel good driving faster than the speed limit.	1	2	3	4	5	6	7
m. I would feel bad driving faster than the speed limit.	1	2	3	4	5	6	7
n. I would feel anxious driving faster than the speed limit.	1	2	3	4	5	6	7
o. I would feel guilty about driving faster than the speed limit.	1	2	3	4	5	6	7

The next set of questions asks you about the penalties for drink driving and speeding.

10. What do you know of the penalties for: *Please circle the number that best sums up your answer.*	Nothing at all						A lot
a. First drink driving offence?	1	2	3	4	5	6	7
b. Two or more drink driving offences?	1	2	3	4	5	6	7
c. First speeding offence?	1	2	3	4	5	6	7
d. Two or more speeding offences?	1	2	3	4	5	6	7

The following questions ask you about your exposure to the Police.

11. How often have you used any of the following "avoidance strategies" to reduce your chances of being caught for drink driving and speeding? *Please circle the number that best sums up your answer.*	Never						Very often
The following questions relate to drink driving:							
a. Avoided getting caught for drink driving by watching out for other drivers flashing their lights?	1	2	3	4	5	6	7
b. Avoided getting caught for drink driving by staying away from known locations where police frequently set up Random Breath Test operations?	1	2	3	4	5	6	7
c. Avoided getting caught for drink driving by driving more carefully?	1	2	3	4	5	6	7
d. Avoided getting caught for drink driving by driving more slowly?	1	2	3	4	5	6	7
e. Avoided getting caught for drink driving by getting someone else to drive?	1	2	3	4	5	6	7
f. Avoided getting caught for drink driving by taking the back streets home?	1	2	3	4	5	6	7
g. Avoided getting caught for drink driving by remaining watchful for police vehicles?	1	2	3	4	5	6	7
The following questions relate to speeding:							
h. Avoided getting caught for speeding by watching out for other drivers flashing their lights?	1	2	3	4	5	6	7
i. Avoided getting caught for speeding by slowing down where you have regularly seen speed cameras before?	1	2	3	4	5	6	7
j. Avoided getting caught for speeding by driving more carefully?	1	2	3	4	5	6	7
k. Avoided getting caught for speeding by hitting the brakes when you see a speed camera unit down the road?	1	2	3	4	5	6	7
l. Avoided getting caught for speeding by taking the back streets home?	1	2	3	4	5	6	7
m. Avoided getting caught for speeding by remaining watchful for police vehicles?	1	2	3	4	5	6	7
n. Avoided receiving or paying a speeding ticket by getting another person to say they were driving?	1	2	3	4	5	6	7

How many of your friends and family have used any of the following "avoidance strategies" to reduce their chances of being caught for drink driving and speeding?

12. To the best of your knowledge, how many of them have: *Please circle the number that best sums up your answer.*	**Friends** None of them	Most of them	**Family** None of them	Most of them
The following questions relate to drink driving:				
a. Avoided getting caught for drink driving by watching out for other drivers flashing their lights?	1 2	3 4 5 6 7	1 2	3 4 5 6 7
b. Avoided getting caught for drink driving by staying away from known locations where police frequently set up Random Breath Test operations?	1 2	3 4 5 6 7	1 2	3 4 5 6 7
c. Avoided getting caught for drink driving by driving more carefully?	1 2	3 4 5 6 7	1 2	3 4 5 6 7
d. Avoided getting caught for drink driving by driving more slowly?	1 2	3 4 5 6 7	1 2	3 4 5 6 7
e. Avoided getting caught for drink driving by getting someone else to drive?	1 2	3 4 5 6 7	1 2	3 4 5 6 7
f. Avoided getting caught for drink driving by taking the back streets home?	1 2	3 4 5 6 7	1 2	3 4 5 6 7
g. Avoided getting caught for drink driving by remaining watchful for police vehicles?	1 2	3 4 5 6 7	1 2	3 4 5 6 7
The following questions relate to speeding:				
h. Avoided getting caught for speeding by watching out for other drivers flashing their lights?	1 2	3 4 5 6 7	1 2	3 4 5 6 7
i. Avoided getting caught for speeding by slowing down where you have regularly seen speed cameras before?	1 2	3 4 5 6 7	1 2	3 4 5 6 7
j. Avoided getting caught for speeding by driving more carefully?	1 2	3 4 5 6 7	1 2	3 4 5 6 7
k. Avoided getting caught for speeding by hitting the brakes when you see a speed camera unit down the road?	1 2	3 4 5 6 7	1 2	3 4 5 6 7
l. Avoided getting caught for speeding by taking the back streets home?	1 2	3 4 5 6 7	1 2	3 4 5 6 7
m. Avoided getting caught for speeding by remaining watchful for police vehicles?	1 2	3 4 5 6 7	1 2	3 4 5 6 7
n. Avoided receiving or paying a speeding ticket by getting another person to say they were driving?	1 2	3 4 5 6 7	1 2	3 4 5 6 7

