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Author (s) Ross Homel				
Performing Organisation (Name and Address) School of Behavioural Sciences Macquarie University North Ryde 2113				
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<p>Abstract A theoretical model of the process of general deterrence is constructed, and tested against data collected as part of an evaluation of the impact of the introduction of random breath testing (RBT) in New South Wales, Australia in December 1982. The model entails a specification of the causal links between police activity and media publicity, and behaviour change. The model goes beyond utility theory in the conceptualisation of the processes whereby an individual may choose between driving after drinking and alternative modes of action. The data were derived from two surveys of the general population conducted within four months of the introduction of RBT, and included a longitudinal component (185 drinking motorists were reinterviewed after six weeks). Despite problems of measurement, the theoretical model was strongly supported for the short term impact of RBT. It is concluded that deterrence is an unstable process, and that the long term deterrent impact of measures like RBT depends mainly on the level of continual, visible police enforcement.</p>				
<p>KEYWORDS: drinking and driving, random breath testing, deterrence, police enforcement, conviction, penalties, behaviour change, peer pressure</p>				

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Policing the Drinking Driver

Random Breath Testing and the Process of Deterrence

Ross Homel
School of Behavioural
Sciences
Macquarie University

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PREFACE AND ACKNOWLEDGEMENTS

At one level, this report is about the impact of a specific drink-drive countermeasure (random breath testing, or RBT) in a particular place (New South Wales, Australia) at a particular time (early 1983). At another level, however, the research reported herein is concerned with general questions of *deterrence*, with the impact of the criminal justice system on the perceptions and behaviours of a broad cross-section of the population. In contrast to much of the research in the drink-drive field, the research questions are concerned with the psychological and sociological *processes* whereby behaviour is altered in the short-term as the result of a massive legal intervention.

The main significance of the research probably lies, therefore, not in the detailed empirical findings for New South Wales (important as I believe these are) but in the construction of a theoretical framework and research design which allow the causal chains linking legal punishments with short-term behaviour changes to be identified and the critical links quantified. It is my hope that another researcher could take this theoretical model and research design and apply them, with appropriate modifications, to the effects of a sudden, publicised change in the law in their own jurisdiction.

However, it is unlikely that the kind of research described in this report will be carried out every time something like RBT is introduced. For one thing it is very expensive, since it entails longitudinal surveys, and for another it may be seen by some pragmatic officials as unnecessarily complex and theoretical. In many instances traffic crash statistics, which are routinely collected and therefore do not constitute a major research cost, will provide data sufficient to enlighten all the important policy decisions. Nevertheless, for those in the field who have wondered just how law enforcement influences the perceptions and behaviours of the target population, or who have struggled with the design of a publicity campaign intended to reduce alcohol related traffic crashes, there may be a few clues in the present report, and a few ideas for future in-depth research.

Of course no piece of research answers all the questions. The most important question left unanswered in the present study is whether RBT in New South Wales will defy all the rules and achieve a permanent deterrent impact. Again, however, there are some clues in the analysis as to how such an effect might occur and the conditions required to bring it about, so that even if the New South Wales campaign goes the way of all previous campaigns, the research may help someone else to achieve a better result in the future. In any case, it is to be hoped that the present research will have contributed to a better standard of evaluation of the impact of drink-drive countermeasures like RBT.

In this report, I have adopted the policy of using the masculine form when referring to the drinking driver. This is not due to any anti-feminist bias (quite the contrary) but to the fact that about 85% of drinking drivers on the road are men, and 98% of all convicted offenders are men. The use of the masculine form serves as a reminder that drink-driving, like most other social problems, can be blamed mainly on the dominant sex.

This study was supported financially by the NSW Drug and Alcohol Authority, by Australian National Opinion Polls (ANOP), and by the Federal Office of Road Safety, Australian Department of Transport. I would like to thank Bruce Flaherty of the Authority and Carol Boughton of the Federal Office of Road Safety for their encouragement. However, the opinions and conclusions expressed in this report are my own and do not necessarily reflect those of the FORS or the Drug and Alcohol Authority. Special thanks are also due to Les Winton of ANOP, who donated resources to cover the shortfall in funds for the first survey. Without Les' support, and expert advice, the study could never have been undertaken. Needless to say, the questionnaires and research design are entirely my responsibility.

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The RBT advertisement on page 17 is reprinted by kind permission of John Bevins Pty Ltd. and the NSW Department of Motor Transport.

Finally, I owe an enormous debt to my families, both nuclear and extended. My wife Beverley suffered nobly through the completion of a project which seemed simple to start with but became (as she predicted) a marathon to complete. My children, who are really too young to understand, have also suffered many weeks without Daddy as the manuscript was typed and revised many times.

I have dedicated this work to my nephew, who died on his motorbike as this report was being born.

INTRODUCTION AND SUMMARY

The Nature of the Study

This study is concerned with the impact of the criminal justice system on the behaviour of drinking drivers and potential drinking drivers. Specifically, the study is about *deterrence*.

Deterrence is at the heart of the criminal law (Morris, cited in Zimring and Hawkins, 1973), and the criminal law is the primary tool for road accident prevention. The theory of deterrence through criminal law enforcement has determined the major system of public responsibility for road safety in the United States and in countries, like Australia, with a similar cultural heritage (Gusfield, 1981b). The major objective of this study is to test the claims for the deterrent effectiveness of a specific aspect of the operation of the law in New South Wales, by investigating the processes whereby deterrence may take place. The aspect of the criminal justice system which is the focus of attention is the enforcement of drink-drive law by police using random breath testing (RBT). The theoretical focus is *the process of general deterrence* - the ways in which RBT succeeds or does not succeed in deterring potential offenders.

The Value of Studying Drinking and Driving

The research in many ways is the result of an attempt to follow the agenda set by Zimring and Hawkins (1973) and by Andenaes (1974) in their pioneering studies of deterrence. Zimring and Hawkins suggest four criteria for determining research priorities in the field of crime control: the social importance of the problem to be studied, the social benefits which could flow from correct hypotheses about the deterrence process, the amenability of the issue to reliable assessment, and finally the significance of the issue to deterrence theory as a whole. They assert that the problem of the drink-driver "scores close to the top on all four of our criteria for according research priority" (p. 345).

Apart from the social importance of the problem, one of the chief advantages of drink-driving over other offences as a vehicle for research is the ready availability of data. New South Wales is one of the two states in Australia where good quality court statistics are available. An earlier study of the marginal specific deterrent impact of penalties imposed on convicted offenders (Homel, 1975; 1979; 1980a; 1981a) relied heavily on these statistical series, which the present author helped to develop some years ago when employed by the New South Wales Bureau of Crime Statistics and Research. A further advantage of studying drinking and driving is that sudden, publicised changes in law enforcement methods (like RBT) occur from time to time, making it possible to use quasi-experimental techniques to evaluate the impact of the change (Ross and McCleary, 1983). However, the design of the present study differs from the designs commonly employed in quasi-experimental research, in that the emphasis is on the social and psychological *processes* involved in deterrence, rather than on an analysis of fluctuations in crash statistics.

Deficiencies in Previous Research into the Deterrence of the Drinking Driver

There are a number of deficiencies in existing research on the deterrence of drink-driving. Although often of very high quality, the research on the general deterrent impact of innovations in drink-drive law and its enforcement has generally not attempted to trace the assumed causal chain linking objective legal activities with drink-driving behaviour. In other words, the process of deterrence has not been examined explicitly, and deterrent effects have been inferred from variations in crash statistics. For example, it has often been argued without direct evidence that declines in traffic crash rates coincident with changes in the law have been caused by increases in subjective arrest probabilities (Ross, 1982). A specific objective of the present study is to remedy this defect by measuring perceived arrest certainty, and relating it to other elements in the assumed causal chain.

The research on the specific deterrent effects of penalties has likewise failed to pay sufficient attention to perceptual variables, since the perceived severities of the punishments inflicted on

convicted offenders have seldom been measured. This omission is surprising, given that perceived severity is at the heart of the concept of specific deterrence (Gibbs, 1979; Brody, 1976). Consequently, a major objective of the penalties research cited above was to develop a measure of perceived severity of penalty among convicted offenders.

In summary, the emphasis in this report is on understanding the deterrence process. The study of the causal chain which is assumed on theoretical grounds to link police RBT activity with drink-drive behaviour is one way of studying the process of general deterrence. In this respect the present study goes beyond previous research.

Social Policy

The primary goals of this study are to understand the effects of RBT on drinking drivers and potential drinking drivers, and to test the adequacy of deterrence as an explanatory system. A subsidiary goal is to indicate from the data the directions social policy might take. The key questions concern methods of police enforcement of drink-drive law generally and of RBT specifically, the role of publicity, and the desirability of severe penalties. A summary of the policy recommendations, which are discussed at greater length in Chapter 6, is set out at the end of this section.

The Deterrence Model

In order to study the deterrence process, it is necessary to develop a model of how the deterrence of the drinking driver is supposed to take place, and to make explicit the causal sequence linking law enforcement with drinking and driving behaviour. Such a model, developed from the general literature on deterrence and from the drink-drive literature, is set out in general form in Chapter 2, and then applied to the impact of RBT (Figure 2.1). This model is the basis for the analyses reported in Chapter 5. The major purpose of the data analyses is to test the adequacy of the deterrence model as a description of the impact of RBT in New South Wales within four months after its introduction.

A fundamental assumption of the model is that general and specific deterrence are one and the same phenomenon, and that it is appropriate to consider them together within a single theoretical framework. As Zimring and Hawkins (1973) observe, specific deterrence is really a special effort to make individuals more sensitive to general deterrence. For Walker (1979), the only difference between the two processes is that one depends on memory and the other on imagination. At the level of theory this statement is fairly accurate, but complications arise when non-deterrent properties of punishment are considered (for example, the sense of injustice). Moreover, because two different populations are involved (potential offenders and those convicted and punished), studies of general and marginal specific deterrence require rather different research designs. Nevertheless when outlining a model of the deterrence process, it seems appropriate to encompass both phenomena within the same general framework.

If drink-drivers, whether convicted or not, stop committing the offence because they fear legal punishments, they may be said to have been deterred. This phenomenon is often referred to as *simple deterrence*, to distinguish it from more subtle and long term effects of legal sanctions (Ross, 1982). Simple deterrence is the focus of the present research. Nevertheless, the studies of Gusfield (1981a, 1981b) and Norström (1983) remind us of the broad social context within which drink-drive laws operate and of the many ways in which law enforcement may affect drink-drive behaviour in the short term. A very real possibility is that legal innovations like RBT may make it easier for some people to resist peer pressure to drink, thereby reducing the level of drinking and driving by a mechanism other than fear of punishment. This possibility is allowed for in the model, and tested in the analysis.

Many other subtle variations in the model are considered, particularly with respect to the effects of sociodemographic variables such as age, sex and alcohol consumption. However, the model does not specify in any detail the ways in which groups may differ in the extent to which they are deterrable. There is simply not enough known about the causes of drink-driving or the composition of the drink-drive population to allow such theoretical specification. The typology of

offenders, developed from the data of the penalties study (Homel, 1981a), was designed to facilitate theoretical developments of this kind.

Overview of the Chapters

Chapter 1 sets the scene for the whole study. The second half of the chapter is devoted to a description of how the drink-drive countermeasure system operates in New South Wales, with special attention being paid to RBT and its history. These sections were written with overseas readers particularly in mind, but even Australian readers may find it necessary to review the operations of the police and the courts before considering the empirical work. The first half of the first chapter is focussed on ways of researching the interaction between the criminal justice system and the drinking driver, and on the social and cultural context of drinking and driving. An important question considered in this first half is the identity of the drinking driver. Discussion of this question helps set the context for the deterrence analyses. This discussion also entails a consideration of the role of young men in drinking and driving, and prepares the way for an examination of whether they are more or less *detrable than other groups*, a consistent subtheme of the data analyses.

Chapter 2 is the main theory chapter, and contains a description of the deterrence model and how it can be applied to the study of RBT and to the study of penalties imposed on convicted offenders. The model is related to the theoretical literature on deterrence, and an attempt is made to go beyond utility theory as a description of how the decision to drink and drive may take place.

Empirical research on deterrence is reviewed in Chapter 3, with particular emphasis being placed on drink-drive research and on studies which have employed perceptual measures. The aim of the literature review is not so much to cover exhaustively all extant studies (although the coverage should be fairly complete) as to identify the major unanswered questions as well as the most troublesome methodological problems. The model set out in Chapter 2 provides a framework for the review, and readers are therefore advised to absorb Chapter 2 before reading Chapter 3.

Chapters 2 and 3 together provide the basis for the detailed research questions and for the methods of analysis employed in Chapter 5. Chapter 4 contains the research questions for the study, as well as the research methods. The results of the study are reported in one chapter (Chapter 5).

In Chapter 6 the implications for the deterrence model of the results of the analyses are considered, and directions for future research discussed. The chapter includes a brief examination of the policy implications of the study. These policy issues are prefigured in Chapter 1, and bear on police enforcement procedures, the undesirability of severe penalties, the appropriateness of particularly punitive measures directed at young men, and the role of publicity. The chapter concludes with a discussion of the behavioural impact of law and the value of deterrence-based policies.

Summary of Report

Theoretical Model

Four key propositions undergird the model. First of all, individuals must be *exposed* personally to law enforcement, or must receive information about law enforcement, before they can be deterred. Secondly, neither exposure to law enforcement nor perceptions of legal sanctions have any influence on behaviour apart from a process of *evaluation* whereby these experiences or cognitions are given a meaning. Thirdly, the extent to which an individual is deterred can, in principle, be measured by questioning him or her. Finally, there must be an investigation of the effects of official legal activity (RBT, punishment) on *non-legal sanctions* which inhibit or encourage drinking and driving, so that the deterrent effects of legal activity can be clearly distinguished from other effects.

Briefly stated, the model proposes that official legal activities and drink-driving are linked through exposure to law enforcement leading to perceptions of severe and/or certain sanctions and

hence to attempts to avoid committing the offence when there is a risk of driving whilst impaired. The class of people to whom deterrence will be applicable are, in the case of RBT, drivers who drink (at least occasionally), and in the case of penalties, those who have been penalised. The behaviour of all types of persons can be described in terms of the deterrence model, even the behaviour of persons who might have highly developed consciences concerning drinking and driving and the behaviour of people labelled as problem drinkers or alcoholics. However, it is recognised that there are two forms of non-legal sanctions which can influence behaviour in contrary directions: feelings of guilt if an individual does drink and drive (self imposed punishment) and informal punishments imposed by peers if an individual does *not* drive after drinking. (In the less common situation in which stigma is associated with committing the offence, all forms of sanctions operate in the same direction.)

In most cases the drink-drive decision is framed as a choice between losses, and the perceived costs associated with non-legal sanctions enter into the decision making process together with the perceived costs of legal sanctions in a complex and possibly interactive fashion. Following Kahneman and Tversky (1982), sure losses (such as social stigma) will weigh more heavily in the decision process than merely possible losses (such as apprehension for drinking and driving).

At the heart of the model are the perceptions of legal sanctions. However, these perceptions on their own are not sufficient to explain behaviour; a process of evaluation takes place, whereby the individual weighs the personally determined costs of the threatened consequences of his behaviour. Thus two individuals might have exactly the same perception of the penalties which would be applied to them for drinking and driving, but one might be much less worried than the other at the prospect of actually experiencing those penalties.

Perceptions and evaluations of sanctions (both legal and non-legal) influence behaviour. Legal sanctions may encourage individuals to adopt strategies to avoid drinking and driving on occasions when committing the offence is a possibility, but informal sanctions may have the opposite effect. In particular, the belief that threatened punishments would be personally unpleasant and the belief that the chances of arrest are high lead to increased attempts to avoid drink-driving. (Note that the measurement of attempts to avoid drink-driving necessarily requires some degree of reporting of motivations by the respondent, since only actions which are undertaken for a specific *reason* are of theoretical interest.) Such avoidance strategies, in turn, lead to less drinking and driving (or to drinking and driving at lower blood alcohol levels) and this results in fewer traffic crashes.

Given that informal and formal sanctions operate in opposite directions in many cases, a prediction concerning deterrence is not possible unless the effect of legal sanctions on the informal sanctions can be stipulated. In the case of both RBT and the infliction of penalties, it is proposed that the legal actions reduce peer pressure to drive after drinking by providing an exculpatory defence or legitimate excuse for actions taken to avoid the offence. In the case of those with a conviction, the more severe the punishment actually experienced, the more cogent the excuse.

In order to be a sociological model, perceptions must be linked in some way with the objective legal actions. It is proposed that official legal activity is relevant to the individual only inasmuch as it enters the world of his everyday experience. Laws which are passed or punishments which are imposed without the knowledge of the individual cannot affect his decision making processes, at least until the activities of other people who affect that individual are altered. Thus *exposure* to the legal actions is the variable linking official activity with perceptions and evaluations of sanctions. The more intensive or frequent the official activity, the more intense or frequent will be the exposure of the threatened or punished population. Exposure might occur through observing or experiencing police breath testing, or through knowing others exposed in this way. In addition, the experience of punishment through a conviction is a form of exposure.

The model predicts that those exposed to legal sanctions in any of these ways will be fearful of the consequences of drinking and driving and will modify their behaviours accordingly. But the relationship between exposure and fear of sanctions is not automatic. Once again, it is proposed that an individualised process of evaluation takes place. The experience of being randomly tested may have more impact on one driver than on another; the experience of a heavy fine and a long period of disqualification may be interpreted by a repeat offender as fair, or at least to be expected, while exactly the same penalty may be interpreted by a first offender as extremely tough. These differing constructions of the meaning of similar experiences will lead to differing evaluations of threatened or actual legal sanctions.

Finally, the model incorporates a range of social and demographic variables, such as alcohol consumption, age and sex. These variables are assumed to influence all components of the model, including rates of exposure, evaluations of the meaning of exposure, perceptions and evaluations of legal sanctions, strategies to avoid drinking and driving, drink-driving behaviour and the intensity with which non-legal sanctions apply. One effect of importance is that individuals who have broken the law with impunity, particularly those who have successfully driven over the legal limit, will not fear legal sanctions as much as those without this experience of law breaking. Although predictions concerning the nature of other effects can be made, the possibilities are so numerous and complex that they are better dealt with on an ad hoc basis when the major paths of the model are investigated.

Research Design

The study is based on interviews with randomly selected residents of New South Wales. The study was conducted in two stages. The first stage (February 1983) involved a sample of 400 Sydney residents, and was conducted 10 weeks after the introduction of RBT (December 17, 1982). The second stage (April 1983) involved 200 Sydney residents and 400 residents in other parts of New South Wales, and was conducted just after Easter 1983, six weeks after the first stage.

This time period between stages was chosen because a quarter of a million dollars was spent on RBT media publicity over Easter, and an objective of the study was to assess the relative deterrent values of publicity and visible RBT enforcement. To facilitate this analysis, in the second stage 185 drinking licence holders were reinterviewed, making the study longitudinal, and towns and cities outside Sydney were selected so as to ensure maximum variation in intensity of enforcement of RBT over the Easter period. Interviews in both surveys included questions on perceptions of sanctions, exposure to RBT and to RBT publicity, and behavioural responses to RBT.

