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**AN APPLICATION OF STAFFORD AND WARR'S  
RECONCEPTUALIZATION OF DETERRENCE TO A GROUP OF  
RECIDIVIST DRINK DRIVERS**

James Freeman<sup>a</sup> & Barry Watson<sup>b</sup>

**Abstract**

Recent revisions of deterrence theory have highlighted the powerful effects of personal and vicarious punishment avoidance on criminal activity. The present paper reports on an application of Stafford and Warr's (1993) reconceptualisation of deterrence theory to a group of recidivist drink drivers to explain their self-reported offending behaviours. The analysis indicated that punishment avoidance exerted the greatest influence on self-reported offending behaviours, although perceptions of arrest certainty and severity also appear associated with drink driving offences. In contrast, vicarious exposure to others who have been punished or avoided punishment was not associated with further drink driving behaviours. The results suggest that recidivist drink drivers are not heavily influenced by vicarious experiences, and that past behaviour is an efficient predictor of future behaviour. The findings have direct implications for the reconceptualisation and application of deterrence models to elucidate offending behaviours.

**Key Words:** recidivist, drink driving, deterrence and sanctions.

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### 1.1 The Present Context

While there have been significant reductions in the prevalence of drink driving over the past 15 years (Mayhew et al., 2002; Voas & Tippetts, 2002), research continues to demonstrate that between 20 to 30% of convicted drink drivers have a prior drink driving offence (Brewer et al., 1994; Brown et al., 2002; Bryant, 2002; Hedlund & McCartt, 2002b; Peck, 1991; Sheehan, 1993; Wiliszowski, Murphy, Jones & Lacey, 1996). Of concern is that those with a number of prior offences (i.e., recidivist offenders) remain a major threat to road safety as they are at the greatest risk of being involved in an alcohol-related crash (Brewer et al., 1994; Jones & Lacey, 2000; Mann et al., 1994; Simpson et al., 2004) and are therefore disproportionately represented in crash statistics (Beirness et al., 1997; Brewer et al., 1994; Brown et al., 2002; Hedlund & McCartt, 2002a; Little, 2002; Nadeau, 2002; Popkin, 1994; Popkin et al., 1992; Simpson & Mayhew, 1991).

The effectiveness of drink driving countermeasures to reduce repeat offending is vital when considering the enormous toll this behaviour imposes on road safety. As a result, a wide variety of countermeasures is currently being employed in an attempt to break the drinking and driving sequence for recidivist offenders. These countermeasures consist of four main forms, (a) specific deterrence-based sanctions (e.g., fines, licence loss and incarceration), (b) rehabilitation and treatment programs, (c) vehicle control mechanisms and other technological advances (e.g., alcohol ignition interlocks), and (d) offender monitoring and probation (e.g., electronic monitoring) (Ferguson et al., 1999).

While the above countermeasures have demonstrated varying levels of success, the practice of implementing one intervention in isolation does not appear to completely eliminate all recidivism (Beirness et al., 1997). As a result, drink driving interventions are increasingly being combined in a further attempt to impact upon repeat offending (Jones & Lacey, 2000). Despite the more recent combination of countermeasures, within many motorised countries the major sentencing options remain sanctioning offenders with licence disqualification periods coupled with fines, and where available, offering offenders the opportunity to seek additional treatment.

The application of legal sanctions following a conviction for drink driving has a number of purposes including punishment, reform, retribution and incapacitation (Ross, 1992; Watson, 1998). However, a primary goal of the sanctioning process is to deter offenders from repeating the same crime in the future. This motive is encapsulated within deterrence theory, which proposes that individuals will avoid offending behaviour if they fear the perceived consequences of being apprehended and punished for the act (Homel, 1988; Von Hirsch, Bottoms, Burney & Wikstrom, 1999). While the threat of legal sanctions can provide a general deterrent against drink driving for motorist, in the current context, the application of legal sanctions relates to specific deterrence, such as the ability of sanctions to deter individuals from engaging in further offending behaviours. Deterrence theory is central to criminal justice policy (Andenaes, 1974; Babor et al., 2003) and in the context of drink driving, provides the foundation for a number of drink driving countermeasures such as legal sanctions (i.e., fines and licence loss), random breath testing, and well-publicised media campaigns.

Given the overwhelming evidence of high levels of repeat offending in a number of countries (Brewer et al., 1994; Brown et al., 2002; Bryant, 2002; Henderson, 1999; Hedlund & McCartt, 2002b; Sheehan, 1993; Wiliszowski et al., 1996), the popular assumption is that repeat offenders are affected less than the general public by the threat of legal sanctions (Beirness et al., 1997; Hedlund & McCartt, 2002a; Taxman & Piquero, 1998; Yu, 2000). Apart from this general assumption, little is presently known about how repeat offenders perceive the certainty and severity of sanctions, what effect such sanctions have on further offending behaviours, nor what sanctions are needed to increase levels of deterrence for persistent offenders.

### **1.2 Extensions of Deterrence Theory**

The predominate deterrence theory that has been utilised to investigate the impact of legal sanctions on offending behaviours is generally known as the Classical Deterrence Doctrine. Two 18<sup>th</sup> century utilitarian philosophers Bentham and Beccaria are regarded as the founders of this perspective, which makes implicit assumptions regarding human behaviour, namely that law breaking is inversely related to the certainty, severity and swiftness of punishment (Taxman & Piquero, 1998). That is, legal threats are most effective when potential offenders perceive a high likelihood of apprehension, and believe that the impending punishment will be certain, severe and swift.

Since the 18<sup>th</sup> century, a number of modifications and extensions have been made to the Classical Deterrence Doctrine. Researchers have argued that penalties are not applied within a social vacuum and thus a number of factors can influence offending behaviour(s) (Akers, 1990; Homel, 1988; Williams & Hawkins, 1986). One prominent direction of theoretical development has been to consider the effect of avoiding punishment and exposure to others avoiding punishment, which has been

proposed to have a major influence on offending behaviour. Stafford & Warr (1993) proposed a reconceptualized model of deterrence that incorporates four categories of experiences that have been suggested to affect deterrent process, which are:

- (a) Direct experience of punishment;
- (b) Direct experience of punishment avoidance;
- (c) Indirect (vicarious) experience of punishment; and
- (d) Indirect (vicarious) experience with punishment avoidance.

Stafford and Warr (1993) proposed that general deterrence can be conceptualised as vicarious experiences of punishment and punishment avoidance, while specific deterrence represents personal or direct experiences of punishment as well as avoiding punishment. The model suggests that both general and specific deterrence have the potential to influence an individual's decision to commit an illegal behaviour, and is thus compatible with contemporary learning theories through the acknowledgement that both experiential and vicarious experiences have a direct effect on learning and decision making (Stafford & Warr, 1993). The model highlights that the experience of punishment is not the only important factor to achieve deterrence, but also recognises that the process of punishment avoidance is likely to influence further offending behaviours (Paternoster & Piquero, 1995)<sup>1</sup>. The four categories are briefly reviewed below.