13. How strongly do you agree with the following statements: *Please circle the number that best sums up your answer.*	Strongly disagree						Strongly agree
The following questions relate to drink driving:							
a. The penalties for first time drink driving offences are very harsh.	1	2	3	4	5	6	7
b. The penalties for two or more drink driving offences are very harsh.	1	2	3	4	5	6	7
c. If you are caught for a first time drink driving offence you are likely to be punished.	1	2	3	4	5	6	7
d. If you have been caught for two or more drink driving offences you are likely to be punished.	1	2	3	4	5	6	7
e. You are likely to get punished quickly if you get caught for a first time drink driving offence.	1	2	3	4	5	6	7
f. You are likely to get punished quickly if you get caught for two or more drink driving offence.	1	2	3	4	5	6	7
The following questions relate to speeding:							
g. The penalties for first time speeding offences are very harsh.	1	2	3	4	5	6	7
h. The penalties for two or more speeding offences are very harsh.	1	2	3	4	5	6	7
i. If you are caught for a first time speeding offence you are likely to be punished.	1	2	3	4	5	6	7
j. If you have been caught for two or more speeding offences you are likely to be punished.	1	2	3	4	5	6	7
k. You are likely to get punished quickly if you get caught for a first time speeding offence.	1	2	3	4	5	6	7
l. You are likely to get punished quickly if you get caught for two or more speeding offences.	1	2	3	4	5	6	7

14. How strongly do you agree with the following statements: *Please circle the number that best sums up your answer.*	Strongly disagree						Strongly agree
The following questions relate to drink driving:							
a. It's OK to drive after drinking one or more alcoholic drinks, but remain under the legal BAC limit.	1	2	3	4	5	6	7
b. It's OK to drive over the legal BAC as long as you don't get caught.	1	2	3	4	5	6	7
c. The police spend too much time hassling those who drive over the BAC limit.	1	2	3	4	5	6	7
d. Driving while over the legal BAC is part of my normal driving routine.	1	2	3	4	5	6	7
e. It's OK to drive while over the legal BAC as long as you don't do it too much.	1	2	3	4	5	6	7
f. Drink drivers generally drive more carefully on the road.	1	2	3	4	5	6	7
g. Everybody drives while over the legal BAC once in a while.	1	2	3	4	5	6	7
h. There is no excuse for driving while over the legal BAC.	1	2	3	4	5	6	7
i. I believe that driving over the legal BAC for your licence type is dangerous.	1	2	3	4	5	6	7
j. We need harsher penalties for people who drive over the legal BAC.	1	2	3	4	5	6	7
k. I would find it inconvenient to catch public transport after drinking alcohol.	1	2	3	4	5	6	7
l. I would find it too expensive to catch a taxi after drinking alcohol.	1	2	3	4	5	6	7
m. I would feel unsafe catching public transport after drinking alcohol.	1	2	3	4	5	6	7
The following questions relate to speeding:							
n. It's OK to drive faster than the speed limit as long as you don't get caught.	1	2	3	4	5	6	7
o. It's OK to exceed the speed limit so long as you drive to conditions of the road.	1	2	3	4	5	6	7
p. The police spend too much time hassling those who drive over the posted speed limit sign.	1	2	3	4	5	6	7
q. Driving faster than the speed limit is part of my normal driving routine.	1	2	3	4	5	6	7
r. Driving faster than the speed limit is OK when you are running late.	1	2	3	4	5	6	7
s. Driving faster than the speed limit is OK in an emergency.	1	2	3	4	5	6	7
t. Driving faster than the speed limit is OK if you are careful.	1	2	3	4	5	6	7
u. Everybody drives faster than the speed limit once in a while.	1	2	3	4	5	6	7
v. Drivers should always stick to the speed limit.	1	2	3	4	5	6	7
w. I believe that driving faster than the speed limit is dangerous.	1	2	3	4	5	6	7
x. We need harsher penalties for people who drive faster than the speed limit.	1	2	3	4	5	6	7
y. I would find it inconvenient to stick to the posted speed limits.	1	2	3	4	5	6	7
z. There is no alternative transport for me to use in my area.	1	2	3	4	5	6	7

The next questions ask you to think back to when you first started driving solo (unaccompanied).

15. Back then, how much did you base your decision on whether <u>to drive after drinking alcohol or not</u> on the behaviour of: *Please circle the number that best sums up your answer for each statement.*	Not at all						A lot
a. . . . your friends?	1	2	3	4	5	6	7
b. . . . your family members?	1	2	3	4	5	6	7
c. . . . your closest friend/partner?	1	2	3	4	5	6	7
d. . . . other drivers on the road?	1	2	3	4	5	6	7

16. Back then, how much did you base your decision on whether <u>to speed or not</u> on the behaviour of: *Please circle the number that best sums up your answer.*	Not at all						A lot
a. . . . your friends?	1	2	3	4	5	6	7
b. . . . your family members?	1	2	3	4	5	6	7
c. . . . your closest friend/partner?	1	2	3	4	5	6	7
d. . . . other drivers on the road?	1	2	3	4	5	6	7

The next questions ask you about the number of people you know who engage in drink driving and speeding. The type of people include family, friends, other people (work colleagues or acquaintances).