Main Results

The community context. RBT was introduced into a community in which the great majority of motorists drink. Nearly one drinking motorist in ten can be classified as a heavy drinker, and many of those who consume lesser quantities frequently engage in "binge" drinking leading to drunkenness. This latter pattern of drinking is characteristic of young men, particularly those in their early twenties, for whom beer is the preferred beverage. Men of this age often feel great pressure to continue drinking when in a group situation, although such pressure can be felt by all sectors of the community.

Driving after drinking is common behaviour in New South Wales. Nearly half of all drinking licence holders admitted to driving while intoxicated at some time in the past, and nearly one in ten had driven while intoxicated at least twice in the four months since the introduction of RBT. More than one in five of the heavy drinkers had driven while intoxicated at least twice, partly because they felt peer pressure very keenly. High alcohol consumption, perceived pressure to drink and driving while intoxicated comprise a cluster of correlated attributes. However, as a response to RBT, drivers with these characteristics were adopting a wider than normal range of strategies to avoid drink-driving.

Support for the deterrence model. Through police enforcement and media publicity, a very high proportion of motorists were aware of RBT, and more than one in ten had been tested personally within three months of the enactment of the law. As expected, the intensity of police random testing in an area was a major determinant of an individual's chances of being randomly tested, and was therefore a determinant of other aspects of exposure, such as the number of friends and acquaintances tested. The number of one's friends tested, rather than other aspects of exposure, was in turn a strong predictor of the perceived chances of being tested and arrested. Thus objective levels of enforcement were linked with perceptions of sanctions through this particular aspect of exposure. Finally, following the causal chain hypothesised in Figure 2.1, perceptions of the chances of arrest predicted the number of ways in which respondents were modifying both their

drinking and their driving practices. The major predictions of the deterrence model might therefore be said to have been verified.

A number of other results provided support for the assertion that RBT achieved a deterrent effect in New South Wales, including the reasons offered for either drink-driving or not drink-driving and the outcome of the analysis of the longitudinal data. In the longitudinal analysis, direct exposure to RBT in the period between interviews corresponded to increased modifications to travel arrangements, and conversely experience with drink-driving corresponded to a decline in the number of such modifications. In addition, perceptions of an increase in penalty severity correlated with reduced drink-driving in the period between interviews, a surprising result in view of the literature but nevertheless in accordance with the deterrence model. The replication of Buikhuisen's (1969) study encourages the view that there is a relationship between perceptions and evaluations of penalty severity which varies systematically with social factors.

The relative importance of publicity and exposure to police enforcement of RBT. Despite the intense publicity accorded RBT over Easter 1983, in the longitudinal analysis exposure to police enforcement, rather than exposure to publicity, correlated with changes to travel practices. However, at this time about 95% of the target population were aware of RBT because of the initial publicity campaign, so it is not valid to conclude that publicity did not influence perceptions or behaviour. In the analysis of data from the April survey, those exposed to TV publicity (68.3% of the sample) had altered their travel arrangements to a greater extent than those not exposed to TV publicity. Nevertheless it is likely that in order to *maintain* a deterrent effect created initially by massive publicity visible police enforcement is more important than further publicity campaigns, at least in the first few months.

The effects of RBT on peer pressure to drink. A substantial minority (40%) of drinking motorists found it easier since RBT to resist pressure to drink, and this in turn appeared to be an influence on behaviour independent of the effects of fear of punishment. On the other hand, one drinking motorist in twelve claimed to find it more difficult since RBT to cope with group pressure to drink. However, these people also had higher perceptions of the chances of arrest. In addition, among those who felt the greatest pressure to drink, an increase between interviews in the perceived chance of being tested coincided with a decline in the number of modifications to travel arrangements. These results are consistent with the deterrence model, since they suggest that when there is a conflict between the effects of formal and informal sanctions, informal sanctions (which are a *sure* loss) will probably emerge as the stronger force.

The effects of alcohol consumption. One of the clearest findings of the study was that the greater a respondent's consumption of alcohol, and the greater the perceived pressure on him to drink, the more ways he reported modifying both his drinking habits and his travel arrangements. However there was evidence that among heavy drinkers the contradictory pressures of peer pressure and fear of arrest produced a psychologically unstable situation, making the deterrent impact of RBT in many cases rather short-lived.

The effects of a conviction. One of the most interesting results was an interaction between arrest certainty and a conviction for drink-driving. Among those with a conviction, arrest certainty explained nearly 20% of the variance in the number of changes to travel practices, compared with little more than 1% among those without a conviction. However the evidence fell short of establishing an absolute specific deterrent effect of punishment, since the interaction became non-significant when analysis was restricted to those who reported having driven whilst impaired sometime in the past. Nevertheless, those with a conviction were more likely to cite fear of arrest as a reason for avoiding drinking and driving. These results are consistent with the argument that legal threats have greater deterrent impact for those with a conviction because the threatened punishments are not merely theoretical. It is also of interest that the convicted group made more changes to their travel behaviours between interviews, an effect which was amplified if penalties were believed to have increased when RBT was introduced. This last interaction strengthens the argument that motorists with a conviction are more responsive than average to the threat of legal punishments.

The role of the perceived severity of penalty. Only one measure of perceived penalty severity - whether respondents believed penalties had increased when RBT was introduced - had any predictive power. The analyses based on this variable suggest that when the perceived chances of arrest are high, perceived penalty severity can have a deterrent impact additional to that of arrest certainty, particularly among those who have already suffered legal punishments for

drinking and driving.

The effects of age and sex. Neither age nor sex predicted arrest certainty on its own or after adjustment for other variables, and neither variable played any significant role in the longitudinal analysis. These results suggest that RBT had much the same impact for men and women of all ages. However, the results of the analyses of changes in behaviour indicated that young men were more influenced by RBT than other groups. Moreover, men were more likely to cite fear of arrest as an explanation for their actions in avoiding drinking and driving, suggesting that the measure of arrest certainty may not be completely satisfactory. Thus men (young men in particular), were if anything more deterred by RBT than women (and older men). The only exception to this conclusion relates to men aged 21-24, who were slightly less likely than average to modify their drinking habits. No interactions with age and sex were significant, reinforcing the general conclusion that men and women of all ages were, on the whole, about equally responsive to RBT.

The effects of socioeconomic status. The shape of the relationship between socioeconomic status (measured by occupation and education) and arrest certainty was roughly an inverted-U, with those in the middle range (lower white collar and skilled blue collar) being most fearful of arrest. Occupation was significant as a predictor of changes in travel and drinking behaviours, but dropped out of the model when adjusted for age and other variables. It seems that RBT had roughly the same behavioural impact at all status levels.

Problems for the deterrence model. In a number of respects the analysis yielded findings which are not consistent with the predictions of the deterrence model. Many of the problems centre on the failure of the perceptual variables to behave as predicted. The analysis of reasons for not drink-driving suggests that the measure of arrest certainty may have missed important aspects of the perceptual process. This impression is supported by the results of many of the statistical analyses. Thus the effects of exposure to RBT on behaviour change should theoretically have been mediated through perceptions of the chances of arrest, but frequently exposure had a direct correlation with behaviour. In addition, drink-driving between interviews should have been predicted by perceptions in the first stage survey (February) of the chances of being randomly tested. Most serious was the failure to find a positive correlation between changes in the perceived probability of being tested between interviews and changes in the number of modifications to behaviour.

Deterrence as an unstable process. The data analyses, including those focussed on peer pressure and on the experiential hypothesis, suggest that RBT is always in the process of losing its effectiveness among drivers who, because they feel under pressure to drink or because they haven't seen RBT in operation for some time, take the risk of driving after drinking. However, through personal exposure to RBT new groups of motorists are constantly being added to the pool of those who are deterred. Thus whether a deterrent effect is maintained or not is essentially an outcome of a delicate balance, over time, between the forces maintaining and those tending to erode perceptions of arrest for drinking and driving as a likely event. This balancing process is set out as the "hole in the bucket" model of deterrence in Figure 6.1.

According to this model, the long-term impact of RBT will depend on the relative sizes of the input and output effects - in other words, how full the bucket can be kept through police enforcement. If RBT is to have a sustained impact on the road toll, the number of people being reminded of the operation of RBT must exceed the number lost through peer pressure, lack of exposure to RBT operations, or experience with successful drink-drive episodes.

Policy Recommendations

1. In New South Wales RBT should be continued indefinitely in much the same form as at present. In other jurisdictions, RBT or a similar law should be introduced, and should be enforced in a highly visible manner and supported by extensive media publicity.
2. When a high level of awareness of RBT is achieved through publicity (the situation in New South Wales), the efficiency of the visible police enforcement of RBT should be maximised. Publicity should not be neglected, but could operate at a less intense and less frequent level than during the initial months of the law.

3. *Gaps in police procedures* which may lessen the deterrent impact of their operations should be plugged. Problems of police visibility in bad weather need to be addressed, and steps need to be taken to ensure that police time devoted to RBT is not consumed by paperwork. Sufficient mobile breath analysis units to allow motorists who are found to be over the limit to be processed quickly should be available to the police. Attempts by motorists to avoid RBT through the careful calculation of back road routes should be countered.
4. Police should be encouraged to *experiment with different methods of enforcement of RBT*, for example through intense blitzes in local areas or through variations in methods to counter avoidance tactics by motorists. Such experiments should be planned and evaluated scientifically.
5. *The inevitable trend toward an apprehension based policy should be recognised*, and countered through in-service training of police, involvement by police in experiments to improve the operation of RBT, and through general RBT publicity.
6. *An extensive media campaign* (probably at Christmas) should be undertaken every two or three years to reinforce the operation of RBT. In the intervening periods, continuous but not intense publicity should be carried out, with the objective of reminding the public that police are still active. The publicity should reinforce police activity rather than be of a general "anti-drink-driving" type, although the latter type of campaign could be conducted at any time to influence the social milieu of drinkers. TV, radio and the print media should all be utilised.
7. Outside of RBT, *police enforcement of drink-drive law should be concentrated in high risk times and places*, rather than on high risk motorists such as young, beer drinking men.
8. *Specialised media and education campaigns* should be developed to influence newly licensed drivers and men who feel particularly sensitive to group pressure to drink. A program of education about RBT could operate among Year 10 students at school. For both groups, publicity along the lines that it is alright to say "no" may be helpful. Radio may be a more effective way of reaching young people than TV or newspapers, but other forms of outreach, such as commercials on home videos, may need to be developed.
9. *Penalties for drinking and driving should not be increased*, either in the legislation or in practice.

1. DRINKING DRIVERS AND THE CRIMINAL JUSTICE SYSTEM

In all developed countries, the criminal justice system is assigned a key role in the fight against drinking and driving. The problem is construed not as one of car design (constructing a crash proof vehicle), or of the regulation of big business (reconciling profits from the sale of alcohol with public safety), or as one of the roadside environment (making it more forgiving of the inebriated motorist). Responsibility is placed squarely on the shoulders of the individual driver. If he or she cannot be educated or persuaded to separate drinking and driving, then reliance must be placed on the heavy hand of the law to deter, or in the case of the convicted offender, to punish and incapacitate as well. To speak therefore of *drink-drive countermeasures* as they currently operate is, by and large, equivalent to discussing the operation of the police, courts, licensing agencies and prisons. This is particularly the case in Australia, which has some of the toughest drink-driving laws of any western nation (Johnston, 1982).

The purpose of this study is to evaluate the effectiveness of some of the tough legal measures adopted in New South Wales to deter the drinking driver. Specifically, the focus is on the general deterrent effectiveness of random breath testing (RBT).

This chapter is designed to provide a framework both for the theoretical model of the deterrence process proposed in Chapter 2, and for the data analyses set out in Chapter 5. In the first section of this chapter, ways of studying the interaction of drinking drivers with the police and the courts are examined briefly. The traditional approach (the approach adopted, on the whole, in this study) is to focus on the impact of the criminal justice system on the behaviour of offenders and potential offenders. The second approach, which is usually called *interactionist*, is to focus on the definition of drinking and driving as a crime and on the way in which the problem is managed by the agents of social control (particularly police and court officials).

Some of the insights from the interactionist literature are applied to the drink-driving phenomenon in subsequent sections of the chapter. In the second section the implications for deterrence of the ambivalent status of drink-driving as a crime are explored. This is followed in the third section by an examination of what is known about the composition of the drink-driving population. The composition of the drink-driver population is of particular importance to the study of deterrence, since it is possible that not all drivers are equally deterred by legal punishments. However, the question is not simply a behavioural one - a matter of objective fact - it is also a question of definition and social control. It is argued that definitive answers to the behavioural questions are not to be had from the literature, partly because the research results reflect the shifting definitions and perspectives of competing interest groups.

The second half of the chapter contains a description of how the criminal justice system operates in New South Wales. These sections provide background information essential for an understanding of the material in later chapters. The penalties normally imposed for drink-drive offences are described first, together with the processes of enforcement prior to the introduction of RBT. The operation of RBT and the manner of its introduction are then dealt with. The chapter concludes with a summary of the effects of RBT in New South Wales, both at the political level and at the level of road accidents. Through an examination of the statistics on fatal crashes, a *prima facie* case is established for the deterrent impact of RBT. This sets the scene for the description of the deterrence process which is proposed in Chapter 2.

Ways of Studying Drinking and Driving in the Context of the Criminal Justice System

Cohen (1973) has pointed out that in addition to the stock set of *behavioural* questions which have been the traditional focus of attention in criminology, there are a set of *definitional* questions. There are three major behavioural questions: why did they do it? what sort of people are they? how do we stop them doing it again? All three of these questions will be considered in the present work, with particular emphasis being placed on the last. However, the definitional questions will also receive some attention, albeit in a much less detailed and systematic manner. These questions are, in Cohen's terms:

Why does a particular rule, the infraction of which constitutes deviance, exist at all? What are the processes and procedures involved in identifying someone as deviant and applying the rule to him? What are the effects and consequences of this application, both for society and the individual? (p. 13).

Thus in the case of alcohol related road deaths, we might ask: why are the manufacturers of alcoholic beverages not held responsible? Why don't we have laws which require vehicle manufacturers to produce crash-proof vehicles (Ross, 1982)? Is drinking and driving really deviant in the opinions of ordinary people? Given that only a tiny minority of drinking drivers are ever apprehended, how do the police come to test and charge certain people and not others? Do all magistrates view drinking drivers as criminals, and how do they vary in their penal philosophies and sentencing behaviours? How, if at all, does affixing the label *drink-driver* to a motorist affect his self image and his behaviour?

These questions are *definitional* because they pertain to how society defines and manages the problem of drinking and driving. The focus is not only on the offenders and their behaviours, but also on the activities and preoccupations of the rule-makers and the rule-enforcers, and on the interplay between the two sets of participants in the legal drama. For this reason the approach is usually referred to as *interactionist*.

Although not addressed to the behaviours of offenders, the definitional questions are behavioural questions to the extent that they ask about the activities and motivations of legislators, police, magistrates and others involved in the legal process. Moreover, they have a direct relevance to the questions which are focussed on the behaviour of offenders. For example, a knowledge of the correlates of recidivism is of limited value without a knowledge of how magistrates go about the job of sentencing. A demonstrated bias against (say) young male offenders in the sentencing process might be contrasted with data suggesting that age and sex are unrelated to the probability of reconviction. To take a second example, the behavioural impact of police enforcement of drink-drive law cannot be assessed properly without some knowledge of what kinds of motorists are most commonly the target of suspicion. If (again) young men are the object of a disproportionate share of police attention, a sense of being harrassed and stigmatised may amplify the very problem which such enforcement was (at least in theory) designed to control (this is the phenomenon of *secondary deviation* referred to by labelling theorists such as Lemert, 1978).

This report contains the results of a study of deterrence, and therefore has a behavioural focus. This study was designed and implemented as part of a broader research program concerned with the operation of the criminal justice system. The relationships between the studies are set out in Figure 1.1.

The study of the effects of RBT is largely a study of the effects of a particular form of police enforcement of drink-drive law. This is paralleled by a study of the factors which influence the way in which a motorist comes to police attention for a screening breath test, with an emphasis on the nature of police discretion (Homel, 1983c). The study of the effects of penalties on convicted offenders (Homel, 1980a, 1981a) is paralleled by a study of the sentencing process, with an emphasis on the styles of sentencing employed by magistrates and on the offender/offence characteristics which influence magistrates with different sentencing styles (Homel, 1983b).

In Figure 1.1, the studies of apprehension and sentencing are labelled as *managerial* because they are concerned with how drink-driving is managed and controlled through the criminal justice system. Overarching all the studies is the issue of how drinking and driving is viewed in our society. This is truly a definitional question. Following Gusfield (1981b), it is proposed that behind the drink-drive legislation is the image of the *killer drunk*, the morally flawed character who has committed more than an ordinary traffic violation. Undergirding all the studies is another general question: who is the drinking driver? This question has generally been regarded as a behavioural one, and has inspired many offender typologies (Wilkins, 1969). A typology developed within this research tradition is presented in Homel (1980a). However, some attention will be paid in the present study to the way in which perceptions of what drinking drivers are like are determined by what the current concerns of the authorities may be. Just as the cultural forms of our society generate a particular type of accountability (the offence of drinking and driving), so the shifting balance of power between various kinds of experts leads to different answers to the question: who?

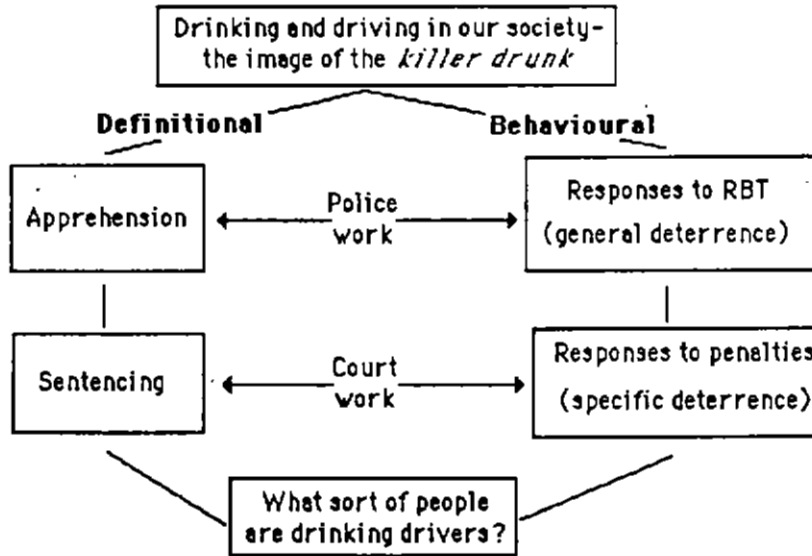


Figure 1.1. Representation of the Relationship Between Studies of Deterrence and Studies of the Operation of the Police and the Courts.

An Interactionist Perspective

The interactionist approach to the study of crime and deviance has become popular in the last two decades, particularly through the work of sociologists who have been concerned with the effects of the criminal label on the behaviour of those so labelled. Apart from the already noted interest in the agents of control and their interactions with those labelled as criminal, probably the hallmark of the interactionist approach is the concern with constructing the social reality of the criminal (Poveda and Schaffer, 1975). Interactionists are interested in the *meaning* of events for the criminal or deviant, the way in which he understands and interprets the world around him.