### 1.2.1 Direct Experience of Punishment

The first aspect of the revised model focuses on the traditional affects of specific deterrence, as experiencing certain, severe and swift penalties is hypothesized to act as a deterrent against further offending behaviours. Contrary to expectations, a growing body of research has demonstrated a negative –albeit weak and often

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<sup>1</sup> This is particularly the case where punishment is a rare event.

complex- relationship between perceptions of arrest certainty (Grosvenor, Toomey & Wagenaar, 1999; Homel, 1988; Nagin & Pograsky, 2001; Piquero & Paternoster, 1998; Piquero & Pogarsky, 2002) and punishment severity (Nagin & Pograsky, 2001; Pograsky, 2002) on intentions to drink and drive. Not surprisingly, research has demonstrated that the perceived risk for oneself is greater than the perceived risk for others (Jensen, Erickson, Gibbs, 1978; Paternoster & Piquero, 1995). However in the current context, questions remain about the deterrent impact of direct punishment for repeat offenders as the popular assumption remains that repeat offenders are not deterred by severe sanctions (Ahlin et al., 2002, Beirness et al., 1997; Hedlund & McCartt, 2002a), and preliminary evidence suggests this to be the case (Piquero & Pogarsky, 2002; Smith, 2003).

### **1.2.2 Direct Experience of Punishment Avoidance**

The second category is arguably the key component of the model for drink drivers, as the act of committing an offence and avoiding apprehension and punishment is proposed to have a powerful effect both on the process of deterrence and actual offending behaviours. Specifically, Stafford and Warr (1993) hypothesized that punishment avoidance lowers perceptions of arrest certainty, which directly promotes further offending behaviours. In fact, punishment avoidance may prove to be a greater modifier of offending behaviour than punishment itself, especially when the probability of detection remains low. Therefore, experiences of punishment and punishment avoidance most likely work in opposite directions (Paternoster & Piquero, 1995).

Preliminary research has demonstrated punishment avoidance to be negatively associated with perceptions of arrest certainty, and positively associated with illegal drug use in high school students (Paternoster & Piquero, 1995). In the current context,

Piquero & Paternoster (1998) examined Snortum and Berger's (1989) data of 1,686 general motorists in the United States and reported higher levels of personal experience with punishment avoidance was a predictor of intentions to drink and drive again in the future. In addition, Piquero & Pogarsky (2002) also reported a negative relationship between personal punishment avoidance and intentions to drink and drive for a sample of 250 college students<sup>2</sup>. When considering that researchers have calculated that the chances of being caught for drink driving is 1 in 200 (Beitel, Sharp & Glauz, 1975), or 0.5% to 1.5% (Homel, et al., 1988), the process of punishment avoidance may prove to have a considerable influence on the perceived certainty of apprehension and drink driving behaviours.

### 1.2.3 Indirect Experience of Punishment and Punishment Avoidance

In addition to direct experiences of punishment and punishment avoidance, it is proposed that aspects of general deterrence such as observing others being punished as well as avoiding punishment may have a substantial effect on offending behaviours. For example, observing others committing offences with or without punishment may affirm and strengthen individual perceptions regarding the certainty of apprehension (Paternoster & Piquero, 1995). Preliminary studies have demonstrated that observing others avoid detection subsequently reduces perceptions regarding the likelihood of apprehension for oneself as well as for others (Paternoster & Piquero, 1995). Conversely, observing individuals being apprehended and punishment may increase perceptions regarding the likelihood of police detection. Therefore, the process of direct and indirect punishment and punishment avoidance may have opposite effects on perceptions of arrest certainty and intentions to re-offend.

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<sup>2</sup> However a limitation of the study was that 98% of the sample had not been arrested and convicted of a drink driving offence in the last five years, and 86% had never been tested for drink driving.



In the case of drink drivers, the model has particular relevance as a deviant “beer-culture” may exist with its own values and standards regarding tolerance and acceptance levels (MacDonald & Dooley, 1993; Mookherjee, 1984), which may promote the likelihood of observing others regularly drinking and driving while avoiding apprehension. For example, research has demonstrated that knowledge of friends drink driving behaviour has a positive effect on projections to re-offend (Piquero & Paternoster, 1998; Piquero & Pogarsky, 2002). However, knowledge of friends’ drink driving convictions has also been proven to promote further intentions to re-offend (Piquero & Paternoster, 1998). Some researchers have suggested that rather than informal sanctions producing and/or contributing to deterrence, they may actually create the opposite effect, negating the deterrent effects of formal legal sanctions (Ahlin et al., 2002; Berger & Snortum, 1986; Homel, 1988; Piquero & Paternoster, 1998; Von Hirsch et al., 1999). This proposition has direct links to differential association-reinforcement theory, which proposes that behaviour is acquired directly through conditioning or indirectly through imitation or modelling of others’ behaviour (Akers, 1994). Preliminary research has provided support for this assertion as Smith (2003) investigated the driving behaviours of 19 repeat offenders and reported that peers and friends actively encouraged and condoned drink driving. Furthermore, Ahlin, et al. (2002) examined the driving behaviours of 1,377 repeat offenders participating in the Maryland interlock trial and reported that social bonds were positively associated with recidivism rates.

However, in general, a major limitation within the deterrence literature is the lack of research that has examined convicted offenders (Decker, Wright & Logie, 1993; Klepper & Nagin, 1993). Instead, the vast majority of deterrence research has focused on college students and the general public (Klepper & Nagin, 1993). In the

present context, there has been very little research that has investigated the deterrent influence of legal sanctions on recidivist drink drivers, nor in fact examined convicted or active offenders. As a result this study aimed to examine a group of recidivist drink drivers' perceptions of deterrence, their self-reported past drink driving events and intentions to re-offend utilising Stafford and Warr's (1993) reconceptualisation of deterrence theory.

## **2. Method**

### *2.1 Participants*

A total of 166 recidivist drink drivers volunteered to participate in the study. All participants were on a court-appointed probation order at the time of the study for a drink driving offence. There were 149 males and 17 females in the study.

### *2.2 Materials*

#### *2.2.1 Demographic Survey*

A questionnaire was developed to collect demographic information such as the age, employment, marital status, and level of income of participants. The Demographic Survey also incorporated questions that relate to the frequency of participants' past drink driving behaviours over their lifetime, and in the last six months, as well as intentions to drink and drive again in the future. Self-reported offending behaviours were measured on 5-point Likert scales.

