

# **DRINK DRIVING IN RURAL AREAS: RECOMMENDATIONS FOR ENFORCEMENT AND PUBLIC EDUCATION BASED ON SURVEYS OF HOTEL PATRONS**

Warren A Harrison  
ARRB Transport Research Ltd

## **ABSTRACT**

This paper reports the results and recommendations of a study commissioned by Austroads to make recommendations to optimise enforcement programs for drink-driving in rural areas. Surveys of hotel-patrons (using a repeated-measures design) in rural towns coincided with three enforcement programs utilising different enforcement styles (overt, covert, and mixed). The results of the surveys were analysed to compare the effects of the three enforcement styles, to investigate factors associated with drink-driving and related decision-making processes, and to test predictions made by a new decision-making model incorporated into the deterrence model. The results suggested that there were some differences in the effects of the enforcement programs that favoured an increase in the level of overt (or detection-oriented) enforcement activity in rural areas, that the decision-making process that leads to drink-driving is complicated and has implications for enforcement programs, and that the naturalistic decision making model applied to the deterrence model was consistent with the survey data. The implications of the results for enforcement and public education are discussed.

## **INTRODUCTION**

Drink driving continues to represent an important road safety problem in rural areas, in spite of the high levels of enforcement and publicity characteristic of Australian road safety programs. In 1998, 24% of drivers killed in crashes in rural areas in Victoria (with known BACs) had BACs over .05 g/100ml. This was also the case in 1992, suggesting that there have been no net gains since then, despite variation over that time and high levels of enforcement and publicity.

The primary aim of this study was to compare three different enforcement styles in rural towns in Victoria and South Australia. This conference paper is a summary of the complex series of results arising from the study, but does not include the results of the comparison between the three enforcement styles which suggested that there are roles for both detection- and deterrence-based programs in rural areas. The detailed report of the project can be found in Harrison (2000). This conference paper is more concerned with the other aims of the study, where it was proposed to investigate the decision-making processes that might underlie drink driving in rural areas and the effect of contact with enforcement on the decision to drive after drinking. The project was concerned with decision making processes, and with the chain of decisions that lead to decisions to drive after drinking.

## **ISSUES IN DECISION-MAKING**

Understanding the link between traffic-law enforcement and driver behaviour has traditionally relied on the application of the deterrence theory, which in turn takes a normative or rational view of the processes underlying decision-making. The importance of incorporating a decision making model into the deterrence theory needs to be emphasised. Although under the control of many complex factors, human behaviour ultimately involves psychological processes that intervene between external contingencies (such as traffic enforcement) and the behaviour itself. Discussing driver behaviour in terms of its relationship with external factors without considering the role of psychological and cognitive factors would lead to an incomplete understanding of the behaviour concerned.

Beach and Lipshitz (1993) argue that there is a need to discard rational decision-making models (in general) in light of recent evidence that these models may be inappropriate for real-world behaviour. A number of authors (eg. Beach and Lipshitz, 1993; Klein, 1989, 1993) have addressed the relevance of rational decision-making models in the context of decisions in ordinary activities. In particular, they note:

- The computational intensiveness of rational decision-making models (which require that the likely consequences of every behavioural option be determined, valued, and compared before a decision is made) argues strongly against their application to most behaviours.
- People trained to use rational decision-making are reluctant to use it, using intuitive or subjective approaches even in situations where a rational approach might prove beneficial.
- There is evidence that people with experience in the decision-making context do not usually compare alternative behaviours. Instead, they evaluate the likely outcome of a single behaviour selected as the most likely to meet the situational demands. Where this option is satisfactory, it is acted upon. Alternative behavioural options appear to be generated only when the first generated behavioural response is unsatisfactory.

The decision environment in which driving behaviour occurs matches closely the characteristics emphasised by Orasanu and Connolly (1993) in their discussion of naturalistic decision making. The driving environment is poorly structured; it is uncertain and dynamic; the driver often has competing and ill-defined goals and motivations while driving; there are high levels of time-stress and risk; and the effects of momentary decisions become part of the next round of decision-making. It was considered appropriate to attempt to apply a naturalistic model of decision making to driver behaviour, specifically in the drink-driving area.