Most researchers working within this tradition have emphasised the crucial role played by social audiences, arguing that the responses of others - and how these responses are interpreted - sharply influence an individual's actions (Goode, 1978). An audience may consist of one's peers or some group with whom one is in face-to-face interaction, but it may also consist of one's conception of society at large and of the police, courts and prisons. Whatever the audience, there is an ongoing creation of meaning within the immediate social setting. Representing an older tradition within criminology, positivists conceptualise crime as a problem of defective individuals impelled by social or psychological forces beyond their control. In contrast to this view, by emphasising the subtleties of the immediate social situation, interactionists see deviant behaviour as the result of a dynamic process rather than as the almost inevitable outcome of a preexisting condition.

Although it does not appear to have been often appreciated, there are at least two ways in which the deterrence model, as propounded by classical theorists such as Beccaria and elaborated by modern sociologists, bears a close affinity to the tenets of the interactionist school. It is now commonly recognised that at the heart of the deterrence process is the *perception* by an individual of the costs and rewards associated with the commission of an illegal act (Gibbs, 1975). If these costs and rewards are interpreted broadly to include such things as informal sanctions imposed by one's peers, the interactionist's emphasis on the meaning of the situation to the actor becomes rather pertinent. (The ethnographic research of Gusfield [1981a] on drink-driving in the context of bars, discussed in Chapter 2, is particularly relevant as a bridge between interactionist and deterrence research.) Secondly, the deterrence model is in accord with interactionism in that it has little place for fixed character traits or for other predetermining influences on the individual. Just as the interactionist emphasises the dynamics of the immediate social setting and an active process of interpretation by the individual, so deterrence theorists see a criminal or deviant act as the outcome

of a complex process of evaluation and calculation. The emphasis in both cases is on factors in the immediate setting and in the broader social environment which are interpreted and acted upon by the individual.

One of the central objectives of this study is to quantify some aspects of the process of perception and evaluation which is at the heart of the deterrence model. Although consistent with an interactionist approach, the logic of this procedure really flows from the nature of the deterrence model itself. Without some understanding of how an offender or potential offender construes his situation, it is impossible to come to any definite conclusions about whether or not he has been deterred.

Drinking and Driving as Crime

In Australia, the full weight of criminal law is brought to bear on the problem of drinking and driving. In New South Wales, as in all but two states and territories, the amount of alcohol permitted in the blood of a driver (the *blood alcohol concentration*: BAC) may not exceed .05 grams of alcohol per 100 millilitres of blood. This *prescribed concentration of alcohol* (PCA) is as low as would be found in any jurisdiction throughout the world, and is much lower than that obtaining in most parts of the United States, where the limit is usually .10 (T. Cameron, 1979). Moreover, large numbers of motorists are charged each year under the drink-drive legislation. In New South Wales in 1982 (the last year for which statistics have been published) there were 25,015 court appearances for drink-driving offences (NSW Bureau of Crime Statistics and Research, 1984). This represented 35.1% of all criminal matters dealt with at magistrates' courts that year (excluding minor traffic offences such as speeding and negligent driving), and was 50% more than all property offences combined.

Since December 17, 1982, the law has been enforced in an even more rigorous fashion in New South Wales through *random breath testing* (RBT). Under RBT legislation, police may demand a preliminary breath test from a motorist in situations where there is no evidence (such as involvement in a crash) that the motorist may have been drinking. At the time RBT was introduced penalties were again increased, so that now even a first offender with a BAC as low as .08 suffers a mandatory three months period of licence disqualification and a fine of as much as \$1000. Lest it be thought that, once charged, there are many points at which the accused can escape punishment, it should be noted that in a typical year 98% of all positive breath analyses for which records are kept result in a court appearance for PCA, and that 99% of these court appearances result in a finding of guilt (NSW Bureau of Crime Statistics, 1984).

Drink-drive laws in Australia are tough, and are enforced with a considerable degree of rigor. Moreover, the laws are enacted and enforced in an atmosphere of public approbation. Consistently, opinion polls have indicated community condemnation of drink-driving and widespread support for vigorous enforcement and severe penalties. In a national Gallup Poll conducted in April, 1974 (McNair Survey 04/4/74), alcohol was the factor most frequently cited as a major cause of road deaths. In February of the same year (Survey 04/2/74), 93% of a sample of adult Australians rated drunken driving as being "very wrong", compared with 53% who rated speeding in the same way. In August, 1975 (Survey 07/12/75), 62% of Australians called for more severe penalties on drunken drivers, but only 30% called for RBT. By March, 1979 the vote in favour of RBT had risen to 73% (Survey 03/3/79), but in New South Wales in March 1984 the approval level was a record 91.5% (Cashmore and Vignes, in press). Moreover, by July 1984 the proportion of the population in favour of tougher drink-drive laws had risen to 76% (Survey 04/6/84).

It is of interest that the enthusiasm of the public for legal sanctions is not only shared by many judicial officers but is regarded by some as not going far enough. Of 341 judges and magistrates sampled in a national survey (Law Reform Commission, 1980), 58.6% were happy with the extent to which imprisonment is currently used for drink-drive offences, but 25.8% favoured greater use of imprisonment. In New South Wales, 40.3% of magistrates were of the view that more drinking drivers should be jailed. Since penalties for drink-driving have risen steeply in severity over the past decade, and given that currently only about 2% of convicted offenders are sentenced to a term of imprisonment (NSW Bureau of Crime Statistics and Research, 1984), these expressions of opinion by magistrates are perhaps indicative of one direction social policy will take in the future.

The opinion poll data indicate a considerable degree of public disapproval of drinking and driving. People of all ages and both sexes are prepared to support a policy of strict enforcement, and there seems little doubt that many view the offence in moral terms. However, these polls sit rather uneasily with other surveys which suggest that drinking and driving is a very widespread phenomenon (Freedman, Henderson and Wood, 1973; Sloane and Huebner, 1980). Sloane and Huebner estimated that in Victoria in the period November 1978 to January 1979 10% of the two million licensed drivers in the state drove over .05. In addition, they found that about 60% of their respondents who reported drinking in the week prior to the interview did not regard drinking drivers as criminals. It is clear that many who condemn the offence in response to a survey must actually commit it fairly often.

At the level of law and its enforcement further puzzles are evident. In New South Wales drinking and driving is an offence which is listed not in the Crimes Act but in the Motor Traffic Act (Sections 4E[1], 4E[1B], 4E[7] and 5E[2]). Thus it appears in company not with murder, rape and arson but with negligent driving, speeding and crossing an unbroken centre line. Moreover, Homel (1983b) has shown that when sentencing drink-drivers, magistrates do not take into account previous non-motoring criminal offences. The evidence is that for many magistrates, and for many other legal officials, drinking and driving is viewed as not much more serious than a traffic misdemeanour.

An explanation for these apparent contradictions may be sought at the level of individual attitudes and psychological processes. For example, part of the explanation for the discrepancy between the different forms of survey data may lie in an "us and them" mentality. People either deny, to themselves and others, that they consume enough liquor to put them over the legal limit, or they consider that they are more able to hold their liquor than others (and are therefore not a danger). Thus, put into colloquial terms, drinking and driving is wrong when the other bloke does it, but it's alright for me because I know my limits.

A more formal psychological explanation for the rather ambiguous status of drinking and driving as a crime appears not to have been attempted. One possible line of inquiry involves the use of attribution theory, an area of social psychology which is concerned with the processes whereby we interpret and understand the actions of others (Shaver, 1975). A fundamental assertion of attribution theorists, which is supported by many experiments, is that there is a bias toward attributing an actor's behaviour to an underlying disposition of the actor, rather than to contingencies of the social or physical environment. (However, this process is reversed when one's own behaviour is in question.) Thus it is more satisfying emotionally for me to attribute a road accident to the negligence of a reckless or drunken driver than to attribute it to a failure in road engineering - unless I am the driver.

Many types of attribution theories have been developed. A simple example, suitable for the purposes of the present argument, is Kelly's covariation theory (Shaver, 1975). In this model, the perceiver is thought to arrive at an attribution by applying the principle of covariation along each of three dimensions. One dimension consists of the entities or behaviours to be judged - let us say, driving behaviour. A second dimension consists of persons, including the perceiver, and a third consists of the variety of contexts within which driving occurs. If an individual is judged by me and by all my acquaintances to drink and drive often, and in a variety of situations, I may conclude that he is behaving dangerously and in an antisocial manner. In the language of Kelly's theory, there is *consensus* among persons and *consistency* across contexts. If in addition I perceive his behaviour as far worse than average, my reaction is *distinctive* across entities and an attribution of a deviant, criminal or alcoholic disposition to the individual is likely. Accepting this model as valid, the most likely reason why the criminal label is not affixed to drinking drivers more often is the failure to perceive the behaviour as distinctive. In other words, in a society in which many people frequently drive over the limit, apparently without incurring undue risks, an individual's behaviour in this respect must be fairly extreme before he is regarded as deviant.

This general line of argument helps to explain the bias toward attributions of individual responsibility in road safety policies, and also how an individual drink-driver might acquire a deviant reputation. However, as a psychological theory it does not contribute much to an understanding of the peculiar status of drinking and driving as behaviour which, when viewed from some angles, is an excusable traffic misdemeanour, but when viewed from other angles is a contemptible criminal act.

In order to answer this question, a broader perspective is required. The most promising ideas

come from those social scientists who (with interactionists) are concerned with the culture of public problems - that is, with the relationship between shared symbols or ways of seeing and the labelling of some behaviours as deviant, criminal or morally reprehensible. Anthropologists Douglas and Wildavsky (1982) have attempted this task for environmental dangers, arguing that "a cultural approach can make us see how community consensus relates some natural dangers to moral defects" (p. 7). A cultural theory of risk perception sees the social environment, the selection principles, and the perceiving subject as all one system.

Gusfield (1981b) has most effectively carried out this type of analysis for drinking and driving. According to Gusfield, behind all drink-drive legislation is the image of the killer-drunk, the morally flawed character who has committed more than an ordinary traffic violation. The drinking driver is a villain who threatens the lives of others through indulgence in his own pleasures, and is more open to condemnation than the motorist who occasionally lapses from proper driving conduct. Echoing Durkheim (1964), the criminal justice system through drink-drive legislation both expresses a particular system of values and helps to maintain a society against which the drinking driver appears factually and morally deviant. "The punishment of the offender is the ritual action which attests to the validity in fact and morality of the law" (p. 157).

In contrast to drink-driving, traffic offences are clearly not regarded as criminal. As Braybrooke (1975) has pointed out, traffic offences do not fit easily into the general criminal justice system since there is either harm without intention or intention without harm, or neither harm nor intention. Traffic offences are ubiquitous, their perpetrators are representative of the motoring population, and the offences do not carry a stigma. They are a "folk crime" (Ross, 1960). From the legal perspective, traffic law is essentially a form of administrative activity - "the regulation of the flow of automobile traffic in a convenient and safe form" (Gusfield, p. 123).

The fact that all motorists are potential traffic offenders has important implications for the status of traffic offences as non-crimes. Cressey (1974) has highlighted the presence of respectable, powerful and influential people among the population of motoring offenders, and the consequences of this for police enforcement. He argues that historically the most significant impact of the automobile's advent was the raising up of a different and more powerful population of offenders who claimed the normal prerogative of the rich and powerful: freedom from regulation. Extending his argument slightly, we may conclude that traffic offences (maybe even serious ones like drinking and driving) are not really crimes because to label them as such would be to criminalise the behaviour of the very people who make and enforce the laws.

But, insists Gusfield, while there is much that is similar in the drink-drive laws to those of other traffic offences, drinking-driving legislation is also unlike traffic legislation and more akin to laws about crimes without victims. In drink-driving it is the behaviour itself, the hostile, antisocial menace which is singled out for greater disapproval. "The enforcement of drinking-driving legislation, from this perspective, is as much a matter of public morality as it is of public convenience and safety. The drinking-driver is a public criminal and a faulty person" (p. 129).

Gusfield's emphasis on law and its enforcement as dramas for the consumption of an audience has implications which are critical for deterrence research. In effect, he has challenged the conventional notion that these performances are intended (except perhaps as an afterthought) to achieve a deterrent impact:

I find it useful to see the various parts of the legal process less as artillery weapons aimed at a target than as self-contained games, only tangentially part of a linear strategy instrumental to traffic safety. The police and the courts are attuned to the drinking-driver as criminal offender, not to the traffic analyst's knowledge and concerns ... the firing of the cannon is as much a matter of the love of noise as of a desire to reach a target. (pp 144-145).

The actual enforcement of drink-drive law blunts its cutting edge as a deterrent. As a matter of Law (the law on the books), drinking and driving is a criminal offence; as a matter of law (the world of the police, attorneys, lawbreakers and magistrates) it is not more than a traffic violation. At the level of the routine actions of daily life, the drinking-driving event becomes part of a negotiated reality constructed through the choice, discretion and power of the several parties interacting in the process of law. The general and abstract rules of legislation are transformed into a new, less formal set of rules, reflecting such things as organisational and time constraints and the prejudices and theories of individual law enforcement officials.

In practice the enforcement of drink-drive law is a ritual of *upgrading*. The police and the courts are sobered by a perception of drink-driving as a minor sin, no more mortal than other traffic violations. The court process is routinised and penalties are normally far below the maxima specified in legislation. The actual process of enforcement "diminishes the deviance of the drink-driver and restores him to community, slightly dented but still intact" (p. 162).

It is for these reasons that the behavioural impact of law is a problematic, empirical question. The implication of Gusfield's analysis is that deterrence, at least on a lasting basis, is a most unlikely outcome.

Who is the Drinking Driver?

The Social Drinker Versus the Problem Drinker

The cultural perspective emphasises symbols and public rituals, and helps us to see how the phenomenon of drinking and driving is translated, through moral outrage at the image of the killer drunk - the hostile, antisocial menace - into specific legislation and enforcement practices. From this point of view, the procedures of law are a morality play for the consumption of an audience. However, Gusfield also argues that the structure of public problems involves a *cognitive* dimension as well as a moral dimension. "Without both a cognitive belief in alterability and a moral judgement of its character, a phenomenon is not at issue, not a problem" (p. 10). Moreover, the cognitive dimension is related, in complex ways, to social organisation and to arguments about who "owns" the problem of drinking and driving and who is responsible for its solution. A variety of groups and institutions "compete and struggle over ownership and disownership, the acceptance of causal theories, and the fixation of responsibility" (p. 15).

The behavioural and causal questions are meaningful and important, even if they cannot be investigated in a social and cultural vacuum. More than most other illegal acts, drinking and driving is quantifiable and its correlates measurable. There is value, therefore, in exploring briefly how conceptions of the drinking driver have varied over the years, and how these varying conceptions bear on the issue of deterrence.

In Australia there has been a great deal of debate about the most appropriate way of categorising drink-drivers. Tomasic's (1977) review of some Australian studies leaves the impression that there is no consensus at all. Should we talk, for example, of alcoholics and non-alcoholics, dividing the latter group into "excessive" and "responsible" drinkers? Should a BAC of .15 or higher be evidence of an excessive drinking problem? Are some drink-drivers "typical criminals", while others are "typical motorists"? Raymond (1973) argues that existing evidence suggests that there are two fairly distinct types of drinking driver. One attracts police attention and gets caught, the other drives in a responsible manner and does not get caught. Her study is that a particular type of driver continually comes to the attention of the authorities, regardless of the method of detection used, and this group is similar in characteristics to recognised alcoholics. This implies that all convicted drink-drivers tend to be similar to each other in that they are alcoholics or potential alcoholics, and often have a record of drink-drive, traffic or criminal convictions.

Raymond's position is supported by McLean and Campbell (1979), whose research might be regarded as typical of its kind. These authors compared a sample of 70 drink-drivers convicted in Victoria with 39 hospitalised alcoholics and 39 university students rated as "heavy drinkers". It was found that the drink-drivers and the alcoholics (or problem drinkers) had lower mean profiles on the California Psychological Inventory than the control group, and that the differences between the drink-drivers and the problem drinkers could probably be attributed to the fact that the problem drinkers were generally older. This implies that drink-drivers are problem drinkers detected early.

The drinking driver as a problem drinker or alcoholic is a recurring theme in the literature. Cameron (1979) has pointed out that in the United States in the 1940's, the "moderate" drinker was seen as the real menace since drivers in an advanced state of inebriation were assumed to draw attention to themselves before they caused any trouble. However by the mid-1950's, chemical testing in Canada had revealed high BAC's in many accident involved or arrested drivers, suggesting that problem drinkers were a large part of the road safety problem. It was concluded that

rational appeals, including those involving the threat of punishment, were unlikely to be successful, and that the appropriate response to the problem was to initiate treatment programs. The unique importance of the small number of problem drinkers was officially recognised when the United States introduced the Alcohol Safety Action Projects (ASAP's) in the early 1970's (National Highway Traffic Safety Administration, 1977). These programs, which were implemented at the local level, emphasised both police enforcement and treatment of offenders.

The redefinition of the drinking driver as deviant problem drinker during the 1960's occurred not only in North America but in Europe as well. One of the earliest studies in the field of traffic offences was carried out by Willett (1971), an English sociologist who demonstrated the link between conventional criminality and the commission of many serious motoring offences, including drinking and driving. Buikhuisen (1969), a Dutch criminologist, asked whether we should think of a "criminal on the road" or a "patient on the road" (p. 6). He noted a high incidence of alcohol abuse among convicted drinking drivers, and also found them to be more neurotic, more extravert, more impulsive, less socialised and more likely to take risks than matched control groups of people free of traffic convictions. One consequence of this transformation of the drinking driver is that ownership of and responsibility for the drink-drive problem pass very largely from the police and the courts to the medical profession and to psychiatrists and psychologists. If the drinking driver is sick, he needs to be cured, not punished.

However, argues Gusfield (1976, 1981b), this view of the problem is not simply a conclusion drawn from unambiguous scientific data, but is also a product of rhetoric and polemic. In discussing an article by Waller (1967), in which the author drew a strong distinction between social drinkers and problem drinkers, Gusfield draws attention to the "literary art of science" (Gusfield, 1981b, p. 83). According to Gusfield, it is not that scientific articles are works of art, but that a rhetorical component is unavoidable if the article is to have theoretical or policy relevance. By selecting certain data and by emphasising certain relationships the scientist's interpretation involves theatre: "it involves a performance and a presentation which contain an element of choice and which both enlist and generate a context, a set of meanings which give content and imagery to his data" (pp. 107-108). Thus in Waller's presentation, and indeed in most of the articles written by psychiatrists and psychologists on this topic, the social drinker is cast as a comic, but not dangerous, figure, while the problem drinker, with his lowly status and compulsive drives, is a figure of pathos, a candidate for therapy.

From the point of view of those interested in a solution to the drink-driving problem, it is not satisfactory to conclude that answers to the question of who the drinking driver is depend on who asks the question. In principle, it ought to be possible to derive objective measures of key variables and then to devise appropriate countermeasures. Nevertheless, satisfactory answers are not to be had from the literature. Part of the reason why an adequate typology has been so difficult to construct may relate to the imprecision of the concepts of problem drinking and of alcoholism, and even of drinking.