	Friends							**Family**							**Other People**						
17. How often do the following people: *Please circle the number that best sums up your answer.*	Not very often						Always	Not very often						Always	Not very often						Always
d. . . . drive after drinking alcohol but may have been over the legal BAC limit for their licence type?	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
e. . . . . drive **<u>up to 10 km/hr above</u>** the posted speed limit?	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
f. . . . . drive **<u>10 km/hr or more above</u>** the posted speed limit?	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7

How strongly do you agree with the following statements. *Please circle the number that best sums up your answer.* **18. My friends:**	Strongly disagree						Strongly agree
a. . . .think there is nothing wrong with anyone driving while over the legal BAC for their licence type.	1	2	3	4	5	6	7
b. . . . would be against me driving while over the legal BAC for my licence type.	1	2	3	4	5	6	7
c. . . . don't care if I drive while over the legal BAC for my licence type, so long as I don't get caught.	1	2	3	4	5	6	7
d. . . . think there is nothing wrong with driving faster than the speed limit.	1	2	3	4	5	6	7
e. . . . would be against me driving faster than the speed limit.	1	2	3	4	5	6	7
f. . . . don't care if I drive over the speed limit, so long as I don't get caught.	1	2	3	4	5	6	7

How strongly do you agree with the following statements. *Please circle the number that best sums up your answer.* **19. My family:**	Strongly disagree						Strongly agree
a. . . .think there is nothing wrong with anyone driving while over the legal BAC for their licence type.	1	2	3	4	5	6	7
b. . . . would be against me driving while over the legal BAC for my licence type.	1	2	3	4	5	6	7
c. . . . don't care if I drive while over the legal BAC for my licence type, so long as I don't get caught.	1	2	3	4	5	6	7
d. . . . think there is nothing wrong with driving faster than the speed limit.	1	2	3	4	5	6	7
e. . . . would be against me driving faster than the speed limit.	1	2	3	4	5	6	7
f. . . . don't care if I drive over speed limit, so long as I don't get caught.	1	2	3	4	5	6	7

20. How strongly do you agree with the following statements relating to drink driving. *Please circle the number that best sums up your answer.*	Strongly disagree						Strongly agree
a. Most of your friends would respect you for driving while over the legal BAC limit for your licence type.	1	2	3	4	5	6	7
b. Your friends would think you were really stupid if you drove while over the legal BAC limit for your licence type.	1	2	3	4	5	6	7
c. Most of your family would respect you for driving while over the legal BAC limit for your licence type.	1	2	3	4	5	6	7
d. Your family would think you were really stupid if you drove while over the legal BAC limit for your licence type.	1	2	3	4	5	6	7
e. You could lose your job if your boss knew you had driven while over the legal BAC limit for your licence type.	1	2	3	4	5	6	7
f. You wouldn't like your workmates to know you had driven while over the legal BAC limit for your licence type.	1	2	3	4	5	6	7
g. Driving over the legal BAC limit for your licence type is generally not worth the risk of being caught and punished.	1	2	3	4	5	6	7
h. Overall, there are more bad things that are likely to result from driving over the legal BAC limit for my licence type than good things?	1	2	3	4	5	6	7

21. How strongly do you agree with the following statements relating to speeding. *Please circle the number that best sums up your answer.*	Strongly disagree						Strongly agree
a. Most of your friends would respect you for driving over the speed limit.	1	2	3	4	5	6	7
b. Your friends would think you were really stupid if you drove over the speed limit.	1	2	3	4	5	6	7
c. Most of your family would respect you for driving over the speed limit.	1	2	3	4	5	6	7
d. Your family would think you were really stupid if you drove over the speed limit.	1	2	3	4	5	6	7
e. You could lose your job if your boss knew you had driven over the speed limit.	1	2	3	4	5	6	7
f. You wouldn't like your workmates to know you had driven over the speed limit.	1	2	3	4	5	6	7
g. Driving over the speed limit is generally not worth the risk of being caught and punished.	1	2	3	4	5	6	7
h. Overall, there are more bad things that are likely to result from driving faster than the speed limit than good things?	1	2	3	4	5	6	7

Below are some statements that people might use to describe themselves.
Read each statement and decide whether or not it describes you.

22. Please answer every statement, either TRUE or FALSE, even if you are not entirely sure of your answer.

a. I often do things on impulse	True	False
b. I would like to take off on a trip with no preplanned or definite routes or timetables	True	False
c. I enjoy getting into new situations where you can't predict how things will turn out	True	False
d. I sometimes like to do things that are a little frightening	True	False
e. I'll try anything once	True	False
f. I would like the kind of life where one is on the move and travelling a lot, with lots of change and excitement	True	False
g. I sometimes do 'crazy' things just for fun	True	False
h. I am an impulsive person	True	False
i. I like doing things just for the thrill of it	True	False
j. I like to have new and exciting experiences and sensations even if they are a little frightening	True	False
k. I like 'wild' uninhibited parties	True	False
l. I often get so carried away by new and exciting things and ideas that I never think of possible complications	True	False
m. I prefer friends who are excitingly unpredictable	True	False
n. Before I begin a complicated job, I make careful plans	True	False
o. I tend to change interests frequently	True	False
p. I very seldom spend much time on the details of planning ahead	True	False
q. I like to explore a strange city or section of town by myself, even if it means getting lost	True	False
r. I tend to begin a new job without much advance planning on how I will do it	True	False
s. I usually think about what I am going to do before doing it	True	False