The recognition-primed decision-making (RPD) model (Klein, 1989, 1993) was chosen as an example of a naturalistic model and as an alternative to the normative model used in the deterrence theory. It emphasises the role of the recognition of situational cues and the application of previously learned behaviours associated with those cues. Klein suggested that there are a number of stages in the behavioural decision making process. The first stage involves the classification of the context or situation as either novel or familiar. The second and third stages involve the generation of an “action queue” of potential behaviours ordered in terms of their “typicality” and then the assessment of them one at a time until one is judged to be a satisfactory behaviour in the context or situation. The model is summarised (in the context of enforcement effects) in Figure 1. Assessment of the potential behaviour is based on a mental simulation of the likely consequences of the behaviour based on prior experience and other expectations. Under the RPD model, the cognitive computations required to evaluate these consequences are only required for as long as it takes to find a satisfactory (not necessarily optimal) behavioural response. There is no comparison between alternative behaviours.

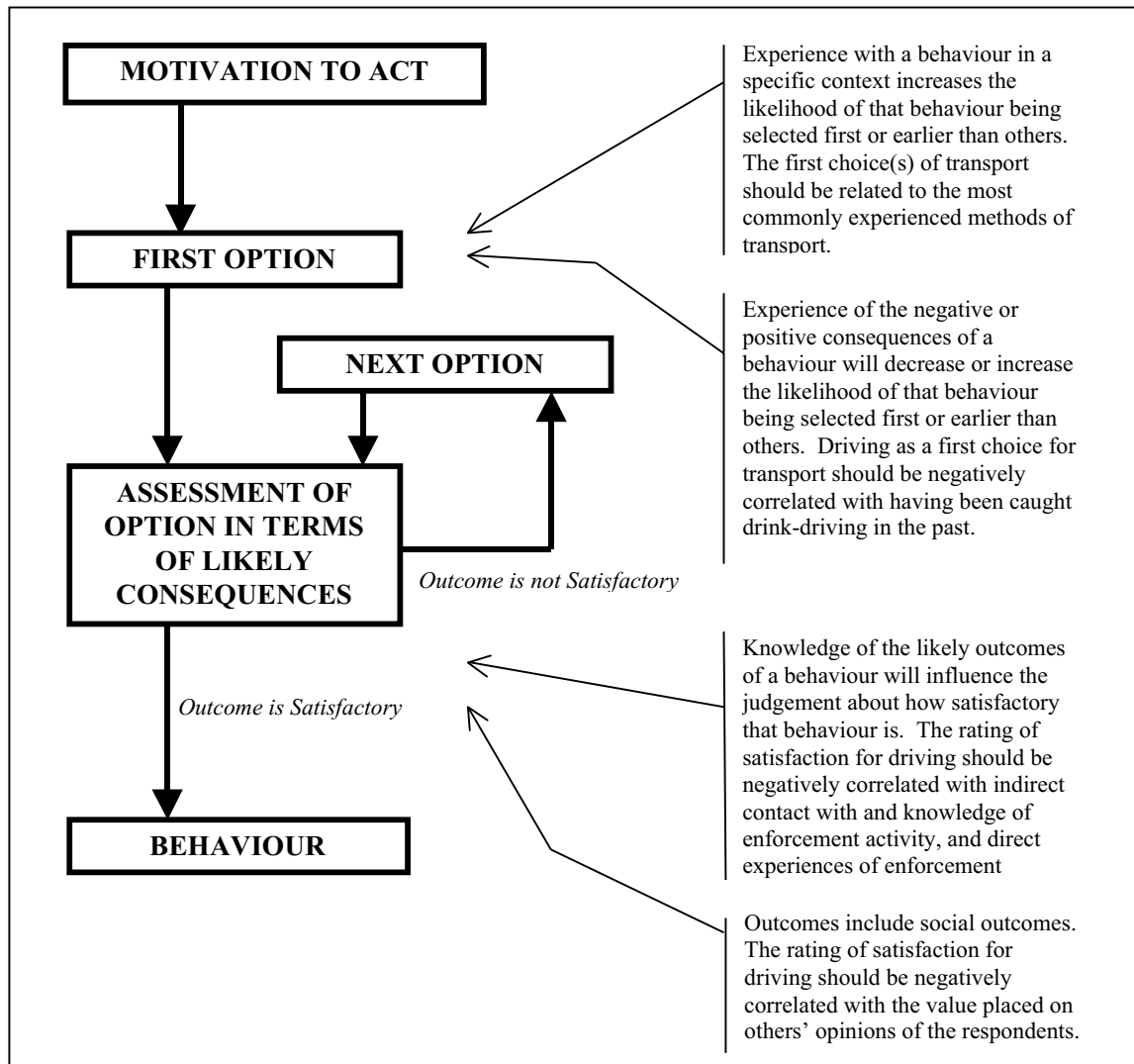
The RPD model is consistent with the Instance Theory of automaticity (Logan, 1988) which argues that experience with a particular behaviour in a particular context leads to an increased likelihood that the behaviour will be generated automatically in that context subsequently. Application of the RPD model to drink-driving is relatively straightforward, in part depending only on an additional notion that the strength of a context-behaviour link under the Logan (1988) instance theory can be modulated by prior consequences of that behaviour in that context.