Room (1981b, 1983) points out that the disease concept of alcoholism, with its emphasis on the individual drinker and his problems, is giving way to an emphasis on the consequences of drinking for the community and for the whole of society. Within this *constructivist* perspective, alcoholism is not something which exists in itself, but is rather a social creation of particular times and situations, in rather the same way that drinking and driving as a public problem arises out of deeply felt values and fears characteristic of a particular culture. Unfortunately, the demise of the disease concept of alcoholism, signalled by the use of the term "alcohol dependence syndrome" in a recent WHO report (Room, 1981b), creates a problem in reviewing the drink-drive literature, in which the term alcoholism has been used freely. Vingilis (1983), in her recent review of studies which examine the relationship between drink-driving and alcoholism, solved this problem in a pragmatic fashion by, in effect, simply accepting anyone as an alcoholic who has been labelled as such in the literature. Although the same approach will be adopted in this discussion, it should be remembered that alcoholism refers to the label affixed by society to an individual, not to some assumed underlying disease state.

Even accepting this simplification, Vingilis (1983) notes a number of difficulties. Often the alcoholic populations for study are drawn from various treatment facilities and cannot be regarded as representative of the total alcoholic population. In addition, the Michigan Alcoholism Screening Test (MAST), which was devised by psychiatrists Selzer and Lowenstein (cited in Vingilis, 1983) in order to detect alcoholism among drivers involved in "alcohol-related" collisions, will almost

certainly produce a high proportion of falsely positive identifications. Vingilis comments that a first-time drink-drive offender, feeling badly about his drinking but endorsing no other question, would be classified as producing "presumptive evidence of alcoholism" (p. 303). In the light of this kind of obvious bias, Gusfield's (1981b) analysis seems particularly apt.

After reviewing about 50 studies, Vingilis (1983) comes to the conclusion that drinking drivers, drink-drive offenders, alcoholics, and collision drivers represent overlapping but not identical populations. The majority of drinking drivers (people who have driven over the limit at least once) are not alcoholics, but among the "high-risk" groups involved in collisions and/or alcohol-related violations the number that could be considered problem drinkers or alcoholics is considerably higher. Vingilis does support the conclusion of Raymond (1973) and others that drink-drive violations and collisions may be one of the early predictors of alcoholism.

The Young Driver as Drinking Driver

Room (1981a) has drawn attention to several theoretical distinctions which are necessary if further progress is to be made in determining the nature of alcohol use, and its relationship to public problems like drink-driving. One critical distinction, consistent with the abandonment of the disease concept of alcoholism, is between problems caused by episodes of drunkenness and problems caused by total consumption. To the extent that problems are linked with drunkenness, and to the extent that the large number of moderate-to-heavy (but not alcoholic) drinkers get drunk out of proportion to their consumption ("binge" drinking), a high proportion of the social problems associated with alcohol may be contributed by non-alcoholics who get drunk only occasionally. It is likely that for many young men drinking follows this binge pattern.

From this point of view, the small minority of alcoholics still cause problems out of proportion to their numbers, but the fact that drinkers with a lower consumption are so much more numerous means that most of the "problem incidents", including drink-driving, are caused by them. In other words, problem drinking is not restricted to those who may have been designated "problem drinkers" on the basis of consumption, a common practice in the literature (e.g.: Selzer and Weiss, 1966). An important consequence of this argument is that although in any sample of drink-drivers alcoholics or problem drinkers will comprise a higher proportion than would be predicted from their numbers in the population, the great majority of drink-drivers will be ordinary drinkers.

Room also draws attention to the importance of the contexts in which drinkers do their drinking. The context may affect quantities and rates of alcohol consumption, and may also determine the risks to which drinkers are exposed due to hazards in the environment. Because they drink away from home, or because in some situations (like the pub) there may be intense pressure to drink, certain groups, such as young men, may be more prone to alcohol related problems than others. It may be possible to moderate the risks for these groups without reducing their total consumption.

Room's emphasis on contexts is of great importance for the study of the relationship between youth and drinking and driving, since much of what is assumed in the literature about this relationship is based on studies of accident statistics or of convicted offenders. Both types of data are biased by factors such as time and place of drinking and the amount of driving (and hence exposure to risk), and these factors in turn are heavily influenced by the drinking contexts preferred by young men.

It is common to hear the view expressed that drinking and driving is predominantly a youth problem. For example, in the newspaper of the National Roads and Motorists Association (June, 1980) we are informed that the "drink-drive toll strikes at young" (p.3). The author of this article observed that more than 40% of the state's drink-drive offenders detected by the police are under the age of 25, and that under 25 drivers also make up almost 40% of drivers killed on New South Wales roads while holding only 20% of driver's licences. The inference is then made that alcohol is an important factor in the death toll among drivers under 25, given the well known association between alcohol and road crashes (Homel, 1982b).

Douglass (1982) has put forward a similar argument, but in a more comprehensive manner, for the United States. He advocates substantial redirection of law enforcement efforts to younger drivers and attention to the increased risks caused by low blood alcohol levels among young

people. He is particularly critical of the Alcohol Safety Action Program (ASAP) experience:

... for some incredible reason, the entire ASAP experience was directed at drivers with chronic drinking problems without recognising that most young people who are crash involved are not necessarily deviant or chronic drinkers, but are certainly intoxicated and involved in acute trauma. (p. 5).

However, detailed epidemiological research reveals a picture which is far more complex than these generalisations suggest. The research of Room (1981a) illustrates how variations in drinking practices and in the contexts of drinking may be correlated with other variables which influence police enforcement and accident involvement. Other researchers have identified a range of factors in addition to alcohol as influences on the high crash involvement of young people. These factors include inexperience (T. Cameron, 1982; Mayhew, Warren, Simpson and Haas, 1981; Pelz and Schuman, 1971), driving exposure (T. Cameron, 1982; Carlson, 1973; Mayhew et al., 1981; Pelz and Schuman, 1971; Robertson, 1981), feelings of rebellion, hostility and alienation (T. Cameron, 1982; Carlson and Klein, 1970; Klein, 1972; Sobel and Underhill, 1976), drugs (McPherson, Perl, Starmer and Homel, 1984; Whitehead and Ferrence, 1976) and peer group characteristics (Clark and Prolisko, 1979; Nusbaumer and Zusman, 1981).

There is no doubt that alcohol is a contributing causal factor in many crashes involving young people, as it is for crashes involving older drivers. However, there is a fair body of evidence that young drivers are less likely to drink and drive than older drivers, and that if they do drink and drive they consume less alcohol than their older counterparts (Mayhew et al., 1981). Nevertheless, small quantities of alcohol appear to have a substantially greater effect on young drivers than on other groups (Mayhew et al.). One further complication is that young drivers are not an homogeneous group. There is little doubt that men drink and drive more than women (Sloane and Huebner, 1980; Freedman, Henderson and Wood, 1973; Warren and Simpson, 1980). Moreover, there seem to be differences in the crash rates and levels of drinking and driving among different age groups: 16 and 17 year old drivers are at high risk of *non*-alcohol related crashes, but after the age of 18 (the legal age of drinking in many jurisdictions), up to about age 25, alcohol related crashes become a bigger problem (T. Cameron, 1982; Pelz and Schuman, 1971).

For purposes of the present study, it is sufficient to highlight two major points. The first point is related to the ways in which drinking and driving is perceived in our society: although very few attempts have been made to *equate* the drink-drive problem with the problem of young drivers, there is a strong movement, both in Australia and in North America, to isolate young drivers as a *high risk* group with respect to drink-driving. As a result of this movement, the legal age of drinking has been increased in many states and provinces in North America (Vingilis and De Genova, 1984), and in Australia a zero BAC requirement for provisional (P-plate) drivers has been introduced in two states (Kelly, 1980; South and Johnston, 1984). Homel (1983c) has argued that one reason for this movement is the similarity in Western culture of the perceived attributes of the killer drunk and those of the adolescent or young man.

The second point is that because the present study is concerned with deterrence, it is more important to understand the characteristics of drink-drivers in the general population and of drink-drivers who are convicted than it is to study the epidemiology of traffic crashes. The remainder of this section will be devoted to an examination of this issue in the Australian context, with particular reference to the place of young men.

Young Men as Drinking Drivers and as Convicted Drinking Drivers

There are two ways of investigating the incidence of drinking and driving in the general population: through random roadside surveys and through surveys which include questions relating to drink-driving practices. The biggest problem with these latter surveys is that there are always doubts about the reliability of the answers.

A recent Australian survey used a more rigorous methodology than most. Sloane and Huebner (1980) took advantage of the relatively objective nature of the drink-drive offence (driving with a blood alcohol level above a prescribed limit) to develop a method for estimating from respondents' accounts of what they drank, how much they drank, and how they got home, whether in fact they had driven over the .05 limit in the previous week. From the information supplied by

227 drinking licence holders in Victoria who drove after drinking in the survey week, they were able to approximate, using a modified Widmark formula, the drinker's BAC at the end of the drinking session and when they left the place of consumption. Although their method was necessarily crude (for example, a person's body weight is required for an accurate estimate of BAC) it is probably an improvement on straight questioning concerning drink-drive behaviour.

Although the authors do not report the rates of drinking and driving broken down by both age and sex, such rates can be calculated from data supplied by David South (personal communication, April 14, 1983). Unfortunately, limitations in the information supplied make it necessary to use all respondents ($N = 1138$) as the base for percentages broken down by age and sex, rather than the number of licence holders who drank ($N = 514$). Only 1.9% of women were calculated to have driven over .05 in the survey week, compared with 14.1% of the men. Among the men, none of the 17-19 age group drove over the limit ($n = 26$). In older age groups the percentages were 21.7% for those 20-29, 22.4% for those 30-39, 13.6% for those 40-49, and 6.3% for those 50 and older. On the basis of these figures, drinking and driving in Australia can hardly be characterised as a problem of adolescence.

While internal comparisons suggest the validity of the measure (for example, the impaired drivers reported higher consumptions of alcohol than the remainder of the sample), it is possible to check some aspects of the survey findings against the results of the even more objective procedure of random roadside surveys.

In roadside surveys, random samples of drivers on the road are stopped (usually by researchers working alongside police) and asked to take a breath test. The procedure differs from RBT as it is conducted in Australia in two respects: cooperation is voluntary (intoxicated drivers are not arrested) and drivers are selected according to strict random sampling procedures. The aim is to obtain accurate estimates of the proportions of drivers on the road who are sober or who have various BAC'S. A number of such surveys have been conducted since the first in 1938, but as Valverius, Moberg and Linden (1980) point out the results are difficult to compare since the study methods differ in important respects.

Only two roadside surveys have been conducted in Australia (Johnston, 1982b). The first was conducted in Canberra, the national capital, during 1971 and 1972 (Duncan, 1976). Only limited data from this survey are available. More recently, McLean, Holubowycz and Sandow (1980) surveyed over 3000 drivers in Adelaide, the capital of South Australia. A comparison of the results of this study with the results of the Victorian self-report study is illuminating.

It is not possible to compare directly the incidence of driving over .05 in both surveys, since the roadside survey yields an estimate of the probability that *on a given trip* a randomly selected driver will be over the limit, while the interview study yields an estimate of the probability that *in the past week* a randomly selected driver will have driven over .05 (the respective figures were 2.6% and 16.3%). However, it is appropriate to compare the age and sex distributions of drivers over .05 in both surveys, although even here we would expect some discrepancies due, among other things, to differential rates of vehicle usage (and hence exposure to risk) among men and women of different ages and to differences in drink-drive patterns between Victoria and South Australia.

On the basis of a re-analysis of the Adelaide data (Homel, 1983c), it can be shown that 15.2% of drivers over .05 were women. The comparable figure from the Victorian study was 14.3%. Similar close agreement is obtained when the age distributions of men over .05 are compared. The percentages of impaired men aged under 30, 30-50 and over 50 from Adelaide and Victoria were, respectively, 43.0 and 41.7, 46.9 and 43.1, and 10.2 and 15.3. The agreement between these two sets of figures is sufficiently close to encourage the belief that self-reports of drinking and of drink-drive behaviour (at least using the modified Widmark formula) are not seriously biased by age and sex, although the possibility of a uniform level of *underreporting* has not been ruled out. More importantly, it is clear that driving over the .05 limit is an offence committed by men of all ages, at least up till 50 years of age.

Further analysis of the Adelaide data (Homel, 1983c) showed that there was no statistically significant relationship between age and driving over .05, although there was some indication of a higher rate of illegal BAC's among 21-29 year old men on Thursday, Friday and Saturday evenings, and a lower rate among men older than 50 during most time periods. Men were more likely than women to record positive BAC's during nearly all time periods, the gap being particularly great during weekend afternoons and all evenings.

Four points stand out clearly from these analyses. First, drink-driving is predominantly male behaviour. Second, the probability that on any given trip a young man in his twenties will drive over .05 is not much greater than for an older driver. This finding is consistent with overseas research (Mayhew et al., 1981). Third, because young men in their twenties drive more often, they are more likely to report driving whilst impaired. Finally, there is no evidence that teenage boys are particularly prone to drink-driving; in fact, the reverse is the case.

These conclusions stand in marked contrast to those which might be drawn from an examination of the conviction statistics. In New South Wales in 1979 (the year of the Adelaide roadside survey), 3% of convicted drink-drivers were women (NSW Bureau of Crime Statistics and Research, 1981). This is about a fifth of the number expected on the basis of both surveys. Moreover, 58% of men convicted were under the age of 30, compared with the 42 or 43% expected. The contrast is even more marked for men under 21: 18% of convicted males were in this age range, compared with only 10% in the roadside survey and even fewer in the self-report study. Homel (1983c) shows that the contrasts remain when adjustments are made for time of driving and exposure, and that the (unavoidable) use of data from three states probably does not invalidate the analysis. It is clear that if the conviction statistics are to be understood, attention must be paid to the criminal justice system, particularly the operations of the police (Carr-Hill and Stern, 1979).

Overview: Who is the Drinking Driver?

At the level of Law and political pronouncements, drinking and driving is an offence committed by individuals who are judged to be a menace to society and who are castigated for their moral dereliction. If not quite criminals in the sense of being a murderer or a rapist, drinking drivers are deemed to have committed more than an ordinary traffic violation. Those concerned with the development of scientifically objective classifications of drinking drivers are not immune to these symbols and images which motivate legislators and law enforcement officials. It is argued by Homel (1983c) that the special attention devoted to young drivers as a high risk group is an example of how attributes of the killer drunk can be imputed to, or be more clearly seen in, certain classes of persons. Moreover, drink-driver classifications reflect in part the struggle for ownership of the problem on the part of various groups (or in the case of the liquor industry, the struggle to disown the problem). This struggle is most clearly reflected in the attempts by some members of the medical profession to label drinking drivers alcoholics rather than social drinkers, and hence to subsume the problem within the medical model.

These suggested classification systems are not necessarily wrong. There does seem little doubt that people who are alcoholics or problem drinkers, labelled as such through various social processes, do comprise a part of the drink-drive population, and in the case of convicted offenders probably a fairly significant part. Indeed, convicted offenders seem to consist of a variety of deviant subgroups, including those with a serious criminal record (Buikhuisen, 1969; Willett, 1971). However, the status of young men as exemplars of the drinking driver is much more uncertain than would be supposed from some of the recent literature. No doubt drinking drivers on the road are overwhelmingly male, and certainly the convicted drinking driver is odds on to be a man under 30, but the evidence presented above suggests that the age and sex profile of the convicted offender may to a considerable degree be a function of selective police practices (Homel, 1983c).

A general conclusion, supported by the kind of model of drinking behaviour proposed by Room (1981a), is that it would probably be a mistake to concentrate too much on the search for deviant or pathological subgroups. As Radzinowicz and Hood (1975) pointed out in a discussion of motoring offences, criminological research has gradually freed itself from bondage to the positivist position that all criminals are inherently different from normal people. The most common view nowadays seems to be that although a small proportion of offenders may commit large numbers of serious offences, perhaps the bulk of crime is committed by quite ordinary people in the face of particular temptations and opportunities (Clarke, 1979). This position is consistent with the interactionist and constructivist perspectives, and with deterrence theory.

From the point of view of deterrence, two conclusions seem warranted. First, there is no compelling evidence that more than a tiny minority of drinking drivers are so dominated by the craving for alcohol that they may be impervious to threats of punishment. Indeed, as we have seen,

the very concept of such an addiction is increasingly being called into question (Room, 1983). Secondly, there is no simple ready-made typology, either of convicted or never-convicted offenders, which can be gleaned from the general drink-drive literature and used as a basis for testing hypotheses about the differential impact of the legal threat. Although there have been many attempts to develop typologies, the purpose in most cases was to guide those interested in treatment (e.g.: Steer, Fine and Scoles, 1979). As a result, these typologies have few obvious implications for testing the deterrence hypothesis.

Random Breath Testing in New South Wales

Trends in Enforcement, 1968-1983

RBT was introduced in New South Wales on December 17, 1982. It represented a radical departure from previous law enforcement practices in the state, since under RBT police are permitted (indeed, *required*) to carry out preliminary breath tests on randomly selected groups of motorists at arbitrarily selected checkpoints regardless of whether those motorists have exhibited any signs of alcohol impairment and regardless of whether they have committed any offence. However, despite the radical nature of the new law, it should be seen as part of an evolutionary process.

Ever since the introduction of the breathalyser into New South Wales in 1968, police have had the power to require a motorist to submit to a preliminary breath test if he or she has committed an offence, has been involved in an accident or has been driving in a manner suggestive of the influence of alcohol. These powers were strengthened, but the scope of police discretion somewhat reduced, when in July 1980 police were required to breath test *all* motorists involved in a crash or committing a four-point motoring offence. The RBT legislation further increased police powers by allowing officers to demand a screening breath test from any motorist at any time, although in practice the government, especially in the early months, regulated police activity to some extent (for example, by discouraging random breath testing during the weekday commuter hours).

Penalties for drinking and driving (as opposed to police powers) were increased in December 1978 when the maximum fine was raised from \$400 to \$1000, and again in December 1979 when mandatory minimum periods of licence disqualification were introduced. At the time RBT was brought in, the government once more strengthened the penalty system with the addition of a three-tier offence for drinking and driving (allegedly to tackle problem drinkers), and also provided for compulsory blood tests of drivers, motor cyclists and pedestrians admitted to hospital following road accidents. It is commonly believed that to coincide with the RBT law the prescribed concentration of alcohol was reduced from .08 to .05, but in fact the limit was lowered two years earlier, on December 15 1980. It seems that people were generally not concerned about the .05 limit, or perhaps were not even aware of it, until they believed they had a good chance of getting caught. This might also serve as a commentary on the deterrent impact of all the pre-RBT measures described above.

Ever since 1968, the trend has been toward heavier penalties and more rigid application of the law. However, most of the changes have occurred since 1976, when the Labor government came to power. During the early seventies the law changed very little, penalties were stable and the totals convicted varied little from year to year. In 1972, the first year for which detailed statistics were published, there were four drink-drive offences under Sections 4E and 5 of the *Motor Traffic Act* and Section 100 of the *Justices Act* (aid and abet). The great majority of these were PCA (driving with the prescribed concentration of alcohol), a pattern which has become more pronounced over the years as breath test units have become more widespread. The distributions of offences for 1972 and 1982 are set out in Table 1.1 (1982 is the most recent year for which court statistics are available).