23. Please tick one of the boxes between these two descriptions of some common behaviours to indicate where you belong.

Casual about appointments	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Never late
Not competitive	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Very competitive
Good listener, hears others out	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Anticipates what others are going to say (nods, interrupts, finishes for them)
Never feels rushed, even under pressure	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Always rushed
Can wait patiently	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Impatient when waiting
Casual	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Goes “all out”
Take things one at a time	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Try to do many things at once
Slow, deliberate talker	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Emphatic in speech (may pound desk)
Only cares about satisfying himself no matter what others may think	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Wants good job recognised by others
Fast (eating, walking, etc)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Slow doing things
Hard driving	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Easy going
Expresses feelings	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	‘Sits’ on feelings
Many interests	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Few interests outside work
Satisfied with job	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Ambitious

24. Please circling the response that best describes your drinking. Your answers will remain confidential so please be as accurate as possible.

a. How often do you have a drink containing alcohol?	Never	Monthly or less	2-4 times a month	2-3 times a week	4 or more times a week

b. How many drinks containing alcohol do you have on a typical day when you are drinking?	1 or 2	3 or 4	5 or 6	7 to 9	10 or more

c. How often do you have six or more drinks on one occasion?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
d. How often during the last year have you found that you were not able to stop drinking once you had started?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
e. How often during the last year have you failed to do what was normally expected of you because of drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
f. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
g. How often during the last year have you had a feeling of guilt or remorse after drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
h. How often during the last year have you been unable to remember what happened the night before because of your drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily

i. Have you or someone else been injured because of your drinking?	No	Yes, but not in the last year	Yes, during the last year
j. Has a relative, friend, doctor, or other health care worker been concerned about your drinking or suggested you cut down?	No	Yes, but not in the last year	Yes, during the last year

Thank you very much for completing the questionnaire!

Appendix C:

Summary of Scales used in main study

Deterrence Theory:

C1 Exposure to speed related enforcement

Items: *. . . how often do you see the Police doing the following things on the road? (Measured on 7-point Likert scale: 1 = Not very often, 7 = Very often)*

Operating speed cameras

Conducting other speed radar operations, e.g., speed guns

Cronbach's alpha = .81

C2 Personal knowledge of drink driving sanctions

Items: *. . . what do you know of the penalties for: (Measured on 7-point Likert scale: 1 = Nothing at all, 7 = A lot)*

First drink driving offence

Two or more drink driving offences

Cronbach's alpha =.91

C3 Personal knowledge of speeding sanctions

Items: *. . . what do you know of the penalties for: (Measured on 7-point Likert scale: 1 = Nothing at all, 7 = A lot)*

First speeding offence

Two or more speeding offences

Cronbach's alpha =.76

C4 Perceived Risk of Apprehension

Items: . . . *how likely do you think the following things are?(Measured on 7-point Likert scale: 1 = Very unlikely, 7 = Very likely)*

Getting Random Breath Tested by the police

Getting caught by a speed camera/radar if you were speeding

Getting caught if you were not wearing a seat belt

Getting caught for tailgating by the police

Having your licence checked by the police

Cronbach's alpha =.80

C5 Perceived Risk of Punishment for Drink Driving - Certainty

Items: . . . *how strongly do you agree with the following statements?(Measured on 7-point Likert scale: 1 = Strongly disagree, 7 = Strongly agree)*

If you are caught for a first time drink driving offence you are likely to be punished.

If you have been caught for two or more drink driving offences you are likely to be punished.

Cronbach's alpha =.87

C6 Perceived Risk of Punishment for Drink Driving - Severity

Items: . . . *how strongly do you agree with the following statements?(Measured on 7-point Likert scale: 1 = Strongly disagree, 7 = Strongly agree)*

The penalties for first time drink driving offences are very harsh.

The penalties for two or more drink driving offences are very harsh.

Cronbach's alpha =.89

C7 Perceived Risk of Punishment for Drink Driving - Swiftness

Items: . . . *how strongly do you agree with the following statements?(Measured on 7-point Likert scale: 1 = Strongly disagree, 7 = Strongly agree)*

You are likely to get punished quickly if you get caught for a first time drink driving offence.

You are likely to get punished quickly if you get caught for two or more drink driving offences.

Cronbach's alpha =.87

C8 Perceived Risk of Punishment for Speeding - Certainty

Items: *. . . how strongly do you agree with the following statements?(Measured on 7-point Likert scale: 1 = Strongly disagree, 7 = Strongly agree)*

If you are caught for a first time speeding offence you are likely to be punished.

If you have been caught for two or more speeding offences you are likely to be punished.

Cronbach's alpha =.86

C9 Perceived Risk of Punishment for Speeding - Severity

Items: *. . . how strongly do you agree with the following statements?(Measured on 7-point Likert scale: 1 = Strongly disagree, 7 = Strongly agree)*

The penalties for first time speeding offences are very harsh.

The penalties for two or more speeding offences are very harsh.

Cronbach's alpha =.85

C10 Perceived Risk of Punishment for Speeding - Swiftness

Items: *. . . how strongly do you agree with the following statements?(Measured on 7-point Likert scale: 1 = Strongly disagree, 7 = Strongly agree)*

You are likely to get punished quickly if you get caught for a first time speeding offence.

You are likely to get punished quickly if you get caught for two or more speeding offences.