#### *2.2.2 Deterrence Questionnaire*

A second 10-item questionnaire employed in the study, referred to as the Deterrence Questionnaire (DQ)<sup>3</sup>, collected a variety of information focusing on participants' perceptions of legal sanctions and experiences of direct and indirect punishment and

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<sup>3</sup> The DQ formed part of a larger questionnaire that aimed to examine the impact of a variety of legal and non-legal sanctions, as well as various countermeasures/interventions, on the group of repeat offenders.

punishment avoidance (see Appendix A). Two items measured the perceived severity of penalties (Q1 & Q7), two items assessed the perceived swiftness of personal punishment<sup>4</sup> (Q5 & Q10), while one question each measured direct punishment avoidance (Q2), indirect punishment avoidance (Q3), and observing others being punished (Q6). Two additional questions focused on respondents' perceptions regarding the certainty of being apprehended for drink driving. The first question assessed participants' beliefs about the chances of being caught for the offence (Q9 = objective estimation), and the second question measured concern about being apprehended when participants' were engaged in the offence (Q8 = subjective estimation). Participants were required to respond on a 10-point scale (1 = strongly disagree, 5 = unsure, 10 = strongly agree).<sup>5</sup> A further question (Q4) examined the perceived risk to others, which was similar to the scale implemented by Paternoster & Piquero (1995) and required participants to estimate the likelihood that others would be apprehended for drink driving.

### *2.3 Procedure*

Probation officers provided a list of individuals who agreed to participate in the research. The overall response rate for the study was 44.75% as 371 repeat offenders were asked by their respective probation officer to participate in the research over the 20 month data collection period. Participation was on a voluntary basis and withdrawal was permitted from the study at any time, without inquiry. No incentive was offered to participate in the study. Data were collected through structured interviews via two procedures. Firstly, the majority of participants (79.5%,  $n = 132$ )

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<sup>4</sup> The mean score for two items were utilised for some factors to increase the reliability of the data as the piloting process revealed some offenders experienced difficulty comprehending abstract words i.e., severe.

<sup>5</sup> The piloting process also revealed that participants experienced difficulty responding to large numbers of Likert scaled questions. As a result, a 10-point scale was predominantly implemented to measure perceptions of legal and non-legal sanctions, with 5-point Likert scales reserved for the measurement of concrete factors (e.g., intentions to re-offend).

were interviewed at their local Community Corrections regional centre after they had met with their probation officer. Only the researcher and the participant were present during the interview and all collected data remained confidential. Secondly, when face-to-face interviews were not possible due to logistical problems (e.g., time and travel) telephone interviews were conducted at a convenient time for participants (20.5%,  $n = 34$ ). Both forms of interviews took approximately 20-30 minutes to complete<sup>6</sup>. Participants signed a “Statement of Release” consent form that allowed the researcher to obtain information regarding previous traffic and non-traffic convictions that was provided by the Queensland Police Service and Queensland Transport Department.

### 3. Results

#### 3.1 *Characteristics of Sample*

The average age of the participants was 37, with a range from 20 to 67. In summary, the majority of participants were male Caucasians who were mostly employed (66.3%), on a full-time basis in blue-collar occupations, earning approximately \$12,000 - \$35,000. There was considerable variation in the level of participants' education and more than half the sample reported currently being in a relationship. The socio-demographic characteristics of the sample are comparable to recent studies that have focused on drink driving repeat offenders apprehended in Queensland (Buchanan, 1995; Ferguson et al., 2000). On average participants were disqualified from driving for approximately 15 months (range 2-60mths), the majority received a \$500 fine<sup>7</sup>, and were placed on a probation order for an average of 16 months (range

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<sup>6</sup> Between groups analysis revealed no significant differences between those interviewed face-to-face compared to over the phone on a number of key research outcomes such as perceptual deterrence factors (e.g., legal and non-legal deterrence) or self-reported offending behaviour(s).

<sup>7</sup> Magistrates usually waive the traditional monetary sanction in lieu of paying a \$500 fee to enrol in a drink driving rehabilitation program which participants in the current study were also required to complete while they were on a probation order.

6-36mths). In general, participants had been convicted of approximately three drink driving offences ( $M = 2.86$ , range 2-7), and their BAC reading for the most recent offence was on average three times the legal limit ( $M = .155$ , range .05-.317gm/100 ml).

### *3.2 Self-reported Drinking and Drink Driving Behaviours*

For self-reported offending behaviours (Table 1), the majority reported drink driving more than 10 times in their lifetime, were offending regularly in the 6 months before their most recent apprehension, and started drink driving at a relatively young age (i.e., 19 yrs). A noteworthy finding was that despite recently being sanctioned and placed on a probation order, three participants reported it extremely likely they would re-offend (1.8%), six reported that it was likely (3.6%), a relatively large sample of 30 were unsure (18.1%), whilst 58 (34.9%) believed it unlikely and 69 (41.6%) reported it very unlikely.

Insert Table 1

### *3.3 Perceptions of Specific and General Deterrence*

The first aim of the study was to examine participants' self-reported perceptions of recently incurred sanctions and their experiences of direct and vicarious punishment avoidance. The relative descriptive statistics are reported in Table 2. The procedure to divide respondents' scores on the 10-point scale into low, medium and high categories was based on the principle of natural breaks in the distribution of scores.

In regards to Classical Deterrence, just over half the sample agreed that the objective chances of being apprehended for drink driving was high (56%), while 28.3% believed the probability was low, and 15.7% were unsure ( $M = 6.27$ ). In addition, participants' subjective perceptions of being apprehended e.g., worry ( $M = 6.39$ ) were similar to objective perceptions ( $M = 6.27$ ), and the inter-item correlation between the

two scales was high (.89), which leads to two possible conclusions. Firstly, those who agreed that the chances of being caught as high were also worried when they do drink and drive ( $\tau = .67^{**}$ ), whilst those who believe the probability of apprehension as low are least concerned of detection. Secondly, it is possible that the participants perceived the two questions as similar and did not recognise the different context of the questions, which has been evident in previous deterrence research (Homel, 1988). For objective certainty for others, participants on average believed one quarter of drink drivers would be caught within the Brisbane city ( $M = 28.04$ ) although there was considerable variability ( $SD = 23.24$ ). In regards to perceived severity, the majority reported sanctions to be severe, indicating that recently incurred penalties produced a considerable impact upon their lives (86.2%,  $M = 8.35$ ). However, it should be noted that 23 participants did not consider their penalties for drink driving to be severe.

Examination of participants' personal experience with punishment avoidance was consistent with their self-reported offending behaviours during the last six months, as two thirds agreed that they regularly avoided punishment when drinking and driving. In regards to indirect punishment avoidance, approximately half the sample was aware of friends who avoided detection, although a third believed their friends were not regularly avoiding apprehension. Finally, approximately half the sample indicated that they knew of a friends' conviction, while 29% were unsure<sup>8</sup>. Taken together, the results suggest the sample were offending regularly, were likely to observe others avoid detection, but were also aware of friends being apprehended and punished for the offence.