Each year since 1969, about 85% of PCA offenders in NSW have been dealt with by means of a fine and a period of licence disqualification or suspension. The remaining 15% have been dealt with either by a period of imprisonment not usually exceeding six months (although multiple offenders can be incarcerated longer by being imprisoned for several offences), by being dealt with under Section 556A of the *Crimes Act*, or finally by being given a recognizance under Sections 554

Table 1.1. Drink-drive Offences in NSW, 1972 and 1982.

Offence	1972 %	1982 ^a %
Higher PCA - Driving with a concentration of alcohol greater than or equal to .08gm/100ml	88.0	80.2
Lower PCA - Driving with a concentration of alcohol greater than or equal to .05gm/100ml but less than .08gm/100ml.	-	13.9
PCA - unknown concentration of alcohol	-	0.6
DUI - Driving under the influence of intoxicating liquor	9.7	2.6
Refusal to take a breathalyser test	1.7	2.0
Aid and abet a drink-drive offence	0.6	0.7
TOTAL	17,873	24,191

Note: From *Breathalyser Offences 1972*, NSW Bureau of Crime Statistics Research, 1973, and *Court Statistics 1982*, NSW Bureau of Crime Statistics and Research, 1984, Sydney: NSW Government Printer.

^a78 cases of driving under the influence of drugs have been excluded from the table.

or 558 of the *Crimes Act*.

Until 1977, the median period of disqualification for PCA was three months. In 1978 the median rose to four months, and in 1979 and all subsequent years it has been six months. The increase to six months in 1979 occurred before the law of December, 1979 introduced mandatory minimum periods of three months for a first offence and six months for a second or subsequent offence. It appears that magistrates were responding at this time to community pressure for tougher penalties.

The median fine in 1972 was \$125. It was static at \$150 from 1973 to 1978, but in 1979 it jumped to \$400, where it has stayed. The increase in 1979 reflects the legislation introduced in December, 1978, in which the maximum fine was increased from \$400 to \$1000. That no fundamental change in sentencing philosophy took place is indicated by the ratio of median to maximum fine: .38 for 1972-1978, .40 for 1979 and later years.

In 1972, 9.2% of PCA offenders were dealt with under the provisions of S556A, but by 1982 this figure had declined to 6.3%. Section 556A is a remarkable provision of the *Crimes Act*, since it allows the magistrate to find the offender guilty yet record no conviction. Clearly, the existence of such a section has interesting implications for a study of the general deterrent effectiveness of drink-drive law and its enforcement. Briefly stated, Section 556A provides that:

... where any person is charged before a court ... and the court thinks that the charge is proved ... but is of the opinion that, having regard to the character, antecedents, age, health, or mental condition of the person charged, or to the trivial nature of the offence, or to the extenuating circumstances under which the offence was committed, it is inexpedient to inflict any punishment ..., the court may, without proceeding to the conviction, make an order either

(a) dismissing the charge; or

(b) discharging the offender conditionally on his entering into a recognizance ... (*Crimes Act of NSW, 1900*).

The essence of the section is that no conviction is recorded.

Bonds or probation may be regarded as the most severe penalties short of imprisonment, and S.556A as the most lenient. (Probation involves the use of a supervisory order in addition to a

S.554 bond. It is generally used with only a few dozen of the worst offenders each year.) Although the imprisonment rate has been constant over the years, there has been an increasing use of periodic detention and community service orders. In 1972 only three people were dealt with in this way, but in 1982 the figure was 365 (1.6%).

The Introduction of RBT

RBT was not introduced in New South Wales in a political vacuum. Other states of Australia, notably Victoria and South Australia, had already introduced RBT, and by 1982 the perceived ineffectiveness of earlier attempts in New South Wales to contain the problem of road accidents had put pressure on the New South Wales government to follow the example of these states. All opinion polls conducted since 1979 indicated majority support for RBT. As measured by the question "Do you agree or disagree with random breath testing of drivers in New South Wales?", support in Sydney rose from 70% in March 1979 to 79% in December 1981, 80% in December 1982 (the month RBT was actually introduced) and 91% in March 1983 (Cashmore, 1983). These levels of support are considerably higher than the figure of 37% recorded in 1973 (Freedman, Henderson and Wood, 1973), indicating a marked change in community attitudes over the decade of the seventies. Thus by 1982 the climate of opinion was right for RBT, a fact reflected in the official government report which recommended that RBT be introduced (STAYS SAFE, 1982).

Despite the fact that RBT was not the only legal innovation implemented on December 17 1982, from the beginning it received the lion's share of publicity. Many early reactions to RBT by police, the medical profession and the media could only be described as euphoric. The head of the New South Wales Breath Analysis Unit, Sgt. Roy Beverstock, was quoted in the Sydney Morning Herald on December 29, 1982 as being "ecstatic" about the state's low road toll over Christmas, and medical spokesmen from many hospitals in and around Sydney agreed with one doctor that the quiet hospital scene over the holiday period was "just incredible". The Sydney Morning Herald had commented the previous day:

The dramatic drop in the New South Wales road toll over the last fortnight, including the first few days of the Christmas holiday period, is, of course, exceedingly welcome. There can be little doubt that random breath testing is responsible. (Sydney Morning Herald, 28/12/82, p.11).

Thus very soon after its introduction, RBT was popularly seen as being a spectacular success, and this view has, by and large, persisted. Certainly it was very difficult to live in Sydney throughout those early months without being aware that the behaviour of many of one's friends, workmates and relatives had been influenced by RBT, and that it was a popular topic of conversation.

However, more cautious voices were also raised, and the fact that the government had introduced RBT for a three year trial period was emphasised by a number of police and politicians. Indeed, to their credit, the politicians most directly concerned with the introduction of RBT were generally rather restrained in their claims about its success. As was noted earlier, RBT was introduced in New South Wales following a period of essentially symbolic attempts to curb drinking and driving, and it seems that the caution which so characterised earlier government policy carried over into official attitudes towards RBT. In announcing the new measures in a press release on November 3, 1982, the Ministers for Police and for Transport said that in the face of "mounting supportive evidence for RBT, the government has had little alternative but to agree to a trial period". This hardly indicates overwhelming enthusiasm for the new law. There are in fact good grounds for caution, since previous experience with drink-drive countermeasures in a number of jurisdictions suggests that the deterrent impact, if any, is strictly short term. It is likely therefore that the Ministers did not wish to identify too closely with a countermeasure which might turn out to be a "nine day wonder". Nevertheless, they did provide the resources required.

Publicity and Enforcement

When pulled over as part of an RBT operation, a driver is asked to produce a driver's licence and then is subjected to a breath test using a preliminary screening device which shows negative, positive or close. If the breath test is positive the driver is under arrest *solely* for the purpose of obtaining a more precise breath analysis on the bus or at a police station. Should the breath analysis show a reading of .05 or a higher reading, the driver is formally charged (at a police station) with driving with the prescribed concentration of alcohol (PCA). If the reading is under .05 the matter is proceeded with no further and the driver is released.

In the early months of RBT (the period of major concern in the present report) the police set up random breath testing stations by using converted government buses in the Sydney metropolitan area, specifically designed smaller buses in the Newcastle and Wollongong areas and normal police vehicles in the country centres. The buses have the advantage over patrol cars that they are equipped with very bright lights and ensure that police operations are highly visible. RBT has since been expanded to involve all highway patrols in all areas, and the converted buses in Sydney have been replaced with more of the specially designed vehicles. Whatever type of vehicle is used by the police, the major objective of all RBT operations is to achieve a high level of visibility.

Despite their ambivalence about RBT, or perhaps because of it, the politicians ensured that RBT was well publicised. The early publicity was of a high professional standard, and achieved a substantial impact in the target population. Nearly everyone knew about RBT and most were aware of the increase in penalties (Cashmore, 1983; Cashmore and Vignes, 1984a, in press). More than a million dollars was spent on TV, radio and print advertising over Christmas 1982 and Easter 1983. Since then, many more millions have been expended. The early publicity was organised around the slogan "How will you go when you sit for the test, will you be under .05 or under arrest?", set to an infuriating tune which ensured not only that the message got across but that it reverberated interminably in one's head. The slogan received extensive air time on radio and TV and was emblazoned along the sides of government buses. An award winning example of the print advertising campaign is reproduced in Figure 1.2.

Even more impressive than the publicity was the commitment of the police to the enforcement of the law. Detailed statistics relating to enforcement levels in different regions in the first three months are set out in later chapters, and will not be presented here. By way of summary, in the first 12 months of RBT (17 December 1982 to 31 December 1983), nearly one million (923,272) preliminary breath tests were conducted, representing approximately one test for every three licensed drivers (Cashmore and Vignes, in press). To put this figure into perspective, it should be compared with the 113,985 non-random preliminary breath tests conducted in 1982, the year prior to the introduction of RBT. In 1984 testing continued at an even higher level.

In short, RBT has been enforced in New South Wales in a vigorous and wholehearted manner, and has been extensively supported by high quality media publicity. Moreover, both enforcement and publicity have been maintained at high levels for some years. This level of enforcement and publicity over a long period is in marked contrast to the conditions prevailing in most other jurisdictions which have introduced sudden changes to drink-drive law or its method of enforcement (Ross, 1982). For example, in Britain in 1967 there was widespread debate and controversy prior to the introduction of the breathalyser, which ensured that the initial impact of the law on drink-driving and on traffic crashes was quite dramatic. However, neither publicity nor enforcement were maintained at high levels in the following months, so that after about two years the effects of the law had all but dissipated. Ross reports much the same outcome for France, which introduced a package of measures, the chief component of which was a form of RBT, on July 12, 1978.

As more and more jurisdictions in various parts of the world experiment with changes to the drink-drive laws and their methods of enforcement, the New South Wales RBT campaign may emerge as being, from a scientific point of view, of particular importance. For evaluation purposes the legal intervention is reasonably "pure", well sustained and very specific with respect to the main variable which the legislators intended to manipulate (the perceived risk of arrest for drinking and driving). Until the latter part of 1984, when a half million dollar advertising campaign to encourage people to wear seat belts was launched, there were no major road safety initiatives apart from RBT. Although federally funded anti-drink-drive TV publicity was aired during the summer months, this was a continuation of the practice of previous years, and may therefore be regarded as part of the

<h2>What happens if you're under .05:</h2>	<h2>What happens if you're under arrest:</h2> <p>Fail the roadside Random Breath Test and you are arrested there and then. It is not a pleasant experience. The procedure is long and humiliating. You are treated like a criminal. Here is a summary of what you can expect.</p> <ol style="list-style-type: none"> 1. You are advised to lock up your car. Obviously you are not permitted to move it. Police will do their best to assist any inconvenienced family or passengers, but are under no obligation to do so. 2. You are taken away by police car, or led to the Breathalyzer bus, for the purpose of obtaining an accurate analysis of your Blood Alcohol Concentration. Since you are in police custody, the normal security arrangements apply. 3. You are placed in front of the instrument known as the Breathalyzer and directed to blow into it. 4. You are notified of the reading. 5. You are taken to the charging room. (If the Breathalyzer test has taken place in the bus, you are taken in a police car to the police station.) 6. You are placed in the dock. All valuables plus your tie and belt are removed to be returned on your release. 7. You are offered the services of a doctor of your choice, at your own expense, should you wish to undergo a blood test to verify your BAC. 8. You are formally charged and the entry made in the charge book. 9. You are told where and when to appear in Court. 10. You are finger-printed. 11. You are released as per the new bail laws or held in gaol until your Court appearance. 12. On conviction, sentence is handed down by the Court. Even the first offender with a Prescribed Concentration of Alcohol Reading of .05 could be fined up to \$500 and could be disqualified from driving for six months. Higher PCA readings or second offences attract severe penalties including minimum mandatory periods of licence disqualification, fines up to \$2,000 and gaol sentences up to 12 months.
<p>Random Breath Testing. Will you be under .05 or under arrest?</p>	

Figure 1.2. Example of RBT Print Advertising Campaign
(Courtesy NSW Traffic Authority and John Bevins Pty Ltd)

general background of drink-drive countermeasures. The variation in penalties coinciding with RBT is unfortunate, but given the complexity of the new three-tier system the publicity has emphasised almost exclusively the police activity and the chances of arrest. It is therefore reasonable to view RBT as the major new component in the overall package of drink-drive countermeasures employed since 1982 in New South Wales.

The Effects of RBT in New South Wales

To locate the present study in a more general context, it will be useful to indicate some of the general effects of RBT on public opinion and social behaviour, and to examine briefly the apparent impact of RBT on the accident statistics. A more detailed review of the effects of RBT in Australia, and of drink-drive law generally, is presented in Chapter 3.

Notwithstanding general public opinion, the vigorous enforcement of a law giving police unprecedented powers to interfere with vast numbers of ordinary people met with some spirited opposition. The proprietors of clubs and pubs complained of greatly reduced patronage, and concerns were frequently aired about job losses in an industry which, it was claimed, was already hard hit by the effects of the recession. That these concerns had some substance is suggested by recent national statistics which show a decline in beer consumption and a corresponding rise in the amount of wine imbibed, although it should be added that there has been a steady decline in total alcohol consumption nationally since 1979, with per capita beer consumption in 1984 being at a lower level than at any time since 1969 (Australian Bureau of Statistics, 1984a). One response of the breweries has been to promote low alcohol beers ("breathe easy" is a current advertising slogan).

Opposition to the law was not restricted to the liquor industry. (Actually, the liquor industry never officially opposed the law outright. They inveighed instead against the .05 limit, but not until *after* the introduction of RBT.) Idle panel beaters were featured in the media, and on more than one occasion a representative of the Transport Workers' Union attacked the law as being not only an infringement of civil liberties but ineffective as well. The Council for Civil Liberties, of course, had a good deal to say about the civil liberties issue. A memorandum from the Council to all members of the New South Wales ALP Caucus on November 1, 1982 (six weeks before the introduction of RBT) reaffirmed the Council's long-standing policy of opposition to the proposed law. Both in this submission and in public statements, the Council argued that RBT could be the first step in a process leading to police powers to stop, question or search citizens without any pretext, a situation they characterised as being typical of a "police state" (p. 1). However, in its memo to Caucus, the Council went on to moderate this hard-line position:

Nonetheless, we recognise that in a matter of such social concern as alcohol related road deaths that a civil liberty might be set aside in the specific instance if it can be demonstrated that the practice of random breath tests achieves the aim of reducing road deaths. Consequently the issue becomes not civil liberties versus reducing the road toll, but whether the facts available on RBT justify setting aside that civil liberty. (p. 1).

Thus the debate shifted from theoretical arguments about civil liberties to a dispute about the empirical evidence for the effectiveness of RBT.

The issue addressed by the Council in that early memorandum is, of course, the central one. RBT, like all drink-drive laws, is of no value at all if it does not lead to a reduction in the road toll. Furthermore, to be of net social benefit the advantages and savings attributable to RBT should outweigh the costs, whether these be financial, social or legal. Obviously these are very complex questions, and will probably not be completely answered even when all the government evaluations are in. Nevertheless, it is possible to come to some tentative conclusions about the impact of RBT, particularly through an examination of the crash statistics.

Some critics of RBT have argued that any drop in the road toll can be attributed to the effects of the recession (from which by 1984 we were supposed to have recovered), and that in any case (echoing Ross, 1982) the effects of these laws are invariably short term. It will be useful therefore to examine the crash statistics for a number of Australian states, to control to some extent for economic factors. Moreover, at the time of writing more than two years had elapsed since the start

of RBT, so that any trends concerning a wearing off in effectiveness should be discernible.

In Figure 1.3 the fatal crash statistics for New South Wales are set out, for each month from January 1971 to July 1985. The figures plotted are fatal crashes not fatalities, since the latter statistics are affected to some extent by random fluctuations in the numbers of persons killed in a given crash. (This is not to say of course that total fatalities are not important, but rather that the number of fatal crashes is a slightly more reliable statistic for scientific purposes.) The dotted line marks the date on which RBT was introduced.

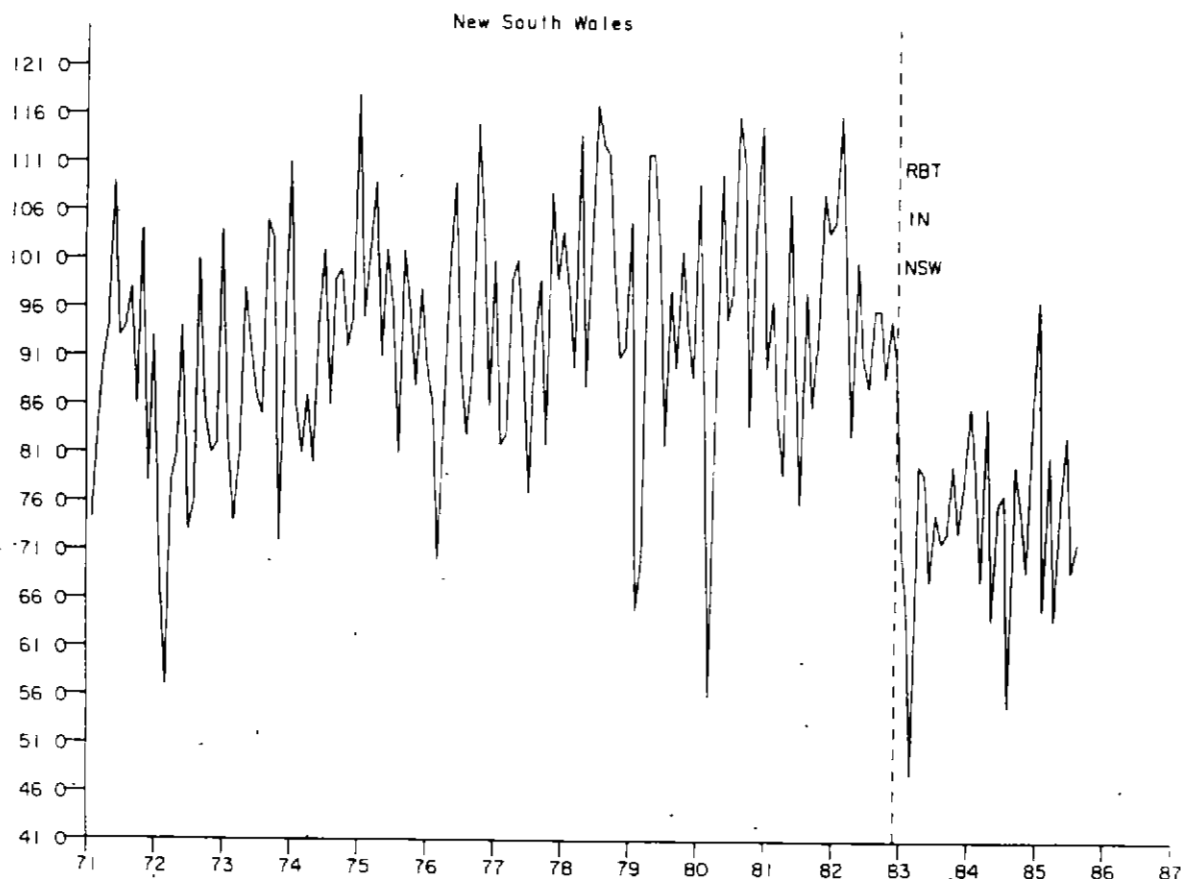


Figure 1.3. Fatal Crashes for New South Wales for Each Month from January 1971 to July 1985

The most noticeable feature of Figure 1.3 is the marked decline in fatal crashes coinciding with the inauguration of RBT. Whereas the series appears to be virtually stationary for the six years prior to this date, with a monthly mean of 95.7 fatal crashes, the mean for the 32 months since RBT was 74.1, a decline of 22.6%. The second noticeable feature of Figure 1.3 is the stochastic nature of the data. The low points are nearly always February, suggesting a sizeable seasonal effect, as well as the need for controls for length of month. Nevertheless the considerable amount of variation in the data underlines the need for time series techniques to be applied in order to assess the statistical significance of the apparent decline in December 1982 (Ross and McCleary, 1983).