Taking up Beach and Lipshitz’s (1993) view that behavioural decisions often serve the needs of more general goals or motivations, the drink-driver makes the decision to drive while intoxicated in the context of more general motivational factors that lead to drinking and that lead to wanting to go somewhere (eg. home or back to work) after consuming the alcohol. In this context, the ordering of behavioural options when faced with the motivation to leave the place of drinking will depend on previous successful experiences of driving after drinking (ie. not having crashed and having avoided detection), and on perceptions of the likelihood of detection based on experience. Under both Logan’s theory and Klein’s model, the most likely behaviour first considered in this context (assuming that it has occurred without negative consequences in the past) is driving. Under Klein’s RPD model it is likely that this potential behaviour would be assessed to be a satisfactory behaviour if the mental simulation does not generate any probable negative outcomes. Where the mental simulation results in the generation of a negative outcome that is not acceptable to the driver, behavioural options lower in the ordered queue would be considered until a satisfactory behaviour is chosen (such as using alternative transport).

Under this model of drink-driving decisions, the role of direct contact with enforcement and publicity (or knowledge of enforcement activity) is twofold. Contact with enforcement would serve to impact on the ordering of potential behaviours, and both would serve to direct the mental simulation of the likely consequences of potential behaviours. Direct experience of enforcement activity and its consequences (and other consequences of drink-driving such as crash involvement) would be expected to impact on the ordering of potential behaviours in a way that reduces the likelihood that driving would be the first potential behaviour considered. Under Logan’s (1988) model, each instance of a particular behaviour

in a particular context adds to the strength of association between contextual cues and behaviour. In this application of the Logan theory, personal experience with negative consequences of some behaviours in the past would weaken the link between context and behaviour, allowing other potential responses to be generated.

Direct and indirect (e.g. knowledge of others') experiences of enforcement and other consequences, and contact with consequence-focused public education materials would be expected to impact on the mental simulation used to assess whether the driving behaviour is satisfactory in the drinking context.



**Figure 1: The Recognition Primed Decision Making Model and Enforcement**

This RPD model of drink-driving behaviour suggests that the role of detection and punishment (specific deterrence) is to reduce the likelihood that the punished behaviour will be considered early in the ordered queue of potential behaviours. Direct experience of detection and punishment, under this model, acts differently to the threat of detection and other consequences (general deterrence) which do not impact on the ordering of potential behaviours but rather act as pointers to potential negative consequences in the assessment of the potential behaviours. This view of the different roles of direct and indirect experience has consequences for the development and implementation of countermeasures to drink driving which need to be investigated. It also leads to testable hypotheses which may serve to determine the appropriateness of the model as a basis for further countermeasure development. In particular it would be expected that the likelihood of generating “driving” as a first option in an ordered list of potential behaviours in the context of alcohol consumption should be inversely correlated with measures of the direct enforcement experiences of drivers but should be less correlated with their indirect experiences. Similarly, their satisfaction with driving as a choice should be correlated with

both direct and indirect experiences of enforcement and with perceptions of the consequences of drink-driving. These hypotheses were specifically tested in this study.

The other focus of this study was the decision chain that leads to drink-driving, and the enforcement related factors that are able to interfere in the decision process,

## **METHOD**

A survey of 342 hotel patrons in four rural population centres in south-eastern Australia (average population about 15,500) was conducted as part of the enforcement evaluation. Items were included in the survey to assess previous experiences of participants in relation to driving home after attendance at the hotel, their ordering of and satisfaction with various transport options, their enforcement experiences, and their drink-driving behaviour. The survey was conducted at the hotels, and in most cases all patrons were approached to take part (excluding those who were apparently intoxicated). The participation rate was almost 70%. Only items relevant to decision making are discussed here, and all comparisons and relationships discussed here are statistically significant (see Harrison, 2000).

## **RESULTS – ASSESSMENT OF THE RPD MODEL**

Respondents reported averages of 7 visits to the hotel per month, 15 hours of driving per week, and 3 hours spent at the hotel on the last visit. They reported an average of 0.9 instances per month of driving home from the hotel when potentially just over the limit. Twenty-four percent of the respondents were female, and the mean age was about 36 years. Eighty percent of respondents had seen random breath testing activity in the preceding four weeks and 44% knew of someone who had been breath tested for alcohol on the same period.