Cronbach's alpha =.91

C11 Direct Punishment Avoidance – Drink Driving

Items: . . . *how often have you used any of the following "avoidance strategies" to reduce your chances of being caught for drink driving?(Measured on 7-point Likert scale: 1 = Never, 7 = Very often)*

Avoided getting caught for drink driving by watching out for other drivers flashing their lights?

Avoided getting caught for drink driving by staying away from known locations where police frequently set up Random Breath Test operations?

Avoided getting caught for drink driving by driving more carefully?

Avoided getting caught for drink driving by driving more slowly?

Avoided getting caught for drink driving by getting someone else to drive?

Avoided getting caught for drink driving by taking the back streets home?

Avoided getting caught for drink driving by remaining watchful for police vehicles?

Cronbach's alpha =.91

C12 Direct Punishment Avoidance – Speeding

Items: . . . *how often have you used any of the following "avoidance strategies" to reduce your chances of being caught for speeding?(Measured on 7-point Likert scale: 1 = Never, 7 = Very often)*

Avoided getting caught for speeding by watching out for other drivers flashing their lights?

Avoided getting caught for speeding by slowing down where you have regularly seen speed cameras before?

Avoided getting caught for speeding by driving more carefully?

Avoided getting caught for speeding by hitting the brakes when you see a speed camera unit down the road?

Avoided getting caught for speeding by taking the back streets home? Avoided getting caught for speeding by remaining watchful for police vehicles?

Avoided receiving or paying a speeding ticket by getting another person to say they were driving?

Cronbach's alpha =.84

C13 Indirect Punishment Avoidance – Drink Driving - Family

Items: . . . *to the best of your knowledge, how many of your family have:*

(Measured on 7-point Likert scale: 1 = None of them, 7 = Most of them)

Avoided getting caught for drink driving by watching out for other drivers flashing their lights?

Avoided getting caught for drink driving by staying away from known locations where police frequently set up Random Breath Test operations?

Avoided getting caught for drink driving by driving more carefully?

Avoided getting caught for drink driving by driving more slowly?

Avoided getting caught for drink driving by getting someone else to drive?

Avoided getting caught for drink driving by taking the back streets home?

Avoided getting caught for drink driving by remaining watchful for police vehicles?

Cronbach's alpha =.92

C14 Indirect Punishment Avoidance – Drink Driving - Friends

Items: . . . *to the best of your knowledge, how many of your friends have:*

(Measured on 7-point Likert scale: 1 = None of them, 7 = Most of them)

Avoided getting caught for drink driving by watching out for other drivers flashing their lights?

Avoided getting caught for drink driving by staying away from known locations where police frequently set up Random Breath Test operations?

Avoided getting caught for drink driving by driving more carefully?

Avoided getting caught for drink driving by driving more slowly?

Avoided getting caught for drink driving by getting someone else to drive?

Avoided getting caught for drink driving by taking the back streets home?

Avoided getting caught for drink driving by remaining watchful for police vehicles?

Cronbach's alpha =.92

C15 Indirect Punishment Avoidance – Speeding - Family

Items: . . . *to the best of your knowledge, how many of your family have:*

(Measured on 7-point Likert scale: 1 = None of them, 7 = Most of them)

Avoided getting caught for speeding by watching out for other drivers flashing their lights?

Avoided getting caught for speeding by slowing down where you have regularly seen speed cameras before?

Avoided getting caught for speeding by driving more carefully?

Avoided getting caught for speeding by hitting the brakes when you see a speed camera unit down the road?

Avoided getting caught for speeding by taking the back streets home?

Avoided getting caught for speeding by remaining watchful for police vehicles?

Avoided receiving or paying a speeding ticket by getting another person to say they were driving?

Cronbach's alpha =.89

C16 Indirect Punishment Avoidance – Speeding - Friends

Items: . . . *to the best of your knowledge, how many of your friends have:*

(Measured on 7-point Likert scale: 1 = None of them, 7 = Most of them)

Avoided getting caught for speeding by watching out for other drivers flashing their lights?

Avoided getting caught for speeding by slowing down where you have regularly seen speed cameras before?

Avoided getting caught for speeding by driving more carefully?

Avoided getting caught for speeding by hitting the brakes when you see a speed camera unit down the road?

Avoided getting caught for speeding by taking the back streets home?

Avoided getting caught for speeding by remaining watchful for police vehicles?

Avoided receiving or paying a speeding ticket by getting another person to say they were driving?

Cronbach's alpha =.88

Social Learning Theory

C17 Personal definition toward drink driving

Items: . . . *How strongly do you agree with the following statements:*

(Measured on 7-point Likert scale: 1 = Strongly disagree, 7 = Strongly agree)

It's OK to drive after drinking one or more alcoholic drinks, but remain under the legal BAC limit.

It's OK to drive over the legal BAC for your licence type as long as you don't get caught.

The police spend too much time hassling those who drive while over the legal BAC limit.

Driving while over the legal BAC for your licence type is part of my normal driving routine.

It's OK to drive while over the legal BAC for your licence type as long as you don't do it too much.

Drink drivers generally drive more carefully on the road.

Everybody drives while over the legal BAC for their licence type once in a while.

There is no excuse for driving while over the legal BAC for your licence type.

I believe that driving over the legal BAC for your licence type is dangerous.