A third noteworthy feature of Figure 1.3 is the failure of the curve to return to pre-RBT levels, suggesting that following the initial shock of RBT the expected decline in perceived risk of detection, even if it occurred (Ross, 1982), did not translate into pre-RBT levels of drinking and driving. Actually, there was a 4.3% increase in fatal crashes for the period December 1983 to November 1984 compared with the same months in the previous year (the first full year of operation), but this increase is sufficiently slight to render premature any conclusions about the long term impact of the law.

In order to assess the force of the economic argument, it is necessary to introduce control series. One possibility is to examine the statistics for other states of Australia. The statistics for the three most populous states outside New South Wales are presented in Figure 1.4. These do not of course represent a perfect control, since economic and other forces are not identical in all areas, and each state has conducted some form of drink-drive countermeasure program over the past few years. Fortunately, only one state - Queensland - introduced a major change in drink-drive law coincidental with RBT in New South Wales, when they lowered the limit from .08 to .05.

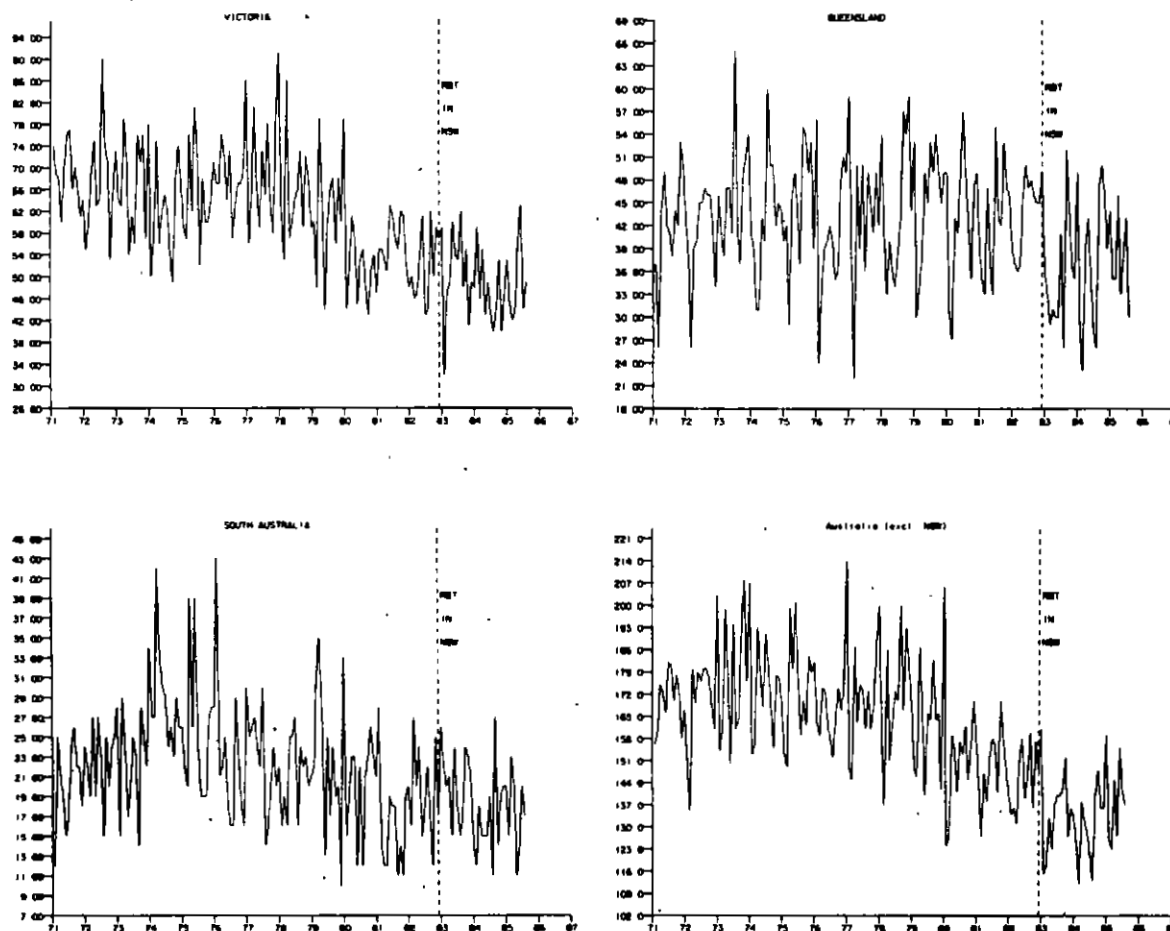


Figure 1.4. Fatal Crashes for Victoria, Queensland, South Australia and the Whole of Australia Excluding New South Wales, for Each Month from January 1971 to July 1985

Only Queensland experienced a sudden decline in fatal crashes in December 1982, but unlike New South Wales the drop seems to have lasted for only a few months. One hypothesis, which needs more rigorous testing before it can be accepted, is that the .05 legislation caused a temporary scare.

Victoria, which has had RBT since 1976, experienced no sudden decline in fatal crashes coincident with RBT in New South Wales, but seems to have benefited from a steady decline since 1980. The reasons for this trend are not well understood. South Australia, which has had RBT since October 1981, appears to have experienced no diminution in fatal crash statistics, and certainly not since RBT was introduced in New South Wales. It seems likely that the poor performance of RBT in South Australia can be attributed to low levels of enforcement and minimal publicity (Bungey and Sutton, 1983; McLean, 1984).

When the statistics for all states and territories of Australia other than New South Wales are

combined, a downward trend in fatal crashes since 1980 is evident. This trend may have accelerated for a few months in early 1983 and flattened out in mid 1985, but generally the rate of decline appears to have been steady. What needs to be emphasised, however, is that this pattern is not at all characteristic of New South Wales. In that state, as we have seen, the series appears stationary from about 1977 until RBT, when there was a sudden reduction in fatal crashes which persisted until at least mid 1985. This pattern is very much what would be predicted if RBT were the key causal agent. The graphs for other states suggest that economic or other forces common to the whole country are not responsible for the sudden drop in the New South Wales figures, although it is possible (even likely) that these forces have helped to keep the post-RBT figures down when an upturn might have been expected (Homel, 1983b; Ross, 1982; Thomson and Mavroleftzerou, 1984).

Figures 1.3 and 1.4 do nothing more than establish a *prima facie* case for the impact of RBT in New South Wales. As noted above, much more rigorous statistical analysis, which is beyond the scope of this study, is required before firm inferences can be drawn from the crash statistics.

Summary

The review in this chapter of the way drinking drivers are dealt with by the criminal justice system has highlighted several important points. Maximum penalties are tough and enforcement is rigorous. The introduction of RBT in New South Wales represented a greatly increased investment by the state in drink-drive law enforcement, with millions of breath tests being conducted and millions of dollars being poured into advertising. However, drink-driving is not unambiguously a crime and in practice the enforcement of the law is a ritual of upgrading.

Gusfield's (1981b) analysis of drinking and driving as a public problem contains an implicit rejection of the idea that law and its enforcement can have much of a deterrent effect on behaviour. Indeed, from this perspective law enforcement is not intended to be a road safety measure as much as it is intended to be a drama for public consumption. Against this view we have the research of Ross (1982) which suggests a considerable, although temporary deterrent impact of certain forms of law enforcement. We also have the evidence of the New South Wales fatal crash statistics, which appear to support the contention that measures like RBT can have an effect for at least two and a half years without a noticeable return to pre-innovation levels.

A significant feature of the drink-drive literature reviewed in this chapter is the conflicting evidence on the nature of the drinking driver. The drinking driver is not necessarily an alcoholic, accepting the traditional usage of that term, and it has certainly not been demonstrated beyond doubt that a policy of isolating young men as a high risk group of drinking drivers is justified. To some extent the question of who the drinking driver "really" is is unanswerable, since the results of any analysis are partly dependent on the ideological bias of the researcher. One consequence of the confused state of the literature is that there is no ready-made typology of drink-drivers which can be used as a basis for incorporating statements about differential deterrability in a theory of the deterrence process.

In Chapter 2, a model of the deterrence process is proposed. The model is stated in general form, covering both general and specific deterrence. The emphasis is on the causal chain which is assumed to link judicial and police activity with drink-driving behaviour, but with one exception no predictions about differential deterrability are made. Using this model, the impact of RBT on drinking and driving behaviours is investigated in Chapter 5.

2. A MODEL OF THE DETERRENCE PROCESS

Deterrence Theory and the Deterrence Doctrine

Random breath testing may be viewed as a particularly vivid, yet simple application of the classical doctrine of deterrence. According to this doctrine, which is generally traced to the writings of the 18th century utilitarian philosophers Bentham and Beccaria, "The rate for a particular type of crime varies inversely with the celerity, certainty, and severity of punishments of that type of crime" (Gibbs, 1975, p. 5). Thus, it is argued, to the extent that punishment for drinking and driving in a jurisdiction is tough, sure and swift, its rate of occurrence will be correspondingly low. The beauty of RBT, from this perspective, is that it should influence the variable which historically has been regarded as most important, namely the *certainty* of punishment. After all, if any motorist at any time can be breath tested, the potential drink driver, no matter how skilled he believes he is in avoiding detection when over the limit, will have cause to think twice before actually committing the offence. In the same way, it is argued, the convicted offender who has suffered a severe punishment, perhaps a long period of licence disqualification or even imprisonment, will have reason to reflect, at leisure, on his experience and on the futility of further malefactions.

At the heart of the arguments for deterrence as a tool for social control is the belief that the behaviour of human beings can be modified by making them fearful of the consequences of committing illegal acts. As Gibbs (1975) has put it: "*Deterrence* can be thought of as the omission of an act as a response to the perceived risk and fear of punishment for *contrary* behaviour" (p. 2). One virtue of this definition, involving as it does perceptions, motivations and the calculation of risks, is that it highlights the inherently psychological nature of the assumed phenomenon. More than that, however, deterrence is a psychological process which is clearly intended to take place within a broad social context. The punishments which are supposed to follow the commission of prohibited acts are prescribed by law, and offenders are apprehended and punished not in a psychological laboratory but in the real world of human activity.

As Beyleveld (1979b) points out, a theory for predicting deterrence needs to specify the concrete social circumstances which determine specific beliefs and perceptions of sanctions and ways of processing them. Such a theory should be distinguished from statements of the deterrence *doctrine* (e.g.: swift, sure and severe punishments reduce crime), not only because the doctrine is vaguely formulated but because it explains neither deterrence nor the offence rate. Propositions of the deterrence doctrine are in fact predictions from a "theory for predicting deterrence" (Beyleveld, 1979b, p. 216). For Beyleveld, such a theory need not specify all the details of the actual decision making process. For example, we know very little about the calculation of personal utilities (or indeed whether deterrence occurs in this fashion at all), and elaboration of these processes requires empirical research.

In the present chapter an attempt is made to specify a model which predicts a deterrent effect of RBT as implemented in New South Wales, and which also predicts a deterrent impact of severe as opposed to light penalties actually imposed on offenders. The emphasis is on the social and psychological processes linking the official actions of legal agencies (RBT, the imposition of punishments) with the drinking-driving behaviour of threatened or punished individuals. The model is outlined in summary form, and then some basic definitions are proposed. The assumptions of the model are then examined in some detail, beginning with the notion of rationality in human decision making. Some ideas from *prospect theory* are applied to the drink-drive decision as a way of dealing with criticisms of utility theory as a description of the decision making process. After a discussion of the nature of the evidence required to decide whether deterrence has taken place or not, the model is applied to RBT. An elaboration of the model for the effects of punishment may be found in Homel (1985), and the results of an empirical study in Homel (1980a, 1981a).

The Model

Four key propositions undergird the model. First of all, individuals must be *exposed* personally to law enforcement, or must receive information about law enforcement, before they can be deterred. Secondly, neither exposure to law enforcement nor perceptions of legal sanctions have any influence on behaviour apart from a process of *evaluation* whereby these experiences or cognitions are given a meaning. Thirdly, the extent to which an individual is deterred can, in principle, be measured by questioning him or her. Finally, there must be an investigation of the effects of official legal activity (RBT, punishment) on *non-legal sanctions* which inhibit or encourage drinking and driving, so that the deterrent effects of legal activity can be clearly distinguished from other effects.

Briefly stated, the model proposes that official legal activities and drink-driving are linked through exposure to law enforcement leading to perceptions of severe and/or certain sanctions and hence to attempts to avoid committing the offence when there is a risk of driving whilst impaired. The class of people to whom deterrence will be applicable are, in the case of RBT, drivers who drink (at least occasionally), and in the case of penalties, those who have been penalised. The behaviour of all types of persons can be described in terms of the deterrence model, even the behaviour of persons who might have highly developed consciences concerning drinking and driving and the behaviour of people labelled as problem drinkers or alcoholics. However, it is recognised that there are two forms of non-legal sanctions which can influence behaviour in contrary directions: feelings of guilt if an individual does drink and drive (self imposed punishment) and informal punishments imposed by peers if an individual does *not* drive after drinking. (In the less common situation in which stigma is associated with committing the offence, all forms of sanctions operate in the same direction.) In most cases the drink-drive decision is framed as a choice between losses, and the perceived costs associated with non-legal sanctions enter into the decision making process together with the perceived costs of legal sanctions in a complex and possibly interactive fashion.

At the heart of the model are the perceptions of legal sanctions. However, these perceptions on their own are not sufficient to explain behaviour; a process of evaluation takes place, whereby the individual weighs the personally determined costs of the threatened consequences of his behaviour. Thus two individuals might have exactly the same perception of the penalties which would be applied to them for drinking and driving, but one might be much less worried than the other at the prospect of actually experiencing those penalties.

Perceptions and evaluations of sanctions (both legal and non-legal) influence behaviour. Legal sanctions may encourage individuals to adopt strategies to avoid drinking and driving on occasions when committing the offence is a possibility, but informal sanctions may have the opposite effect. In particular, the belief that threatened punishments would be personally unpleasant and the belief that the chances of arrest are high lead to increased attempts to avoid drink-driving. (Note that the measurement of attempts to avoid drink-driving necessarily requires some degree of reporting of motivations by the respondent, since only actions which are undertaken for a specific *reason* are of theoretical interest.) Such avoidance strategies, in turn, lead to less drinking and driving (or to drinking and driving at lower blood alcohol levels) and this results in fewer traffic crashes.

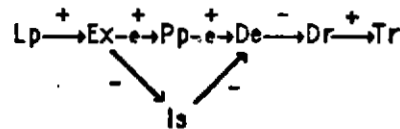
Given that informal and formal sanctions operate in opposite directions in many cases, a prediction concerning deterrence is not possible unless the effect of legal sanctions on the informal sanctions can be stipulated. In the case of both RBT and the infliction of penalties, it is proposed that the legal actions reduce peer pressure to drive after drinking by providing an exculpatory defence or legitimate excuse for actions taken to avoid the offence. In the case of those with a conviction, the more severe the punishment actually experienced, the more cogent the excuse.

In order to be a sociological model, perceptions must be linked in some way with the objective legal actions. It is proposed that official legal activity is relevant to the individual only inasmuch as it enters the world of his everyday experience. Laws which are passed or punishments which are imposed without the knowledge of the individual cannot affect his decision making processes, at least until the activities of other people who affect that individual are altered. Thus *exposure* to the legal actions is the variable linking official activity with perceptions and evaluations of sanctions. The more intensive or frequent the official activity, the more intense or frequent will be the exposure of the threatened or punished population. Exposure might occur through observing

or experiencing police breath testing, or through knowing others exposed in this way. In addition, the experience of punishment through a conviction is a form of exposure. The model predicts that those exposed to legal sanctions in any of these ways will be fearful of the consequences of drinking and driving and will modify their behaviours accordingly. But the relationship between exposure and fear of sanctions is not automatic. Once again, it is proposed that an individualised process of evaluation takes place. The experience of being randomly tested may have more impact on one driver than on another; the experience of a heavy fine and a long period of disqualification may be interpreted by a repeat offender as fair, or at least to be expected, while exactly the same penalty may be interpreted by a first offender as extremely tough. These differing constructions of the meaning of similar experiences will lead to differing evaluations of threatened or actual legal sanctions.

Finally, the model incorporates a range of social and demographic variables, such as alcohol consumption, age and sex. These variables are assumed to influence all components of the model, including rates of exposure, evaluations of the meaning of exposure, perceptions and evaluations of legal sanctions, strategies to avoid drinking and driving, drink-driving behaviour and the intensity with which non-legal sanctions apply. One effect of importance is that individuals who have broken the law with impunity, particularly those who have successfully driven over the legal limit, will not fear legal sanctions as much as those without this experience of law breaking. Although predictions concerning the nature of other effects can be made, the possibilities are so numerous and complex that they are better dealt with on an ad hoc basis when the major paths of the model are investigated.

The details of the model, as well as its antecedents, are examined throughout this chapter. It may assist at this point, however, if the model is represented in diagrammatic form, albeit in a greatly simplified fashion. Since in a number of respects the model is an extension and elaboration of that proposed by Gibbs (1975), a similar form of notation is used. Lp refers to the properties of



legal punishments, Ex denotes exposure to law enforcement (including publicity about the law and its enforcement and the penalties prescribed), Pp is the perception of legal punishments, De is the amount of deterrence (measured in the present study as attempts to avoid drink-driving), Dr is drink-driving, Tr is traffic crashes and Is is informal sanctions (peer pressure, which usually encourages drinking and driving). The arrows denote positive and negative causal relationships, and the small e's denote the process of evaluation.

As a first step toward explanation and elaboration of the model, it is useful to clarify further the key concept of deterrence by introducing some definitions. However, it should be recognised that there is considerable controversy in the literature about definitions, and even more argument about appropriate forms of evidence for the occurrence and effects of deterrence. Indeed, the literature fairly bristles with reviews, overviews, theoretical arguments, conceptualisations, reconceptualisations, criticisms and rebuttals. Tittle (1980a) has referred to "an almost chaotic situation" (p. 24), claiming that "the literature is burdened with a large number of critical hypotheses and issues that remain problematic because of absent or incomplete data or because theoretical arguments and/or research findings are divergent or contradictory" (p. 24).

It is impossible, in general, to come to any definite conclusion about the offences affected by general deterrence or the conditions under which general deterrence might operate (Anderson, 1979; Gibbs, 1979; Tittle, 1980b). Fortunately we are on stronger ground in the study of drinking and driving than in the study of other offences, since the drink-drive researcher has a number of advantages (such as access to reliable and relatively valid measures of the extent of drink-driving) which make the field uniquely suitable as a context for deterrence research (Ross, 1973; Ross, 1982). However, since deterrence is an imprecise concept even drink-drive research suffers from many of the evidential problems which plague research into the effects of actual or threatened punishment on other types of offenders.