Driving to and from the hotel and inclusion of “Drive self” as one of the first three potential transport options for getting home (respondents were asked (early in the survey and without giving it too much thought) to suggest up to five methods of getting home) were both significantly related to the number of times respondents had driven to and from the hotel in the preceding four weeks. Respondents who included “Drive Self” as one of their first three suggestions reported almost twice as many trips from the hotel in which they drove themselves (4.8) as those who did not (2.5 trips). This pattern occurred for other transport modes as well – respondents were likely to think of transport methods that they had been using recently.

The inclusion of driving in the first three options suggested was significantly negatively related to having been caught drink-driving or knowing of someone who had been caught. This suggests that experience of the negative consequences of drink-driving influenced the position of “Drive Self” in the list of behavioural options generated by respondents. Indirect experiences of enforcement and social values were not significantly related to the inclusion of “Drive Self” in the top three transport methods.

Once selected as an option, satisfaction with driving home from the hotel as an option was significantly correlated with the perceived risk of detection for drink driving, having been caught drink driving, and having heard about others being tested or caught. These relationships, however, occurred only for those respondents who had not driven while potentially over the legal alcohol limit in the preceding month. Satisfaction with driving as an option was not significantly correlated with any enforcement or attitude measures for those drivers who had driven in the preceding month while potentially over the legal limit. Satisfaction with driving as an option was correlated with having driven home after the most recent visit to a hotel, but again only for those who had not recently driven while potentially over the limit.

## **RESULTS – THE DECISION CHAIN**

The chain of decisions leading to drink-driving was considered to involve decisions to go to the hotel or other alcohol outlet, to drive there, to drink alcohol, and to drive home. The relationships between items in the survey relevant to these decisions and other items were investigated to assess the factors associated with each part of the decision chain. The results are summarised below.

Having a recent history of driving while potentially over the limit was associated with a less negative attitude towards drink driving and speeding; a relatively low perceived risk of detection for drink driving; and relatively little personal awareness of drink-driving enforcement. It was also associated

with older participants; believing that driving themselves, the use of a taxi, or the use of another driver were relatively unsatisfactory; and including “drive self” in the first three transport responses when asked to nominate methods of getting home from the hotel.

For those respondents who did report having driven while potentially over the legal alcohol limit in the preceding month, the decision to drive to the hotel when they last attended a hotel was associated with placing less value on the opinion of others and lower levels of indirect awareness of enforcement activity. Driving to the hotel for this group was also associated with planning to spend a shorter period at the hotel, and being relatively older than other drivers. People who drove to the hotel were also more likely to rate their satisfaction with walking as a way to get home as very low.

Once respondents had driven to the hotel, relatively high levels of alcohol consumption were associated with greater acceptance of speeding and drink driving; relatively low levels of perceived risk of detection for drink driving; and relatively low levels of personal awareness of enforcement activity. People with their car at the hotel also consumed relatively high levels of alcohol (per hour) on their most recent visit if they spent longer at the hotel, and if they viewed driving and using a taxi as less satisfactory methods of getting home.

For those respondents who reported drinking a relatively large amount of alcohol and who also had driven to the hotel, driving home was not associated with any of the enforcement or attitudinal factors measured in the survey. Driving home was associated with spending relatively less time in the hotel and rating having another person drive them home as less satisfactory than other participants.

Across the sample, people who drove to the hotel were more likely to have driven when potentially over the legal alcohol limit in the preceding month than were those who did not drive.

Driving to the hotel was strongly related to driving home from the hotel across the sample. Only 14% of people who drove to the hotel used a different transport method to return home.

Amongst those who did drive to the hotel, driving home was unrelated to whether they had driven while potentially over the limit in the preceding month, and was related to how much alcohol they consumed while at the hotel. Thirty-one percent of those who consumed a relatively large amount of alcohol chose to use another form of transport to get home, while only 5% of lighter drinkers did so.

## **DISCUSSION**

The results discussed above form a small subset of the results of the surveys conducted with hotel patrons. They lend some support to the RPD model suggested here as the decision-making process underlying the behavioural outcomes of deterrence, and they provide some interesting pointers to the relationship between drink driving and enforcement.

The inclusion of driving home in the first few options suggested by respondents was related to their experience with different methods of transport to and from the hotel in the preceding four weeks. It was also related to their experiences of the enforcement-related or legal consequences of drink driving. Satisfaction with driving as an option was correlated with choosing to drive, and was related to the direct and indirect experiences of potential consequences of drink-driving. The latter result was restricted, however, to those respondents who did not tend to drink-drive. Respondents with a tendency towards driving while over the limit did not show a relationship between driving and their satisfaction with driving, nor a relationship between satisfaction with driving and any of the enforcement-related or social measures used in this survey.