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<sup>8</sup> Within-subject analysis revealed that participants were more likely to experience direct punishment avoidance and have greater knowledge of indirect punishment when compared to indirect punishment avoidance.

## Insert Table 2

*3.4 Intercorrelations between Variables*

The bivariate relationship between the sample's self-reported drink driving behaviours in the last six months, over their lifetime, intentions to re-offend and their direct and indirect experiences of punishment and punishment avoidance are presented in Appendix B. Data screening revealed non-normal distributions for a number of deterrence factors (e.g., severity, intentions to re-offend), which resulted in Kendall's Tau being computed and reported in the place of Pearson's correlations to reduce the influence of distribution anomalies. While the relationship between the major factors and self-reported drink driving are examined in the following logistic regression analyses, some notable bivariate relationships are reported below.

In regards to the self-reported frequency of drink driving, those who engaged in the act regularly in the last six months were also likely to report drink driving more frequently over their lifetime ( $\tau = .32^{**}$ ), as well as report regularly avoiding apprehension ( $\tau = .46^{**}$ ). In addition, participants who reported a higher frequency of drink driving over their lifetime also reported regularly avoiding punishment ( $\tau = .40^{**}$ ), observing friends avoid detection ( $\tau = .18^{**}$ ), and reported lower levels of apprehension certainty ( $\tau = -.17^{**}$ )<sup>9</sup>. However, a strong relationship did not appear to exist between perceptions of arrest certainty and the experience of punishment avoidance ( $\tau = -.06$ ). Apart from this latter finding, the results support Stafford and Warr's (1993) model as those who reported a prolonged history of drink driving maintained lower levels of arrest certainty.

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<sup>9</sup> The objective and subjective measure of certainty were combined.

For indirect punishment avoidance, vicarious learning appears evident, as perceptions regarding the certainty of apprehension were also negatively associated with observing friends regularly drinking and driving while avoiding apprehension ( $\tau = -.12^*$ ). Similarly, the experience of punishment avoidance was also positively correlated with observing friends regularly offending while avoiding police detection ( $\tau = .29^{**}$ ), as well as knowing friends who have been convicted of the offence ( $\tau = .19^{**}$ ). There was also a positive relationship between an individuals' own estimations of being apprehended for drink driving and the estimation of others being apprehended ( $\tau = .16^{**}$ ). From this, it appears that a "drink driving culture" may exist whereby offenders observe their peers drink driving with or without apprehension, which consequently affects perceptions of arrest certainty. The contribution of the above mentioned factors to the prediction of intentions to re-offend will be examined more closely in the following section.

### *3.5 Predictors of Intentions to Re-offend*

A series of ordinal regressions analyses were implemented to determine the contributions of Classical Deterrence Theory and Stafford and Warr's (1993) expanded deterrence model to the prediction of the frequency of past drink driving events over one's lifetime, as well as intentions to re-offend in the future. Table 3 depicts the variables in each model, the regression coefficients and Wald and Model Chi-Square values.

The first model included only the three Classical Deterrence variables (certainty, severity & swiftness), to assess whether the traditional perceptions of deterrence predict both the frequency of past drink driving events as well as intentions to re-offend. In regards to the frequency of drink driving over one's lifetime, perceptions of arrest certainty proved to be a significant predictor of reporting a higher frequency



of previous drink driving events, as those who reported more events also indicated lower levels of concern regarding being apprehended by the police (Wald statistic = 8.95,  $p = .003$ ). In contrast for intentions to re-offend, the overall model was not significant, although similar to previous findings (Piquero & Pogarsky, 2002), perceptions of penalty severity were identified as a predictor of intentions to re-offend, as those who considered their penalties as severe were less likely to indicate intentions to re-offend in the future (Wald statistic = 4.98,  $p = .026$ ). Taken together, the results indicate that recent experiences of severe penalties may decrease the likelihood of re-offending, continually drink driving while avoiding detection reduces perceptions of arrest certainty and arguably has a deleterious effect on deterrence. The impact of punishment avoidance is more specifically addressed in the following section.

The second model includes three of Stafford and Warr's (1993) reconceptualized factors: indirect punishment, direct punishment avoidance and indirect punishment avoidance. Consistent with Stafford and Warr's (1993) prediction that personal punishment avoidance would be a major influence on offenders, regularly drink driving while avoiding detection was identified as a significant predictor of more frequently offending in the past (Wald statistic = 19.03  $p = .000$ ), as well as future intentions to re-offend (Wald statistic = 11.76,  $p = .001$ ). As such, it appears that personal experience with punishment avoidance is not only associated with past offending, but also increases intentions to drink and drive again in the future.

The final ordinal analysis examined a combination of the above factors to test the predictive utility of the expanded deterrence model. In regards to the frequency of drink driving over one's lifetime, once again, perceptions of arrest certainty (Wald

statistic = 8.79,  $p = .003$ ) and direct punishment avoidance (Wald statistic = 21.64,  $p = .000$ ) were identified as significant predictors. However for intentions to re-offend, only direct punishment avoidance proved to predict those most likely to report drink and drive again in the future (Wald statistic = 11.32,  $p = .001$ ).

Several additional regression models were estimated to determine the sensitivity of the results. Separate inclusion of the number of previous DUI convictions, non-drink driving convictions and general socio-economic characteristics (e.g., age, income, employment) in a series of regression models did not increase the predictive utility of the models.

Insert Table 3

#### 4. Discussion

The present study applied Stafford and Warr's (1993) reconceptualized model of deterrence to a group of habitual offenders, and in doing so is one of the first to examine the perceptions and experiences of sanctions for habitual offenders. The study aimed to identify whether direct and indirect experiences of punishment and punishment avoidance affect perceptions of certainty, and whether such perceptions influence behaviour and future intentions to re-offend for a group of active offenders.

##### 4.1 *Experience of Sanctions*

Firstly, there was considerable variability in participants' experiences of direct and indirect punishment and punishment avoidance, although in general, a large proportion of the sample was regularly offending while avoiding apprehension, and were aware of others who drank and drove and avoided punishment. In regards to the experience of direct punishment, the majority reported their recent penalties as being severe. This finding is encouraging, as severe sanctions have generally proven vital

for deterrence theory, in particular the reduction of future drink driving offences (Sadler et al., 1991; Siskind, 1996; Vingilis et al., 1990). However, the result is in contrast with previous research that has suggested the application of legal sanctions applied in isolation is not effective in reducing recidivism rates among repeat offenders (Beirness et al., 1997; Taxman & Piquero, 1998; Yu, 2000). In fact within the current study, perceptions of sanction severity proved a significant predictor of intentions to drink and drive again in the future. However, it is noted that questions remain regarding the stability of such perceptions over time (Green, 1989; Homel, 1988; Minor & Harry, 1982; Saltzman, Paternoster, Waldo & Chiricos, 1982), and as participants were on a probation order, this positive finding may result from a “recency effect”. In addition, an element of measurement error may be evident within the severity factor, as some participants experienced difficulty comprehending the term “severe” during the piloting process, and the alternative question that was utilised to accommodate for such comprehension difficulties focused more generally on lifestyle impact (i.e., Q7). Further research appears necessary to develop effective methods to accurately measure deterrent processes and the corresponding influence on behaviour among this population.