It would be tedious (in fact, impossible) to present a blow-by-blow account of deterrence

research as it has developed in recent years. The present chapter is focussed rather on issues which are most salient to a study of the deterrence of drinking and driving. The definitions discussed below are those most relevant to the study of RBT and the study of penalty severity.

Definitions of Deterrence

A distinction is usually made between *general deterrence*, which relates to the impact of the threat of legal punishments on the public at large, and *specific deterrence*, which relates to the impact of legal punishments on those who have suffered them. However, these terms in no way do justice to the complexities inherent in the concept of deterrence. Gibbs (1975) developed a typology consisting of 16 combinations of conditions, reflecting the individual's previous experience with punishment for the crime in question and with punishment for other types of crimes, and his history of commission of crimes of the type in question or of other types. Thus for example *potential restrictive deterrence Type IV A* relates to a situation in which an individual has never suffered any prescribed punishment for any crime but has previously committed the type of crime in question as well as other types of crime.

Gibbs (1975) points out that the empirical validity of the assertion "punishment deters crime" is relative to particular types of conditions. Since it would be extremely cumbersome to formulate a separate theory for each of 16 types of deterrence, it is fortunate that some simpler definitions derived from Gibbs will suffice. *Absolute deterrence* denotes instances where an individual has refrained throughout life from a particular type of criminal act at least in part because of the fear of punishment, while *restrictive deterrence* is the curtailment of or reduction in criminal activity for a period because of the fear of punishment. Since absolute deterrence pertains to individuals who have never committed the crime in question, it is likely that any deterrent effects of punishment are largely restrictive in nature. This would seem to be particularly the case for drinking and driving, where substantial proportions of the population at risk report having committed the offence at least once (Freedman, Henderson and Wood, 1973; Job, 1983). In order to limit the meaning of general deterrence, Gibbs (1975) equates it with absolute and restrictive deterrence. *Specific deterrence* may be defined as the omission or curtailment of some type of criminal activity by an individual throughout a period because he or she has been punished for an offence and is therefore unwilling to risk being punished again. Note that this definition deals explicitly with the possibility that punishment for one type of offence (say drink-driving) deters an offender from committing other types of offences (perhaps speeding).

Some deterrence theorists (Walker, 1979; Zimring and Hawkins, 1973) consider that the distinction between general and specific deterrence is confusing, since specific deterrence is really a special effort to make individuals more sensitive to general deterrence. Walker says that the only difference between the two processes is that one depends on imagination and the other on memory, while Zimring and Hawkins point out that "the experience of punishment is merely one of an enormous variety of factors which condition threat responsiveness" (p. 225). The distinction between general and specific deterrence is well established in the literature and will be used in the present study, but in agreement with Walker and Zimring and Hawkins it is assumed that both terms refer to the same phenomenon occurring in different populations.

A further distinction which is important when assessing the impact of penalties is that between *absolute specific deterrence* and *marginal specific deterrence* (Gibbs, 1975). All studies of the correlations between penalty severity and recidivism rates deal implicitly with marginal specific deterrence, the effects of severe punishments compared with lenient ones. A more important question, however, is the effect of conviction and punishment in absolute terms. In order to answer this latter question, it is necessary to compare the frequency of criminal acts among individuals who have committed a crime but gone unpunished with the frequency among those who have been punished for the crime. A confusing aspect of this terminology is that *absolute* is used in a sense that differs from its meaning when it applies to general deterrence.

A fundamental question arising out of the usual definitions of deterrence is the nature of sanctions, the independent variable in the equation. It has been implicitly assumed so far in the discussion that deterrence is based on the threat of state-imposed legal sanctions, and indeed much deterrence research has focussed entirely on legal punishments. However, as Grasmick and Green (1980) point out, general sociological theory posits three mechanisms of social control: the threat of

guilt feelings resulting from the internalisation of norms (i.e. self-imposed punishment); the threat of social stigma resulting from informal sanctions imposed by peers; and the threat of physical and/or material deprivation, one source of which is formal, legal punishment. Should the term deterrence apply only to the operation of legal sanctions, thus relegating other sanctions to the status of covariates or moderating variables, or should all forms of sanctions be incorporated in a general deterrence model, as Grasmick and Green (1980) and Tittle (1980a) argue? To some extent the decision is a matter of convenience, provided the importance of investigating the effects of all types of sanctions is recognised. In keeping with most previous uses of the term, deterrence in the present study will refer to the effects of legal sanctions, but the roles of peer pressure and internalisation of norms are included as additional factors in the model (Gusfield, 1981a; Norström, 1981).

A final problem of definition is closely related to the question of sanctions: should deterrence refer only to the effects of legal sanctions in inhibiting individual deviant impulses by the mechanism of fear (as Gibbs, 1975, 1979, argues) or should other preventive mechanisms be included? Gibbs (1975) enumerates nine possible ways that punishment may prevent crime, other than through fear. These mechanisms are incapacitation (e.g.: imprisonment limits opportunities to commit crime), punitive surveillance (e.g.: probation and parole make the offender visible to authorities), enculturation or socialisation (public knowledge of laws is furthered by punishment), reformation (the moral jolt of arrest or punishment), normative validation (legal punishments reinforce social condemnations of an act), retribution (legal punishments discourage crime victims or their families from seeking revenge), stigmatisation (the anticipation of stigma may deter the typical citizen more than the punishment itself), normative insulation (incapacitating punishments like imprisonment reduce the influence of offenders on the attitudes and values of others), and, finally, habituation (people may initially conform to the law through fear or for some other reason, but eventually compliance becomes a habit). In Gibbs' (1979) view a definition of deterrence which included all possible preventive consequences of punishment would make it a "sponge concept" (p.667), a contention vigorously disputed by Tittle (1980a). In this study we will once again opt for simplicity of terminology, using the term deterrence to refer to the mechanism of fear. This definitional restriction does not, of course, entail turning a blind eye to the operation of other mechanisms, but it is consistent with a desire to develop a research design focussed on a small number of manageable questions which are clearly central to deterrence research.

In any case, the difficulties involved in identifying and measuring the effects of non-deterrent preventive mechanisms should not be under-estimated. As Gibbs (1979) has wryly noted, even the *possibility* of such effects creates horrendous evidential problems in deterrence research. For example, when considering the effects of drink-drive law and RBT, there is a very real possibility that any long term impact will not be achieved through deterrence but through normative validation (Norström, 1981; Zimring and Hawkins, 1973). However, in the words of Ross (1982), "...demonstration of the origins of non-legal norms in the historical exposure of a population to specific legal threats is extremely hard to accomplish by scientifically persuasive techniques" (p.9). I do not pretend in the present study even to have begun to address this problem. Moreover, the possibility that a legal innovation like RBT could have an immediate impact on moral attitudes, thereby influencing drink-drive behaviour, has not been systematically investigated, partly because such a phenomenon seems less likely than the hypothesised effect on the peer group.

Deterrence, Human Rationality and Drinking and Driving

Utility Theory

Isaac Ehrlich (Ehrlich and Mark, 1977), an economist who has written extensively on the subject of deterrence, has referred to the "heretical" nature of the proposition that potential offenders respond to incentives (p. 293). The notion is heretical because for many years the majority of sociologists and criminologists have been committed to a positivist tradition in which criminals are seen as ill or maladjusted, and therefore rehabilitation or treatment have been the favoured control policies. Positivists emphasise deterministic explanations, conceptualising crime as a problem of maladjusted individuals, defective families or of alienating communities (Poveda

and Schaffer, 1975). Punishment as a tool for social control has, within this tradition, been regarded with repugnance (Menninger, 1968), and some have even characterised deterrence as a form of "human sacrifice" (Walker, 1979, p. 139). Moreover, functionalist sociologists, the dominant school for many years, had little time for force as a mechanism for social control, emphasising instead internalisation of norms and avoidance of social disapproval as the primary inhibitors of illegal behaviour (Grasmick and Green, 1980).

As Palmer (1977) notes, the debate about the deterrence hypothesis is to some extent a debate between disciplines, with economists on the whole finding evidence in its support, and sociologists finding the opposite (especially with respect to the death penalty). In economic theory the decision to engage in crime depends on the benefits and costs associated with crime and with alternative lawful activities. Increasing the penalties for a crime or the chances of apprehension are, from the economist's viewpoint, ways of increasing the costs involving in committing the crime. An individual will commit fewer crimes if the benefits from crime decrease, the costs of crime increase, the benefits from lawful activities increase, or the costs of lawful activities decrease (Palmer, 1977). One complication of economic theory is that benefits from crime can be pecuniary or non-pecuniary, the latter referring to the enjoyment which comes directly from the criminal act itself. Clearly the benefits from drinking and driving are non-pecuniary in nature but it is not clear how these benefits can be identified, measured or weighted.

Underlying the economic model is the idea of rational potential criminals weighing possible consequences of their actions, both positive and negative, and taking advantage of a criminal opportunity only if it is in their self interest to do so (Cook, 1980). Economists are aware, however, that individuals respond differently to equivalent criminal opportunities. They differ in their willingness to accept risks, they differ with respect to "honesty preference" (p. 217) or moral attachment to the law, they differ with respect to their evaluation of the profit to be gained from a crime, and they differ in their objective circumstances, such as their skills in evading capture (Cook, 1980). Nevertheless, they argue that these kinds of variables can, in principle, be incorporated into the model of rational decision making.

Carr-Hill and Stern (1979) have expressed in mathematical terms the basic model employed by economists and others. Referring to property crimes, they assume that a potential criminal starts off with wealth W . If he gets away with the crime he gains G , to give him wealth $W + G$, but if he is caught his loss is L , leaving him with $W - L$. However, individuals differ in the value they accord to gains and losses of a given amount, and hence it is customary to refer to the *utility* of a consequence, $U(.)$. If the probability of apprehension is p , the expected utility EU for a given individual if he commits the crime is defined as

$$EU = (1-p)U(W + G) + pU(W - L)$$

The rational individual maximises his expected utility, and hence commits the crime if $EU > U(W)$. In the extreme case when capture is certain, EU reduces to $U(W - L)$ and the crime won't be committed, since the utility function is monotonic (although not linear). Conversely, if the probability of capture is zero, EU reduces to $U(W + G)$ and the rational individual would definitely commit the crime. It follows that in order to deter crime, authorities need to increase p , although the exact level required will vary from individual to individual since utility functions are unique. Alternatively, penalties (L) could be increased, or targets could be hardened, reducing G . Note however that this model does not incorporate any non-pecuniary benefits, such as the utility of the act itself, and it is difficult to see how it could be applied in its present form to offences like drinking and driving.

Utility theory has a long history, dating back at least to Bernoulli in the 18th century, but in more recent years attempts have been made to apply comprehensive scientific theories of both a prescriptive and descriptive nature to human behaviour, especially gambling decisions (Lee, 1971). (Prescriptive theories of choice impose consistency or rationality by beginning with a set of mathematical axioms governing the behaviour of hypothetical people). For example, it is possible to replace the actual probabilities in Carr-Hill and Stern's (1979) model with subjective probabilities, a necessary step if these models are to have any value in predicting real crime behaviour (strictly, in this case, we should speak of *subjective* expected utility). Attempts have been made to estimate the shape of the utility function for individual subjects, but as Lee argues, this requires an enormous amount of effort for only a slight improvement on predictions of choices

based on actuarial values. Indeed, the mathematical developments of utility theory, beginning with Von Neumann and Morgenstern (1953), have been rather more impressive than the applications to behavioural decision theory.

However, as Pitz and Sachs (1984) note, *EU* theory has been and continues to be productive despite its limitations, since it has yielded deeper insights and prompted more refined questions than would have been possible without it. For example, some researchers have recently carried out experiments to determine the effects of introducing a multidimensional definition of utility, incorporating such concepts as "regret" (p. 143). Pitz and Sachs consider that "the interaction of prescriptive and descriptive theory through multi-attribute formulations of decision problems promises to increase further its prescriptive value..., as well as its descriptive power" (p. 144).

Researchers investigating the effects of legal sanctions on drinking drivers often mention utility theory without considering its implications in any explicit fashion. The research of Summers and Harris (1978, 1979) is an exception to this rule. The main purpose of their study was to provide, through an integrated conceptual framework based on utility theory, a computer simulation model to guide systematic development and evaluation of drink-drive countermeasures. The conceptual framework, and the research questions with which the study concludes, are probably the most valuable features of the report.

Beginning with utility theory, Summers and Harris (1978) cite research which suggests that most people are characterised by risk avoidance. They argue that if an outcome is potentially severe, people tend not to take the risk even though the probability of the outcome might be very low. The model which they develop is very comprehensive, incorporating perceived risk as well as laws, driver trips, enforcement, adjudication and information feedback. In the model, general deterrence operates to feed back information through various media (e.g.: word-of-mouth exposure) to increase the perceived risks entailed in drink-driving. Since data were not available for the key variables such as perceived risk, values were developed empirically by iteration until simulation outputs were consistent with outputs expected from the literature.

The authors concluded, among other things, that relatively small changes in perceived risk are likely to produce large changes in the number of drink-drive trips or related accidents. They also concluded that word-of-mouth feedback from drivers caught is not likely to reduce drink-driving appreciably, and that the countermeasure with greatest potential is a combination of vigorous enforcement and widespread publicity concerning this enforcement.

The work of Summers and Harris illustrates how testable and non-trivial predictions can be generated through a rigorous application of utility theory combined with plausible assumptions about the roles of key social variables. The continuing productivity of *EU* theory, albeit in a much more complex form than that usually considered in discussions of crime, is encouraging for proponents of deterrence. Nevertheless it is as well to take cognisance of the arguments of those who attack the whole idea of rationality in criminal decision making, especially since drinking and driving may be one of the less calculating offences. (One of the drink-drive offenders interviewed by Petersen, 1982, was asked whether he thought drinking after driving was worth the risk. He replied: "Oh, I always think about it before, but when you get to the pub and have a few drinks you never think about it till after" [p. 43].)

Objections to a Model Which Assumes Rational Decision Making

A red herring. One of the earliest challenges, not only to the predictions of the deterrence doctrine but also to the rationalistic psychology upon which it was assumed to be based, came from psychologists interested in learning theory. Andenaes (1974) cites some psychological studies in which attempts were made to elucidate the problems of deterrence by reference to laboratory animal research, in which there is little place for rational calculation on the part of the subject. Although some of these researchers found evidence to support the deterrence doctrine, particularly with respect to the importance of certainty of punishment, most were skeptical that legal punishments could have much impact in practice. Most psychologists have argued that legal punishments lack the properties required for effective punishment, such as swift, continuous and repeated application (Chopra, 1969).

The great majority of deterrence theorists have rejected the claim that the predictions of the deterrence doctrine can be proved or disproved from laboratory experiments (Andenaes, 1974;

Geerken and Gove, 1975; Gibbs, 1975; Zimring and Hawkins, 1973). Andenaes' summation is most eloquent and most pertinent to the approach adopted in the present study:

The application of legal punishment is the result of the violation of a *general norm* which prescribes punishment and which the offender normally will know in advance. *The whole experience derives its meaning* [italics added] from this relation between the general norm and the application of punishment in the individual case. The situation is very different from the situation of the confused rat or pigeon which is desperately trying to adapt its behavior to the incomprehensible manipulations of the psychologist. (pp. 185-186).

However, despite the general consensus that legal punishments are more generalised and qualitatively different from the punishments administered by psychologists in a laboratory, attempts are still being made to bring deterrence under the umbrella of learning theory. Recently, Cavender (1979) has claimed that since criminal behaviour is operant behaviour, operant learning theory provides an appropriate standard for the evaluation of deterrence.

Cavender limits his evaluation to specific deterrence, comparing the operation of legal sanctions with the criteria for effective punishment developed by Azrin and Holz (cited in Cavender, 1979). These 12 criteria include principles which state that escape from punishment should be impossible, punishment should be intense, each response should be punished, and so on. Cavender concludes that legal punishments do not satisfy a single criterion, and that therefore the predictions of a specific deterrent effect of sanctions cannot be sustained. However, Cavender's argument is really based on a sleight of hand which appears to make plausible the proposition that deterrence theory and operant learning theory have enough in common to make evaluation of deterrence in terms of learning theory principles a reasonable thing to do.

The argument is heavily qualified, and Cavender finds it necessary to abandon the strict environmental determinism of Skinner in favour of a model which has some place for human interaction and reflection. Nevertheless, the 12 criteria for evaluation all appear to arise from conventional laboratory research, and in the end he contradicts himself by arguing that the introduction of legal sanctions along the lines dictated by learning theory would be socially and ethically unacceptable. That, of course, is just the point. Deterrence theorists are not concerned with the effects of electric shocks administered in a laboratory, but with the effects of actual legal sanctions which are subject to the constraints of law.

In order to evaluate the predictions of deterrence theory it is necessary to deal adequately with its assumptions. It is not sufficient to assert that criminal behaviour is operant behaviour and is therefore maintained by its consequences without also demonstrating that the alternative model of criminal behaviour underlying deterrence (which in minimal form includes the idea of perception of legal sanctions and evaluation of profits and losses) is incorrect or inferior. In effect, the learning theorist who criticises the deterrence theorist is arguing that *if* human beings were like animals in a laboratory and *if* the punishments administered were like current legal sanctions then such punishments would not be very effective in suppressing criminal behaviour. This may be true, but is of no interest.

Criminological critiques. A number of criminologists have reacted angrily to the modern emphasis in criminology on crime control and deterrence. For example Cressey (1978) has attacked the foundations of the classical school, rejecting the notion of free will and arguing for a return to the kind of positivistic criminology which sought the causes of crime, if not in individual pathology, then in "the kind of social organisation characterising modern industrialised nations" (p. 183). Fattah (1983, 1980) has gone even further than Cressey in attacking the idea of deterrence and its foundation in assumed human rationality: "...if deterrence does work, it is likely to affect only the rational, thoughtful, premeditated behaviour of normal people under normal circumstances. The problem is, very few people will commit serious, premeditated crimes under normal circumstances!" (Fattah, 1980, p. 82). He adds, however, that "man is not a rational being, he is a rationalising creature" (p. 83), and that the economist's view of the potential criminal is nothing more than a "legal fiction or a philosophical abstraction" (p. 80).

Other criminologists have adopted a more moderate approach, seeking a model which allows deterrence in some circumstances but which also takes into account the many complex forces which may determine behaviour. Henshel and Carey (1975) suggest a conception of man as *goal-seeking but not information-seeking* (p. 57). Such a man may be influenced by legal sanctions, but only if

he hears about them and only if the source of information is credible. In the model proposed by Henshel and Carey and also in the model proposed in the present study, *public knowledge* of legal sanctions is of critical importance.

Webb (1980) has proposed a 3 x 3 table for assessing the applicability of the deterrence model. The three rows of the table correspond to three population subgroups proposed by Zimring and Hawkins (1968), namely those who abide by the law because of the socialisation process, those who are on the margin of crime (who will commit the crime given the opportunity) and the criminal group (who commit a given crime and have certain social, psychological or attitudinal characteristics which set them apart from the general population). The three columns of the table correspond to three kinds of acts: instrumental (e.g.: planning a bank robbery), compulsive (e.g.: theft because of drug addiction) and impulsive (e.g.: shoplifting as a spur of the moment act). He claims that deterrence applies to only two of the nine cells of the table: instrumental acts committed by the marginal or criminal groups.