We need harsher penalties for people who drive over the legal BAC limit for their licence type.

I would find it inconvenient to catch public transport after drinking alcohol.

I would find it too expensive to catch a taxi after drinking alcohol.

I would feel unsafe catching public transport after drinking alcohol.

Cronbach's alpha =.70

C18 Personal definition toward speeding

Items: . . . *How strongly do you agree with the following statements:*

(Measured on 7-point Likert scale: 1 = Strongly disagree, 7 = Strongly agree)

It's OK to drive faster than the speed limit as long as you don't get caught.

It's OK to exceed the speed limit, so long as you drive to the conditions of the road.

The police spend too much time hassling those who drive over the posted speed limit sign.

Driving faster than the speed limit is part of my normal driving routine.

Driving faster than the speed limit is OK when you are running late.

Driving faster than the speed limit is OK in an emergency.

Driving faster than the speed limit is OK if you are careful.Everybody drives faster than the speed limit once in a while.

Drivers should always stick to the speed limit.

I believe that driving faster than the speed limit is dangerous.

We need harsher penalties for people who drive faster than the speed limit.

I would find it inconvenient to stick to the posted speed limits.

There is no alternative transport for me to use in my area.

Cronbach's alpha =.83

C19 Differential Association – Drink Driving – Normative Dimension - Friends

Items: . . . *How strongly do you agree with the following statements:*

(Measured on 7-point Likert scale: 1 = Strongly disagree, 7 = Strongly agree)

My friends think there is nothing wrong with anyone driving while over the legal BAC for their licence type.

My friends don't care if I drive while over the legal BAC for my licence type, so long as I don't get caught.

Cronbach's alpha =.74

C20 Differential Association – Drink Driving – Normative Dimension - Family

Items: . . . *How strongly do you agree with the following statements:*

(Measured on 7-point Likert scale: 1 = Strongly disagree, 7 = Strongly agree)

My family think there is nothing wrong with anyone driving while over the legal BAC for their licence type.

My family don't care if I drive while over the legal BAC for my licence type, so long as I don't get caught.

Cronbach's alpha =.79

C21 Differential Association – Speeding – Normative Dimension - Friends

Items: . . . *How strongly do you agree with the following statements:*

(Measured on 7-point Likert scale: 1 = Strongly disagree, 7 = Strongly agree)

My friends think there is nothing wrong with driving faster than the speed limit.

My family don't care if I drive over the speed limit, so long as I don't get caught.

Cronbach's alpha =.77

C22 Differential Association – Speeding – Normative Dimension - Family

Items: . . . *How strongly do you agree with the following statements:*

(Measured on 7-point Likert scale: 1 = Strongly disagree, 7 = Strongly agree)

My family think there is nothing wrong with driving faster than the speed limit.

My family don't care if I drive over the speed limit, so long as I don't get caught.

Cronbach's alpha =.78

C23 Differential Reinforcement – Drink Driving - Rewards

Items: . . . *How strongly do you agree with the following statements:*

(Measured on 7-point Likert scale: 1 = Strongly disagree, 7 = Strongly agree)

I think it would be more convenient to drive while over the legal BAC limit for my licence type than to use other forms of transport.I would get a thrill driving while over the legal BAC limit for my licence type.

I would get a great sense of achievement from being able to control the vehicle while over the legal BAC limit for my licence type.

I would feel good driving while over the legal BAC limit for my licence type.

Most of your friends would respect you for driving while over the legal BAC limit for your licence type.

Most of your family would respect you for driving while over the legal BAC limit for your licence type.

Cronbach's alpha =.77

C24 Differential Reinforcement – Drink Driving - Punishments

Items: . . . *How strongly do you agree with the following statements:*

(Measured on 7-point Likert scale: 1 = Strongly disagree, 7 = Strongly agree)

I would feel bad driving over the legal BAC limit for my licence type.

I would feel anxious driving over the legal BAC limit for my licence type.

I would feel guilty about driving over the legal BAC limit for my licence type.

Your friends would think you were really stupid if you drove while over the legal BAC limit for your licence type.

Your family would think you were really stupid if you drove while over the legal BAC limit for your licence type.

You could lose your job if your boss knew you had driven while over the legal BAC limit for your licence type.

You wouldn't like your workmates to know you had driven while over the legal BAC limit for your licence type.

Driving over the legal BAC limit for your licence type is generally not worth the risk of being caught and punished.

Overall, there are more bad things that are likely to result from driving over the legal BAC limit for my licence type than good things?

Cronbach's alpha =.79

C25 Differential Reinforcement – Speeding - Rewards

Items: . . . *How strongly do you agree with the following statements:*

(Measured on 7-point Likert scale: 1 = Strongly disagree, 7 = Strongly agree)

I think it would be more convenient to speed than not to speed.

I think I can save time by driving above the speed limit.

I would get a thrill driving over the speed limit.

I would get a great sense of achievement from being able to control the vehicle while driving over the speed limit.

I would feel good driving faster than the speed limit.

Most of your friends would respect you for driving over the speed limit.

Most of your family would respect you for driving over the speed limit.

Cronbach's alpha =.88

C26 Differential Reinforcement – Speeding - Punishments

Items: . . . *How strongly do you agree with the following statements:*

(Measured on 7-point Likert scale: 1 = Strongly disagree, 7 = Strongly agree)

I would feel bad driving faster than the speed limit.