Secondly, the results for the certainty of apprehension were quite ambiguous. In contrast to the general body of research that has found a significant negative relationship between certainty and drink driving behaviours (Grosvenor, Toomey & Wagenaar, 1999; Nagin & Pograsky, 2001; Piquero & Paternoster, 1998; Piquero & Pogarsky, 2002), a significant relationship was not evident between perceptions of arrest certainty and intentions to re-offend. However, lower levels of arrest certainty proved a significant predictor of a higher frequency of past drink driving events.

Thus, while perceptions of arrest certainty were associated with reported past drink driving behaviours, they were not associated with future intentions to re-offend. Furthermore, a strong bivariate relationship was not evident between experience of punishment avoidance and perceptions of arrest certainty. This peculiarity will be considered further in a proceeding section.

#### *4.2 Stafford and Warr's Model*

Thirdly, while Stafford and Warr (1993) proposed that an individual's direct experience may have the same level of influence as their indirect experience, this does not appear to be the case for repeat drink driving offenders. In contrast to the findings of Piquero & Paternoster (1998) who found a positive relationship between exposure to friends' conviction and punishment and respondents own offending behaviours, no relationship was evident between the two factors for the current sample. While participants were generally aware of their friends' drink driving behaviours, this factor did not appear to greatly influence their own offending behaviours in the current analysis. Even if a "beer culture" may exist which endorses drink driving, it was offenders' personal experience with punishment avoidance, rather than friend's experiences which appeared to be the strongest predictor of further drink driving. Once again, in the current context personal experience with punishment avoidance appears greatest for individuals who frequently commit offences.

Taken together, the self-reported experiences and perceptions of the group of recidivist drink drivers partially supports Stafford and Warr's (1993) reconceptualized model. Firstly, direct punishment avoidance rather than direct punishment appeared to be the strongest predictor of past offending behaviours, which is to be expected considering that repeat offenders drink and drive regularly and do not appear deterred by traditional sanctions. However, neither indirect punishment or indirect punishment

avoidance were significantly associated with past offending or intentions to re-offend. In the current context when the two models were combined, punishment avoidance appeared to have a stronger influence on offending behaviours than punishment itself, and direct experiences exert a greater influence than indirect experiences. Furthermore, it does not appear that punishment cancels out the effect of punishment avoidance (Stafford & Warr, 1993), but rather the process of avoiding punishment has a tremendous influence on offending behaviours for this group of “hard-core” repeat offenders. These results do not discount the importance of general deterrence and observing others being punished or avoiding punishment, but rather the individual experiences of recidivist drink drivers appears to promote their habitual offending patterns.

As noted above, a peculiar finding was that while punishment avoidance appeared to affect perceptions of arrest certainty, arrest certainty (which has traditionally been proposed to be crucial to deterrence theory) did not have a direct relationship with intentions to re-offend. There may be a number of explanations for this finding. Firstly, some level of measurement error or limitations with the scale may have diminished the relationship between behaviours and perceptions. Secondly, accurate perceptions of arrest certainty may not exert a tremendous influence on decisions to drink and drive, as a growing body of research has failed to find a relationship between the two factors (Baum, 1999; Green, 1989; Hedlund & McCartt, 2002a; Loxley & Smith, 1991; Paternoster, 1987). Thirdly, experienced offenders may regularly engage in offending behaviours with little consideration for the possibility of apprehension (Pogarsky, 2002). Fourthly, the results may suggest that the effect of habituation is the greatest predictor of intending to re-offend for the current population, as individuals who experience difficulties attempting to change

entrenched behaviours are at a heightened risk of re-offending. Stemming from this, it may yet be proven that repeat offenders' need to drink and drive is greater than current enforcement efforts to deter this population, which ultimately renders perceptions of arrest certainty as irrelevant. Put differently, considering that heavy alcohol consumption has consistently been linked with habitual offending (MacDonald & Dooley, 1993; Wiczorek et al., 1992; Wiliszowski et al., 1996), non-compliance with the law may be better explained through addiction theory rather than models of deterrence. As a result, future sentencing outcomes that combine punitive sanctions with additional countermeasures that address harmful and/or irresponsible drinking behaviours may be required if the drinking and driving sequence is to be successfully broken for this population.

#### *4.3 Limitations*

The limitations of the study should be borne in mind when interpreting the results. Participants were not randomly selected. The accuracy of the self-reported data remains susceptible to self-reporting bias, especially responses that focus on future intentions to re-offend as these may be influenced by fear of probationary punishment. Furthermore, it remains uncertain whether stated intentions are effective predictors of future behaviours. The relatively small sample size limits statistical power and the inclusion of other variables in the analyses (e.g., informal sanctions). The DQ scale developed for the present research requires further validation and amendment with a larger sample size. In addition, the findings may be heavily influenced by an “experiential” effect, as the majority of participants were recently sanctioned and on probation, as questions remain about the stability of these perceptions over time. Therefore, it may be possible that a greater proportion (than 5.4% of the sample) would have reported that they were likely to re-offend once re-licensed and no longer

on a probation order, which is reflected in official re-offence data that indicates 20%-30% of hard-core offenders continue to drink and drive (Brown et al., 2002; Bryant, 2002; Hedlund & McCartt, 2002b).

#### *4.4 Conclusion*

Despite such limitations, the present research is one of the first to provide direct evidence that avoiding punishment has a considerable influence on the offending patterns of recidivist drink drivers. Further examination into the impact that punishment avoidance has on active offenders, as well as contributing factors such as alcohol consumption, can only facilitate the development of countermeasures designed to effectively reduce drink driving behaviour. However, it is noted that from a different perspective, it may simply be that some offenders are incorrigible and as a result do not heed the threat of sanctions (Pogarsky, 2002), but rather, may respond to different stimuli not yet recognised and tested. If this is the case then innovative policies, enforcement practices and post-conviction intervention programs are needed if the drinking and driving sequence is to be broken for this population of habitual offenders. While the task of reducing re-offence rates among such offenders remains costly in both time and money, the benefits for road safety are clearly evident.