Thus, the results provide some support for the RPD model, but raise some interesting questions concerning the assessment of the drive decision in the RPD model for those people who tend to drink-drive. It appears that the assessment component of the RPD model may not function in the same way for drink-drivers as it does for non-offenders. If this is so, then it suggests both an underlying reason for drink-driving (successful experiences of drink-driving lead to “driving” as the first behaviour considered when deciding how to get home from the hotel, and there is no assessment of this behaviour in light of the potential consequences) and an area for countermeasure development (how do we go about encouraging an assessment process prior to driving for drink-drivers).

In a more-general sense, the results of the survey broadly match the predictions generated by the RPD model. The inclusion of a naturalistic decision-making model in place of the normative model currently used in understanding the effects of deterrence on drink-driving behaviour may, therefore, be justified. Further work is now needed to assess the specific predictions of these models and to better

understand the implications of this approach for the development and improvement of countermeasures for drink-driving and other unsafe driving behaviours.

The analysis of the decision-chain data suggests that personal and indirect awareness of enforcement activity act to reduce the likelihood that people will choose risky options at two of the three decision points. Neither appears to influence the decision to drive home once a person has driven to the hotel and has consumed a relatively large amount of alcohol. Indirect awareness of enforcement activity appears to act most strongly in the decision to drive to the hotel, and is therefore likely to influence the final drink-driving behaviour in rural areas by reducing the likelihood that people will have their cars with them when they need to leave the hotel. Personal awareness of enforcement activity appears to influence the amount of alcohol consumed by people who have already driven to the hotel. Thus, personal awareness is likely to influence the amount of drink driving by influencing alcohol consumption by people who have driven to the hotel. Personal awareness of enforcement is also associated with the history of potential or borderline drink driving, and is therefore indirectly associated with the decision to drive to the hotel. This link, however, is likely to be less strong than that between driving to the hotel and indirect awareness of enforcement.

These results are important for a number of reasons. It is clear that awareness of enforcement activity is associated with lower levels of drink driving by rural hotel patrons. This lends support to the continued use of enforcement programs in these areas, perhaps restructured in accord with the results discussed elsewhere in the report. More importantly, the results here suggest that enforcement and the threat of detection act earlier in the chain of events than might have been expected. They do not appear to influence the decision to drive once at the hotel and having consumed alcohol. Rather they act at the time the patron decides how to get to the hotel and when they make decisions about how much alcohol to consume.

This has some important implications for public education programs which use enforcement and the threat of detection as motivators for behavioural change. Linking the threat of detection with decisions about driving from the place of alcohol consumption may be significantly less effective than linking it with decisions about getting there and decisions about alcohol consumption. Developing public education materials focused on earlier points in the decision chain may make better use of the decision processes already occurring in the community.

## ACKNOWLEDGMENT

This work was completed while Warren Harrison was a Senior Research Fellow at Monash University Accident Research Centre. Warren is now a Senior Behavioural Scientist at ARRB Transport Research Ltd and can be emailed at warrenh@arrb.org.au

## REFERENCES

- Beach, L.R. & Lipshitz, R. (1993). Why classical decision theory is an inappropriate standard for evaluating and aiding most human decision making. In Klein, G.A., Orasanu, J., Calderwood, R., & Zsombok, C.E. (Eds). *Decision Making in Action: Models and Methods*. Norwood, NJ: Ablex.
- Harrison, W.A. (2000) *Drink driving and enforcement*. Austroads
- Klein, G.A. (1989). Recognition-primed decisions. In W. Rouse (Ed.). *Advances in Man-Machine System Research*. Greenwich, CT: JAI Press.
- Klein, G.A. (1993). A recognition-primed decision (RPD) model of rapid decision making. in G.A. Klein, J. Orasanu, R. Calderwood, & E. Zsombok, (Eds.) *Decision Making in Action: Models and Methods*. Norwood, NJ: Ablex.
- Orasanu, J. & Connolly, T. (1993). The reinvention of decision making. In Klein, G.A., Orasanu, J., Calderwood, R., & Zsombok, C.E. (Eds). *Decision Making in Action: Models and Methods*. Norwood, NJ: Ablex.
- Logan, G.D. (1988). Automaticity, resources and memory: Theoretical controversies and practical implications. *Human Factors*, 30, 583-598
- Ohlsson, S. (1996). Learning from performance errors. *Psychological Review*. 103, 241-262.