I would feel anxious driving faster than the speed limit.

I would feel guilty about driving faster than the speed limit.

Your friends would think you were really stupid if you drove over the speed limit.

Your family would think you were really stupid if you drove over the speed limit.

You could lose your job if your boss knew you had driven over the speed limit.

You wouldn't like your workmates to know you had driven over the speed limit.

Driving over the speed limit is generally not worth the risk of being caught and punished.

Overall, there are more bad things that are likely to result from driving faster than the speed limit than good things?

Cronbach's alpha =.87

Person-related factors

C27 Zuckerman-Kuhlman Impulsivity and Sensation Seeking Scale

Items: . . . *Please answer every statement, either TRUE or FALSE, even if you are not entirely sure of your answer.*

I often do things on impulse

I would like to take off on a trip with no preplanned or definite routes or timetables

I enjoy getting into new situations where you can't predict how things will turn out

I sometimes like to do things that are a little frightening

I'll try anything once

I would like the kind of life where one is on the move and travelling a lot, with lots of change and excitement

I sometimes do 'crazy' things just for fun

I am an impulsive person

I like doing things just for the thrill of it

I like to have new and exciting experiences and sensations even if they are a little frightening

I like 'wild' uninhibited parties

I often get so carried away by new and exciting things and ideas that I never think of possible complications

I prefer friends who are excitingly unpredictable

Before I begin a complicated job, I make careful plans

I tend to change interests frequently

I very seldom spend much time on the details of planning ahead

I like to explore a strange city or section of town by myself, even if it means getting lost

I tend to begin a new job without much advance planning on how I will do it

I usually think about what I am going to do before doing it

Cronbach's alpha =.85

C28 Bortner Type-A Behaviour Pattern Scale

Items: . . . *Please tick one of the boxes between these two descriptions of some common behaviours to indicate where you belong.*

a. Casual about appointments.....Never late

b. Not competitive .....Very competitive

c. Good listener, hears others out.....Anticipates what others are going to say (nods, interrupts, finishes for them)

d. Never feels rushed, even under pressure .....Always rushed

e. Can wait patiently.....Impatient when waiting

f. Casual .....Goes "all out"

g. Take things one at a time.....Try to do many things at once

h. Slow, deliberate talker .....Emphatic in speech (may pound desk)

i. Only cares about satisfying himself no.....Wants good job recognised by others

.....matter what others may think

j. Fast (eating, walking, etc).....Slow doing things

k. Hard driving.....Easy going

l. Expresses feelings.....'Sits' on feelings

m. Many interests .....Few interests outside work

n. Satisfied with job .....Ambitious

Cronbach's alpha =.65

C29 Alcohol Use Disorder Identification Test

The test consists of ten items. The first eight are measured on a 5-point scale (Never, monthly or less, 2 to 4 times a month, 2 to 3 times a week, 4 or more times a week – scored 0 to 4)

How often do you have a drink containing alcohol?

How many drinks containing alcohol do you have on a typical day when you are drinking?

How often do you have six or more drinks on one occasion?

How often during the last year have you found that you were not able to stop drinking once you had started?

How often during the last year have you failed to do what was normally expected of you because of drinking?

How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?

How often during the last year have you had a feeling of guilt or remorse after drinking?

How often during the last year have you been unable to remember what happened the night before because of your drinking?

Have you or someone else been injured because of your drinking?

Has a relative, friend, doctor, or other health care worker been concerned about your drinking or suggested you cut down?

Cronbach's alpha =.84

Appendix D:

Speeding and drink driving dependent variable distribution of scores

Scale Response	Speeding Non-compliance low N (%)	Speeding Non-compliance high N (%)	Drink Driving N (%)
Never	17 (3.1%)	173 (31.7%)	389 (71.2%)
2	94 (17.4%)	185 (33.9%)	83 (15.2%)
3	91 (16.7%)	50 (9.2%)	15 (2.7%)
4	83 (15.2%)	51 (9.3%)	17 (3.1%)
5	107 (19.6%)	48 (8.8%)	13 (2.4%)
6	98 (17.9%)	27 (4.9%)	12 (2.2%)
Most occasions	49 (9.0%)	7 (1.3%)	9 (1.6%)
Missing	6 (1.1%)	5 (.9%)	8 (1.5%)
Total	546 (100%)	546 (100%)	546 (100%)

Appendix E:

Hierarchical multiple regression for speeding non-compliance low measure

Hierarchical multiple regression analysis of speeding non-compliance low as a function of demographics, deterrence theory, social learning theory and person related factors (N=465)