Table 1

*Self-reported Offending History*

Frequency	<i>n</i>	%	Frequency	<i>n</i>	%
Lifetime offending:			Last six months:		
Never	3	1.8	Never	66	39.7
Once or twice	10	6.0	Once or twice	26	15.7
Three to five	21	12.7	Three to five	22	13.3
Six to ten	19	11.4	Six to ten	22	13.3
More than ten	113	68.1	More than ten	30	18.0
Total	166	100	Total	166	100
Intentions to drink & drive again:			Age at first drink driving event:		
Extremely unlikely	67	40.4	<i>M</i>	19.72	
Unlikely	60	36.1	<i>S.D.</i>	5.48	
Unsure	30	18.1	Range	15 - 45	
Likely	6	3.6			
Extremely likely	3	1.8			
Total	166	100			

Table 2

*Self-reported Measures of Legal and Non-legal Deterrence*

Perceptions	Mean ( <i>SD</i> )	Disagree	Unsure	Agree
Objective Certainty	6.27 3.06	28.3% ( <i>n</i> = 47)	15.7% ( <i>n</i> = 26)	56% ( <i>n</i> = 93)
Subjective Certainty	6.39 3.21	26.5% ( <i>n</i> = 44)	21.5% ( <i>n</i> = 36)	52% ( <i>n</i> = 86)
Certainty (total) <sup>1</sup>	6.34 2.97	26.5% ( <i>n</i> = 44)	21.7% ( <i>n</i> = 36)	51.8% ( <i>n</i> = 86)
Severity	8.35 2.22	9.0% ( <i>n</i> = 15)	4.8% ( <i>n</i> = 8)	86.2% ( <i>n</i> = 143)
Certainty for others	28.04 23.24			
Experiences	Mean ( <i>SD</i> )	Disagree	Unsure	Agree
Direct Punishment A.	6.83 3.10	25.30% ( <i>n</i> = 42)	8.43% ( <i>n</i> = 14)	66.27% ( <i>n</i> = 110)
Indirect Punishment A.	6.10 3.39	32.50% ( <i>n</i> = 54)	19.28% ( <i>n</i> = 32)	48.22% ( <i>n</i> = 80)
Indirect Punishment	6.85 2.96	15.1% ( <i>n</i> = 25)	28.92% ( <i>n</i> = 48)	55.98% ( <i>n</i> = 93)

Note: <sup>1</sup>Composite scale of subjective & objective certainty; Direct Punishment A = Direct Punishment Avoidance; Indirect Punishment A = Indirect Punishment Avoidance.



Table 3. *Ordinal Regression Coefficients for Self-reported Frequency of Drink Driving Over Lifetime and Intentions to Re-offend*

	Over Lifetime		Intentions to Re-offend	
	B	Wald	B	Wald
Classic Deterrence Model				
Certainty	-.09**	8.95	.03	.50
Severity	-.02	0.30	-.10*	5.01
Swiftness	0.01	.02	-.01	.11
Model Chi-Square	9.10	$p = .020$	5.24	$p = .155$
Stafford & Warr				
Direct Punishment Avoidance	.13**	19.03	.14**	11.76
Indirect Punishment Avoidance	.01	.03	.01	.24
Indirect Punishment	-.01	.02	-.07	1.18
Model Chi-Square	26.72	$p = .000$	17.56	$p = .001$
Combined Model				
Certainty	-.09**	8.79	.05	1.88
Severity	.01	.04	-.07	2.97
Swiftness	.03	.69	-.07	.15
Direct Punishment Avoidance	.15**	21.64	.14**	11.32
Indirect Punishment Avoidance	-.01	.20	.02	.38
Indirect Punishment	.00	.03	-.07	4.05
Model Chi-Square	36.51,	$p = .000$	22.72,	$p = .001$

Note. \*  $p < .05$ , \*\* $p < .01$ ; # of D.D. convictions = number of drink driving convictions

## Appendix A

### Deterrence Questionnaire

1. My penalties for drink driving have been severe.
2. I drink and drive regularly without being caught.
3. My friends often drink and drive without being caught.
4. Out of the next 100 people who drink and drive in Brisbane, how many do you think will be caught?
5. The time between getting caught for drink driving and going to court was very short.
6. My friends have been caught and punished for drink driving.
7. The penalties I received for drink driving have caused a considerable impact on my life
8. When I drink and drive I am worried that I might get caught
9. The chances of me being caught for drink driving are high.
10. It took a long time after I was caught by the police before I lost my licence (R).

## Appendix B

Intercorrelations Between Deterrence Factors and Self-reported Intentions to Re-offend

	1	2	3	4	5	6	7	8	9	10	11
1. Intentions to re-offend	1	.26**	.16*	.08	.02	-.06	-.04	-.01	.28**	.11	-.04
2. No. of DD in last six months		1	.32**	.07	-.06	-.05	-.04	.04	.46**	.10	.05
3. No. of DD in lifetime			1	.06	-.17**	-.11	.04	.05	.40**	.18**	.07
4. Alcohol				1	-.08	.12*	.02	-.07	.09	.05	.01
5. Certainty <sup>2</sup>					1	.16**	.03	-.05	-.06	-.12*	-.04
6. Certainty for others						1	.13*	-.01	-.01	-.07	-.03
7. Severity							1	.12	-.08	-.05	-.06
8. Swiftiness								1	.03	-.01	-.01
9. Direct Punishment Avoidance									1	.29**	.16**
10. Indirect Punishment Avoidance										1	.19**
11. Indirect Punishment											1

Note. \*  $p < .05$ , \*\* $p < .01$  (two-tailed); <sup>2</sup>Composite scale of subjective & objective certainty

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## References

Ahlin, E.M., Rauch, P.L., Zador, P.L., Baum, H.M., and Duncan, D. (2002). Social bonds in an ignition interlock license restriction program in Maryland. Proceedings of the 16<sup>th</sup> International Conference on Alcohol, Drugs and Traffic Safety, Montreal, Canada, [CD-ROM], ICADTS.

Akers, R.L. (1990). Rational choice, deterrence, and social learning theory in criminology: the path not taken. *The Journal of Criminal Law and Criminology*, 81 (3), 653-676.

Akers, R.L. (1994). *Criminological Theories: Introduction and Evaluation*. Los Angeles: Roxbury Publishing Company.

Andenaes, J. (1974). *Punishment and Deterrence*. Ann Arbor: The University of Michigan Press.

Babor, T., Caetano, R., Casswell, S., Edwards, G., Giesbrecht, N., Graham, K., Grube, J., Grunewald, P., Hill, L., Holder, H., Homel, R., Osterberg, E., Rehm, J., Room, R., and Rossow, I. (in press, 2003). *Alcohol: No ordinary commodity. Research and public policy*. Oxford: Oxford University Press.

Bandura, A. (1977). *Social Learning Theory*. Englewood Cliffs: Prentice-Hall.

Bartusch, D.R.J., Lynam, D.R., Moffitt, T.E., and Silva, P.A. (1997). Is age important? Testing a general vs a developmental theory of antisocial behavior. *Criminology*, 35(1): 13-48.

Baum, S. (1999). Self-Reported drink driving and deterrence. *The Australian and New Zealand Journal of Criminology*, 32 (2): 247-261.

Beirness, D.J., Mayhew, D.R., and Simpson, H.M. (1997). *DWI Repeat Offenders: A Review and Synthesis of the Literature*. Canada: Health Canada.

Beitel, G.A., Sharp, M.C., and Glauz, W.D. (1975). Probability of arrest while driving under the influence of alcohol. *Journal of Studies on Alcohol*, 36: 109-115.

Bergman, H., Hubicka, B, and Laurell, H. (2002). Alcohol problems among Swedish drivers suspected of DUI. Proceedings of the 16<sup>th</sup> International Conference on Alcohol, Drugs and Traffic Safety, Montreal, Canada, [CD-ROM], ICADTS.

Biecheler-Fretel, M.B., and Peytavin, J.F. (2002). Preventing drink-driving and reoffending: the experiment conducted in French department of vald'oise (1996-2002). Proceedings of the 16<sup>th</sup> International Conference on Alcohol, Drugs and Traffic Safety, Montreal, Canada, [CD-ROM], ICADTS.

Boudreault, J., Brassard, A., and Gagnon, P. (2002). Behavioural assessment of Quebec drivers convicted of a second or subsequent impaired driving offence under the criminal code. Proceedings of the 16<sup>th</sup> International Conference on Alcohol, Drugs and Traffic Safety, Montreal, Canada, [CD-ROM], ICADTS.

Braithwaite, J. (1989). *Crime, Shame and Reintegration*. Cambridge: Cambridge University Press.

Brewer, R.D., Morris, P.D., Cole, T.B., Watkins, S., Patetta, M.J., and Popkin, C. (1994). The risk of dying in alcohol related automobile crashes among habitual drunk drivers. *New England Journal of Medicine*, 331 (8): 513-517.

Brown, T., Nadeau, L., Lageix, P., Lepage, M., Tremblay, J., and Seraganian, P. (2002). Non-adherents in mandatory substance abuse evaluation following a DUI offense: their characteristics and reasons for non-compliance. Proceedings of the 16<sup>th</sup> International Conference on Alcohol, Drugs and Traffic Safety, Montreal, Canada, [CD-ROM], ICADTS.

Bryant, P. (2002). The N.S.W. alcohol ignition interlock trial. Workshop at the 2002 Road Safety Research, Policing and Education Conference. Adelaide, South Australia.

Buchanan, D.A. (1995). Recidivism Rates of a Cohort of Drink-Drivers in Queensland – A Basis for Comparison. Unpublished Masters Thesis, University of Queensland.

Cavaiola, A.A., and Wuth, C. (2002). Assessment and Treatment of the DUI Offender. New York: Haworth Press.

Conigrave, K.M., Hall, W.D., and Saunders, J.B. (1995). The AUDIT questionnaire: choosing a cut-off score. *Addiction*, 90:, 1349-1356.

Decker, S., Wright, R., and Logie, R. (1993). Perceptual deterrence among active residential burglars: a research note. *Criminology*, 31 (1): 135-147.

Ferguson, M., Schonfeld, C., Sheehan, M., and Siskind, V. (2000). The Impact of the “Under the Limit” Drink Driving Rehabilitation Program on the Lifestyle and Behaviour of Offenders. Road Safety Research Report: CR187, Canberra. Federal Office and Road Safety.

Ferguson, M., Sheehan, M., Davey, J., & Watson, B. (1999). *Drink driving Rehabilitation: the present context*. Centre for Accident Research and Road Safety-Queensland. Queensland : Brisbane.

Frank, J.E., Raub, R., Lucke, R.E., and Wark, R.I. (2002). Illinois ignition interlock evaluations. Proceedings of the 16<sup>th</sup> International Conference on Alcohol, Drugs and Traffic Safety, Montreal, Canada, [CD-ROM], ICADTS.

Grasmick, H.G., Jacobs, D., and McCollom, C.B. (1983). Social class and social control: an application of deterrence theory. *Social Forces*, 62: 359-374.

Green, D.E. (1989). Measures of illegal behavior in individual-level deterrence research. *Journal of Research in Crime and Delinquency*, 26 (3): 253-275.

Grosvenor, D., Toomey, T.L., and Wagenaar, A.C. (1999). Deterrence and the Adolescent Drinking Driver. *Journal of Safety Research*, 30(3): 187-191.

Hedlund, H., and McCartt, A.T. (2002a). Drunk driving in the United States. A roadmap for progress. Proceedings of the 16<sup>th</sup> International Conference on Alcohol, Drugs and Traffic Safety, Montreal, Canada, [CD-ROM], ICADTS.

Hedlund JH, and McCartt AT. (2002b). Drunk Driving: Seeking Additional Solutions. Washington, DC: AAA Foundation for Traffic Safety

Henderson, M. (1999). A systematic approach to the control of persistent and recidivist drinking drivers. Proceedings of the Third National Conference on Injury Prevention and Control, Brisbane, Queensland, pp.17–19.

Homel, R.J. (1988). Policing and Punishing the Drinking Driver. A Study of Specific and General Deterrence. New York: Springer-Verlag.

Homel, R.J, Carseldine, D., and Kearns, I. (1988). Drink-Driving Countermeasures in Australia. *Alcohol, Drugs and Driving*, 4 (2): 113-144.

Jensen, G.F., Erickson, M.L., and Gibbs, J.P. (1978). Perceived risk of punishment and self-reported delinquency. *Social Forces*, 57, 55-78.

Jessor, R., and Jessor, S.L. (1977). Problem Behaviour and Psychosocial Development: a Longitudinal Study of Youth. Academic Press: New York.

Jones, R. K., and Lacey, J.H. (1991). Review of the Literature Evaluating the Effect of Countermeasures to Reduce Alcohol Impaired Driving (1980-1989). Springfield: National Highway Traffic Safety Administration.

Jones, R.K. and Lacey, J.H. 2000. State of Knowledge of Alcohol-Impaired Driving: Research on Repeat DWI Offenders. DOT HS 809 027. Washington, DC: National Highway Traffic Safety Administration.

Klepper, S., and Nagin, D. (1989). The deterrent effect of perceived certainty and severity of punishment revisited. *Criminology*, 27 (4): 721-746.