	M	*SD*	*B*	*SE*	β	sr^2	R^2	$AdjR^2$	Δ R^2
S-R freq of speeding	4.25	1.66							
Block 1: Sociodemographic and legal factors									
Gender			0.04	0.16	0.01	0.00			
Age	32.02	10.99	-0.02	0.01	-0.11*	0.01			
Direct exposure to punishment			0.39	0.16	0.12*	0.01			
Personal knowledge sanctions	8.02	3.48	0.00	0.02	-0.01	0.00			
Perc risk of appreh	16.84	5.78	-0.01	0.01	-0.03	0.00			
Risk punish: certainty	10.69	3.04	0.02	0.03	0.03	0.00			
Risk punish: severity	6.80	3.32	-0.01	0.02	-0.03	0.00			
Risk punish: swiftness	9.82	3.29	-0.01	0.03	-0.02	0.00			
Direct punish avoidance	26.46	9.33	0.04	0.01	0.23***	0.03			
Indirect expos speed pun friends			-0.08	0.20	-0.02	0.00			
Indirect expos speed pun family			0.12	0.18	0.03	0.00			
Indirect pun avoid friend	29.86	9.98	-0.01	0.01	-0.07	0.00			
Indirect pun avoid family	27.30	10.71	0.01	0.01	0.04	0.00	.24***	.22	
Block 2: Person-related and Psychosocial factors									
AUDIT	6.25	5.15	-0.03	0.01	-0.10*	0.01			
Bortner Type-A	87.12	15.58	0.00	0.00	0.00	0.00			
Z-K Imp SS	6.72	4.57	0.04	0.02	0.11*	0.01			
Pers def – speed	45.04	13.76	0.03	0.01	0.26***	0.03			
Diff Assoc – norm. friend	6.66	3.35	-0.04	0.03	-0.07	0.00			

Diff assoc - norm. fam	4.79	2.99	-0.02	0.03	-0.04	0.00			
Diff Assoc – beh – friend	3.86	1.41	0.15	0.07	0.13*	0.01			
Diff Assoc – beh – fam	3.40	1.41	0.09	0.07	0.08	0.00			
Imitation – friend	3.13	2.15	0.10	0.05	0.13*	0.01			
Imitation – family	3.44	2.29	0.01	0.04	0.01	0.00			
Imitation – partner	3.33	2.16	-0.06	0.05	-0.08	0.00			
Imitation – other drivers	3.49	2.01	-0.04	0.04	-0.05	0.00			
Anticipated Rewards	4.09	2.36	-0.04	0.04	-0.05	0.00			
Anticipated Punishments	27.95	7.73	-0.02	0.01	-0.09	0.00	.33***	.29	.11***

* p <.05; ** p <.01; *** p <.001

Appendix F:

Hierarchical multiple regression for speeding non-compliance high measure

Hierarchical multiple regression analysis of speeding non-compliance high as a function of demographics, deterrence theory, social learning theory and person related factors (N=465)

	M	*SD*	*B*	*SE*	β	sr^2	R^2	$Adj R^2$	Δ R^2
Self-reported frequency of speeding	2.48	1.54							
Block 1: Sociodemographic and legal factors									
Gender			0.10	0.15	0.03	0.00			
Age	32.02	10.99	-0.01	0.01	-0.05	0.00			
Direct exposure to punishment			0.61	0.15	0.19***	0.03			
Personal knowledge sanctions	8.02	3.48	-0.05	0.02	-0.11*	0.01			
Perc risk of apprehension	16.84	5.78	0.00	0.01	0.01	0.00			
Perc risk punish: certainty	10.69	3.04	0.00	0.03	-0.01	0.00			
Perc risk punish: severity	6.80	3.32	-0.01	0.02	-0.01	0.00			
Perc risk punish: swiftness	9.82	3.29	0.01	0.03	0.02	0.00			
Direct punishment avoidance	26.46	9.33	0.03	0.01	0.20***	0.02			
Indirect expos to speed pun friends			-0.31	0.19	-0.07	0.00			
Indirect expos to speed pun family			-0.14	0.17	-0.04	0.00			
Indirect punish avoid: friend	29.86	9.98	0.01	0.01	0.05	0.00			
Indirect punish avoid: family	27.30	10.71	0.00	0.01	-0.01	0.00	.21***	.19	
Block 2: Person-related and Psychosocial factors									
AUDIT	6.25	5.15	0.00	0.01	0.00	0.00			
Bortner Type-A	87.12	15.58	0.00	0.00	0.03	0.00			
Z-K Impulsivity SS	6.72	4.57	0.06	0.02	0.18***	0.02			
Personal def – speed	45.04	13.76	0.01	0.01	0.13*	0.01			
Diff Assoc – norm. – friends	6.66	3.35	-0.08	0.03	-0.16**	0.01			

	M	*SD*	*B*	*SE*	β	sr^2	R^2	$Adj R^2$	Δ R^2
Diff Assoc – norm. – family	4.79	2.99	0.01	0.03	0.02	0.00			
Diff Assoc – behav.– friends	3.86	1.41	0.08	0.07	0.08	0.00			
Diff Assoc – behav. – family	3.40	1.41	0.17	0.06	0.16**	0.01			
Imitation – friend	3.13	2.15	0.01	0.04	0.01	0.00			
Imitation – family	3.44	2.29	-0.01	0.04	-0.02	0.00			
Imitation – partner	3.33	2.16	0.00	0.05	-0.01	0.00			
Imitation – other drivers	3.49	2.01	-0.03	0.04	-0.03	0.00			
Anticipated Rewards	4.09	2.36	-0.03	0.03	-0.05	0.00			
Anticipated Punishments	27.95	7.73	-0.03	0.01	-0.14*	0.01	.31***	.27	.10***

* p <.05; ** p <.01; *** p <.001