- Little, J. (2002). Interlock Trial in Victoria. Workshop at the 2002 Road Safety Research, Policing and Education Conference. Adelaide, South Australia.
- Loxley, W., & Smith, L. (1991). Roadblock testing in Western Australia and the process of deterrence. *Australian Journal of Psychology*, 43 (2), 101-106.
- MacDonald, S., and Dooley, S. (1993). A case-control study of driving-while-impaired offenders. *Drug and Alcohol Dependence*, 33 (1): 61-71.
- Mayhew, D.R., Simpson, H.M., & Beirness, D.J. (2002). Are the declines in drinking driving fatalities in Canada being overestimated? *Proceedings of the 16<sup>th</sup> International Conference on Alcohol, Drugs and Traffic Safety*, Montreal, Canada, [CD-ROM], ICADTS.
- Mann, R.E., Anglin, L., Wilkins, K., Vingilis, E.R., MacDonald, S., and Sheu, W. (1994). Rehabilitation for convicted drinking drivers (second offenders): effects on mortality. *Journal of Studies on Alcohol*, 5: 372-4.
- Marques, P.R., Voas, R.B., and Hodgins, D. (1998). Vehicle interlock programs: protecting the community against the drunk driver. *Journal of Prevention and Intervention in the Community*, 17 (1): 31-44.
- Minor, W.W., and Harry, J. (1982). Deterrent and experiential effects in perceptual deterrence research: a replication and extension. *Journal of Research in Crime and Delinquency*, 19: 190-203.
- Mookherjee, H. (1984). Psychological factors related to drink driving behaviour. *Journal of Social Psychology*, 133: 289-290.
- Nadeau, L. (2002). Are there better ways to predict recidivism? *Proceedings of the 16<sup>th</sup> International Conference on Alcohol, Drugs and Traffic Safety*, Montreal, Canada, [CD-ROM], ICADTS.

Nagin, D.S., and Pogarsky, G. (2001). Integrating celerity, impulsivity, and extralegal sanction threats into a model of general deterrence: theory and evidence. *Criminology*, 39 (4): 865-889.

Paternoster, R. (1987). The deterrent effect of the perceived certainty and severity of punishment: a review of the evidence and issues. *Justice Quarterly*, 4: 173-217.

Paternoster, R., and Piquero, A. (1995). Reconceptualizing deterrence: an empirical test of personal and vicarious experiences. *Journal of Research in Crime and Delinquency*, 32(2): 251-286.

Peck, R. (1991) The general and specific deterrent effects of DUI sanctions: a review of California's experience. *Alcohol, Drugs and Driving*, 7: 13-41.

Piquero, A., and Paternoster, R. (1998). An application of Stafford and Warr's reconceptualization of deterrence to drinking and driving. *Journal of Research in Crime and Delinquency*, 35: 3-39.

Piquero, A., and Pogarsky, G. (2002). Beyond Stafford and Warr's reconceptualization of deterrence: personal and vicarious experiences, impulsivity, and offending behaviours, *Journal of Research in Crime and Delinquency*, 39(2): 153-186.

Pogarsky, G. (2002). Identifying "deterable" offenders: implications for research on deterrence. *Justice Quarterly*, 19(3): 701-720.

Pogarsky, G., and Piquero, A. (2003). Can punishment encourage offending? Investigating the "resetting" effect. *Journal of Research in Crime and Delinquency*, 40(1), 95-120.

Popkin, C.L. (1994). The deterrent effect of education on DWI recidivism. *Alcohol, Drugs and Driving*, Vol 10 (3-4), 287-294.

- Ross, H.L. (1992). Are DWI sanctions effective? *Alcohol, Drugs and Driving*, 8, (1): 61-69.
- Saltzman, L., Paternoster, R., Waldo, G.P., and Chiricos, T.G. (1982). Deterrent experiential effects: the problem of causal order in perceptual deterrence research. *Journal of Research in Crime and Delinquency*, 19: 172-189.
- Saunders, B., Aasland, O.G., Babor, T.F., de la Fluyente, J.R., and Grant, M. (1993). Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption-II. *Addiction*, 88: 791-804.
- Sheehan, M. (1993). Alcohol recidivism. Proceedings of the Safely on the Road to the 21<sup>st</sup> Century Conference, National Road Safety Advisory Committee, Canberra, p.19-20. .
- Silberman, M. (1976). Toward a theory of criminal deterrence. *American Sociological Review*, 41: 442-461.
- Simpson, H.M., Beirness, D.J., Robertson, R.D., Mayhew, D.R., & Hedlund, J.H. (2004). Hard core drinking drivers. *Traffic Injury Prevention*, 5:261-269.
- Simpson, H.M., & Mayhew, D.R. (1991). *The Hard-Core Drinking Driver*. Ottawa: Traffic Injury Research Foundation of Canada.
- Smith, K. (2003). A Qualitative Study of Deterrence and Deviance in a Group of Recidivist Drink Drivers. Unpublished Masters Manuscript. University of Canberra, Australia.
- Snortum, J., and Berger, D. E. (1989). Drinking-driving compliance in the United States: perceptions and behavior in 1983 and 1986. *Journal of Studies on Alcohol*, 50: 306-3019.

Stafford, M.C., and Warr, M. (1993). A reconceptualization of general and specific deterrence. *Journal of Research in Crime and Delinquency*, 30(2): 123-135.

Tabachnick, B.G., and Fidell, L.S. (1996). *Using Multivariate Statistics* (3<sup>rd</sup> Ed). New York: Harper Collins.

Taxman, F.S., and Piquero, A. (1998). On preventing drunk driving recidivism: an examination of rehabilitation and punishment approaches. *Journal of Criminal Justice*, 26 (2): 129-143.

Voas, R.B., & Tippetts, A.S. (2002). BACs of U.S. drivers in fatal crashes: have they changed in the last 20 years? *Proceedings of the 16<sup>th</sup> International Conference on Alcohol, Drugs and Traffic Safety*, Montreal, Canada, [CD-ROM], ICADTS.

Von Hirsch, A.V., Bottoms, A.E., Burney, E., and Wikstrom, P. (1999). *Criminal Deterrence and Sentence Severity: An Analysis of Recent Research*. Oregon: Hart Publishing.

Watson B. (1998). The effectiveness of drink driving licence actions, remedial programs and vehicle-based sanctions. *Proceedings of the 19th ARRB Research Conference*. Melbourne: Australian Road Research Board.

Wieczorek, W.F., Miller, B.A., & Nochajski, T.H. (1992). Multiple and single location drinking among DWI offenders referred for alcoholism evaluation. *American Journal of Drug and Alcohol Abstracts*, 18(1), 103-114.

Wiliszowski, C., Murphy, P., Jones, R., and Lacey, J. (1996). *Determine Reasons for Repeat Drinking and Driving*. Virginia: National Highway Traffic Safety Administration.

Williams, K., & Hawkins, G. (1986). Perceptual research on general deterrence: a critical review. *Law and Society Review*, 20, 545-572.

Yu, J. (2000). Punishment and alcohol problems recidivism among drinking-driving

offenders. *Journal of Criminal Justice*, 28: 261-270.