Applying Webb's table to drinking and driving, it is probably fair to say that given the widespread use of alcohol in our society, there are fairly large marginal and criminal (habitual drink-driver) groups, but it is not clear whether the behaviour is instrumental, compulsive or impulsive. In certain circumstances it could be all three, so Webb's (1980) classification system fails to clarify the status of drinking and driving as a deterrable offence. Moreover, despite its grounding in commonsense, we have little evidence for the empirical validity of Webb's system.

Zimring and Hawkins (1968), from whom Webb derived one dimension of his table, were not concerned with developing a set of categories to which people could be allocated. Rather they attempted to build a framework for analysis which took into account the fact that some people refrain from criminal activities for reasons other than fear of punishment, and that the remainder respond (if at all) to legal threats in a variety of ways and through a variety of mechanisms. This perspective has been taken into account in the development of the model proposed in this study by including non-legal sanctions related to moral beliefs and to peer pressures.

More difficult is the other dimension of Webb's table. Not only is it not clear how drink-drivers should be classified in terms of this dimension, it is not clear that the distinctions are useful for understanding the deterrence process. As Andenaes (1974) has pointed out, fear may be an element in behaviour which is not rationally motivated. Many offences (like theft by drug addicts) which might be classified as compulsive could just as easily be analysed within a deterrence framework, assigning a very high value to the utility associated with the commission of the criminal act.

Clearly the debate about rationality and decision making is not capable of quick or easy resolution. Nevertheless, deterrence theorists need to deal somehow with the argument that much crime is compulsive or impulsive in nature and therefore not capable of control through the threat of punishment. Cook (1980) has attempted to meet this challenge. He points out that deterrence theory is concerned with making predictions about *aggregate behaviour*. The accuracy of such predictions does not require that every person act predictably, only that some be capable of rational decision making. Moreover a person whose judgment is clouded by emotion or inebriation may still be guided by his personal "standing decisions" (p. 220) which in turn may reflect concern with the threat of punishment. Nevertheless he admits this defence is not entirely satisfactory and turns to the psychological research of Carroll (1978) and Tversky and Kahneman (1981) for light on systematic or predictable deviations from rationality.

It is significant that every theorist has recognised in one way or another that deterrence is a cognitive phenomenon, and since cognitive phenomena are usually considered the province of psychologists, psychological theories are potentially of great importance in deterrence research. Cook (1980) hails Carroll's (1978) experimental research as an entering wedge to further research which applies modern cognitive psychology to the study of the effects of legal sanctions. In Carroll's (1978) model we have "the 'psychological person' who makes a few simple and concrete examinations of his or her opportunities and makes guesses that can be far short of optimal" (p. 1513). Carroll found in a series of three-outcome gambles involving crime and punishment that most subjects focus on one dimension, that different subjects focussed on different dimensions, and that the expected utility model was not supported. He clearly saw his research as establishing a new paradigm for deterrence research, since he asserted that "the debate between sociologists and economists has now become a forum" (p. 1520).

Unfortunately, a search of the recent literature has not revealed the expected flood of

psychological publications on deterrence. However, there is a growing body of psychological research which, although not focussed explicitly on the crime problem, does throw light on the way judgments depart from the prescriptions of formal decision theory (Pitz and Sachs, 1984). It is helpful to focus on one recently proposed alternative to expected utility theory, *prospect theory*, in order to clarify the ways in which the decision whether or not to drink and drive may be viewed by the potential offender (Tversky and Kahneman, 1981).

Prospect Theory and the Drink-drive Decision

Three key concepts of prospect theory will be applied to the drink-drive decision: the ideas of *framing*, *decision weights* and *pre-commitment*.

Framing. Tversky and Kahneman (1981) distinguish two phases in the choice process: an initial phase in which acts, outcomes and contingencies are framed, and a subsequent phase of *evaluation*. Acts are simply options among which one must choose (to drink and drive or to take some action which does not involve drinking and driving), *outcomes* are the consequences of these acts (e.g.: getting home quickly or spending an uncomfortable night sleeping on the floor) and *contingencies* are the conditional probabilities that relate outcomes to acts (e.g.: the chances of getting caught if you drink and drive). Tversky and Kahneman show that an important aspect of framing is whether the problem is construed as a choice between gains or as a choice between losses. For example, with 600 lives at risk, a choice (on the one hand) between the certain saving of 200 lives and a 1/3 probability of the saving of 600 lives and the 2/3 probability that no people will be saved can be contrasted (on the other hand) with a choice between the certain death of 400 people or the 1/3 probability that no people will die and the 2/3 probability that 600 people will die. Actuarially, all alternatives entail an expected loss of 400 lives, but in the first case the choice is presented in terms of lives saved, in the second in the terms of lives lost. For the first framing the majority choice is *risk averse* (people tend to opt for the certain saving of lives) but for the second framing the majority choice is *risk seeking* (people tend to shun the certain loss of lives). In the language of decision theory, this suggests that the utility or value function is S shaped: concave for gains, convex for losses. In addition, Tversky and Kahneman (1981) (also Kahneman and Tversky, 1982) demonstrate that the response to losses is more extreme than the responses to gains, in that the pleasure of winning a sum of money is much less intense than the pain of losing the same sum. Thus the value function is asymmetric.

We can apply this model to the drink-drive decision. Imagine that a man has travelled by car to a party and knows that he has drunk enough alcohol to put him over the .05 limit. Depending on his circumstances, he has a number of choices. He could simply drive home and run the risk of apprehension and punishment for driving with the prescribed amount of alcohol, or perhaps he could leave his car, take a bus or taxi home and return to pick up his car the next day, or perhaps he could persuade a sober mate to drive him home, either in his or his mate's car. The precise options are not as important as the general question: how is he likely to frame the decision problem? In general, it seems highly likely that the problem will be construed as a choice between *losses*, a sure loss if he doesn't drive home, and a possible loss if he does. According to prospect theory, he will probably act in a risk-seeking manner; in other words, commit the offence. Prospect theorists would not deny that offenders might be influenced by calculations concerning possible losses if apprehended, but would argue that given the framing of the problem as a choice between certain and possible losses, there is in most cases a bias toward avoiding the certain loss.

Some careful thought is required to clarify the nature of the losses entailed in the choices facing the potential drink-driver, a task attempted by Mackay-Sim (1983). Apart from the various costs and inconveniences associated with finding alternative transport there are likely to be, as noted earlier, strong social pressures on many people to drink heavily and drive home afterwards. Gusfield (1981a), in a most interesting ethnographic study of drinking-driving in the context of bars, argues that "the failure to drive after drinking is the event that needs to be explained" (p. 160). Starting from the assumption that one's self is an object about which the human being can think and feel, he argues that actors attempt to manage the self impression conveyed by their actions. "It is in how the individual handles the risks of drinking and driving and of drinking-driving that the self is presented and one's moral status performed" (Gusfield, 1981a, p. 160). This suggests that for many drinkers the most serious cost flowing from a decision not to drive home is to be portrayed as

incompetent in one's own eyes or in the eyes of one's peers. Such a portrayal is one of the non-legal sanctions posited by Grasmick and Green (1980), although it is one of the more interesting aspects of drinking and driving that the sanction operates to encourage, not inhibit, law breaking.

Given the work of Norström (1981, 1983), it is necessary to make one other entry in the ledger of possible losses: individuals who believe that drinking and driving is an immoral or antisocial act may experience strong feelings of guilt if they do drink and drive. Such self-imposed punishment is the second of Grasmick and Green's (1980) non-legal sanctions, and to the extent that it occurs may be regarded as a *sure* loss associated with the act of drinking and driving. As noted earlier, Zimring and Hawkins (1968) have argued for the existence of a law abiding group in the community who have received strong moral training in their early years and who cannot commit crimes because their self concepts will not permit them to do so. However, the model proposed in this study corresponds to a parallelogram of forces rather than to a division of the population into those to whom deterrence applies and those to whom it does not. A person's conscience is only one force influencing behaviour, competing with peer pressure and fear of punishment, although in some cases the force of conscience may be the major influence.

In summary, the decision whether or not to drink and drive seems best framed as a choice between losses. There are two kinds of certain losses associated with *not* drinking and driving: the costs and inconveniences entailed in finding alternative transport, and one's portrayal as incompetent in one's own eyes and in the eyes of one's peers. On the other side of the coin, feelings of guilt, to the extent to which they occur, may be viewed as a sure loss entailed in the decision to drink and drive. In addition, some possible losses flowing from arrest and conviction are entailed in the commission of the offence. Prospect theorists would predict that unless guilt feelings are very strong, people will generally behave in a risk-seeking manner and avoid the certain losses inherent in finding another way home. This prediction seems generally consistent with observation.

Decision weights. In addition to the emphasis on framing, prospect theory differs from the expected utility model in its treatment of probabilities. In utility theory the utility of a less than certain outcome is weighted by its actuarial or subjective probability (p): in prospect theory the value of a less than certain outcome is multiplied by a decision weight $\pi(p)$, which is a monotonic function of p but is not a probability. Applied to drinking and driving, p is the perceived probability of arrest. The weighting function has a number of properties which are described by Tversky and Kahneman (1981), but for present purposes the most interesting feature is that while events with a very low or zero probability are discounted altogether ($\pi(0) = 0$), moderately low probabilities are overweighted ($\pi(p) > p$).

This distinction between p and $\pi(p)$ is a very useful feature of prospect theory, not found in utility theory. Applied to crime decisions, a distinction can be made between *perceptions* of arrest probabilities and the weighting or *evaluation* of those perceived probabilities. Similarly, through the value or utility function a distinction can be drawn between perceptions of sanctions and the evaluations of these sanctions. For example, two potential offenders may agree that the chance of being randomly breath tested in the next month is quite high, but differ markedly in the weight they accord this perception in their drinking and driving decisions. Similarly, two individuals may have very similar (if inaccurate) perceptions of penalties for drinking and driving, but may evaluate this perception in different ways (Buikhuisen, 1974). It is of some importance that the sociologist Tittle (1980a), in his wide ranging study of deterrence in a general population sample, strongly emphasised the need for the distinction between perceptions and evaluations to be drawn for sanction severity. Our analysis of prospect theory suggests that the distinction should also be drawn for the probability of arrest.

The properties of the decision weight discussed above suggest that under normal circumstances police enforcement has little impact on drink-drive behaviour, given that the actual probability of apprehension is of the order of one in a thousand and can therefore safely be equated to zero (Ross, 1982). However, during a special campaign or police blitz, the subjective probability of apprehension may be elevated out of the "negligible" into the "moderately low" category, even if the actual chances of getting caught are still less than one in a hundred. Following the predictions of prospect theory, the weights $\pi(p)$ attached to these probabilities will be such that the psychological threat will be exaggerated out of all proportion to the actual threat and the campaign will have more impact than would be expected from strictly actuarial calculations, at least until the subjective

probabilities sink back once more into the negligible category. This pattern predicted by prospect theory is consistent with observations of the effects of enforcement campaigns in many parts of the world (Ross and LaFree, 1984).

Pre-commitment. A final feature (or consequence) of prospect theory as discussed by Tversky and Kahneman (1981) is relevant to deterrence. The authors compare the dependence of preferences on frames to the dependence of perceptual appearance on perspective, and go on to show how the metaphor of changing perspective can be applied to other phenomena of choice, such as the problem of *self control*. The idea is that just as Ulysses requested that he be bound to the mast of the ship in anticipation of the irresistible temptation of the Siren's call, so in general an individual may take action in the present to render inoperative an anticipated future preference. This phenomenon of *pre-commitment* may be particularly relevant to the drink-drive decision, and may be one of the more direct ways in which RBT has an effect on behaviour. That is, RBT may be important not so much for its effects on the balancing of losses when the decision is all but made, but for the way in which people may be encouraged to employ preventive strategies while completely sober, such as leaving the car at home or, even more drastically, giving up drinking altogether.

Limitations of prospect theory. The above three aspects of prospect theory - framing, decision weights and pre-commitment - have been included in this discussion of deterrence since these concepts promise to yield insights into how human decisions depart from rationality (in the sense of utility theory), yet in a predictable fashion. If risky decisions are subject to rules which bear some resemblance to those derived from utility theory, it is likely that deterrence theory will have at least partial validity. However, we still seem to be a fair distance from a psychological theory of decision making under risk which can be applied in an analytical fashion to the study of deterrence. There are many aspects of decision making not covered adequately by prospect theory or by any other theory, such as the use of heuristics or information processing strategies, which cause people to depart significantly from the prescriptions of formal decision theory (Pitz and Sachs, 1984). It would seem that if the notion of rationality is to be salvaged, it may have to be in the form of *limited rationality* (Simon, 1957) substituting "the incredibly clever economic man of decision-making theory with a choosing organism of only limited knowledge and ability" (Douglas and Wildavsky, 1982, p. 77). Henshel and Carey's (1975) notion of human beings as goal seeking but not information seeking reflects a similar outlook.

It is important to recognise that human decisions, including those concerned with law-breaking, are made within a social environment. What appear in the laboratory to be short sighted or limited decisions may be quite functional in everyday life. Although this possibility has recently been recognised by psychologists ("...heuristics may be adaptive mechanisms for coping with a complex, dynamic environment, not just efforts to overcome cognitive limitations" [Pitz and Sachs, 1984, p. 140]), the case has been expressed most clearly by anthropologists Douglas and Wildavsky (1982) in their study of risk and culture. As part of a critique of prospect theory and of the notion of limited rationality, they warn against an excessively individualistic theory:

We now think it is time to incorporate some sociological dimensions into the description of simplifying procedures. Humans are not isolated individuals. Their sociality should be included in the analysis of how their minds work. In risk perception, humans act less as individuals and more as social beings who have internalised social pressures and delegated their decision-making processes to institutions. (pp. 79-80).

This suggests that a complete study of deterrence would be fully situated in the social world of the potential offenders, paying close attention to the "infra-structure of everyday comportment" (Douglas and Wildavsky, 1982, p. 81).

Measuring Deterrence: Gibbs' "Fundamental Problem"

One of the more interesting consequences of the attempt to find evidence for deterrence is the facility with which one is led to very complex theoretical and empirical problems. For Gibbs (1975) the fundamental problem is expressed as a paradox: regardless of whether an individual commits a crime or not, it is not evidence for deterrence. If he commits the crime, clearly he has not been

deterred. However, if he does not commit the offence, the omission might be attributed to the effects of one of the non-legal sanctions such as feelings of guilt. At the heart of Gibbs' difficulty is his adherence to a strict positivism in which it is assumed that people cannot be expected to be able to give authentic accounts of the reasons for their behaviours.

Gibbs recognises that in principle a direct measure of deterrence would solve all the evidential problems. In the case of drinking and driving, such a measure would relate directly to the relative frequency with which an individual contemplated but refrained from drink-driving because of the perceived risk of punishment. He insists, however, that such a measure cannot be derived from observations of that individual's behaviour, and that "... it would be naive to base a purported measure of deterrence on reasons given by individuals for refraining from criminal acts (not to mention practical problems entailed in attempting to gather such data)" (p. 15). This appears to be the only point in his book in which Gibbs entertains the possibility of a direct measure of deterrence based on questioning.

In taking this position Gibbs is presumably not claiming that his respondents would all be liars. Rather, the assumption is that people are forgetful, lazy, occasionally defensive of their actions and beliefs and always impelled by a desire to present themselves to the interviewer in as favourable a light as possible. Moreover, it is proposed that even if internal states and feelings are not simply epiphenomena, people are incapable of reliably reporting relevant features of these internal states. This means that when a question relies for its answer on memory, when it may challenge the propriety of the interviewee's public image, or when it deals with feelings, motivations and other states of mind, the responses should be treated with great caution or discounted altogether.

It follows from this perspective that the use of interviews to gather data is mostly a matter of convenience. Since it is impossible to follow a large number of people around and observe their behaviours, we must rely on reports of what they say they do (or have done). Followed to its logical conclusion, the person within this philosophical tradition is reduced in status to an organism with a variety of properties which can be determined entirely by outside observers. This organism responds in measurable ways to stimuli which can also be observed and quantified. Conclusions about deterrence, which is a statement about people's internal states, are therefore (within this paradigm) necessarily based on inference.

There is no doubt that in many situations this philosophical position has its virtues, and in fact evidence in its favour may be adduced from a number of the analyses presented in this report. (It will be seen in Chapter 4 that even as simple and concrete a question as whether the respondent had been randomly tested was subject to considerable unreliability.) However, there is also no doubt that the dominance of this approach in the social sciences has led to the neglect of an obvious method for studying deterrence, which is simply asking people *why* they refrained from (or why they committed) a criminal act. After all, from a layperson's point of view if one wished to find out why a person did or did not perform some action the simplest strategy would be to ask them for their reasons. (Q: "Why didn't you drive home from the party last night?" A: "Oh, I saw the cops out earlier and decided not to take the chance".)

There is in fact at least one paper in the literature in which this approach is adopted. Meier (1979) compared people who claimed not to have used marijuana because of fear of arrest with those who refrained from use for other reasons. As Meier (1979) reasonably points out, this approach "... views the detection of deterrence as an empirical question and assumes that persons who act in a conforming manner and perceive legal threats as a cause of such action to be instances of deterrence." (p. 13). It seems, however, that other researchers have not been willing to make this assumption.

Since Gibbs wrote his book, there have been developments in the social sciences, particularly in psychology, which have involved a recognition of and a coming to terms with the role of subjectivity (Jessor, 1981). There has also been a renewed interest in verbal reports as data, and their relationship to cognitive processes (Ericsson and Simon, 1980; Nisbett and Wilson, 1977; Smith and Miller, 1978). Some of the philosophical underpinnings required for the analysis of verbal reports have been provided by writers interested in developing a phenomenological or cognitive approach to psychological research. For example, Harré and Secord (1979) (in a chapter entitled "Why not ask them ...?") challenge the mechanistic and behaviourist model outlined above by arguing that person predicates form a bodily-mental spectrum, not two or more exclusive groups. They point out that philosophers have distinguished between predicates like "150 pounds",

which a person can share with a lump of rock, and predicates like "conscience struck" which seem to have application only to people, and then only on the basis of a person's categorisation of his or her own feelings. These predicates were applied by philosophers to a person's body and mind, respectively, but then predicates like "elated" or "deterred", which presupposed an interaction between the corporeal and mental substances, could not be dealt with.

Harré and Secord propose instead that predicates of this type be dealt with by dual criteria, one concerned with the external indicators and one with the internal state. They argue that although a man may well be the best *authority* on how he is feeling or why he is acting, he is not the only one with *access* to information of this sort. In cases of dispute, if we wish to maintain the observer's point of view over against that of the person himself, a special case (such as a Freudian explanation) must be made out.

What Harré and Secord's argument seems to amount to in the present instance is that people's reports of their reasons for not drinking and driving may be accepted as evidence, but not uncritically and not in isolation from the more objective kinds of evidence normally considered. Putting the matter positively, the admission of evidence on which the respondent is the most privileged observer (reasons for not drinking and driving) is essential for the determination of a verdict on whether or not deterrence has been operating, since the predicate is by its nature one for which the application of both types of criteria (overt and covert) is required.

There is some empirical evidence to support the contention that, under certain circumstances, people are capable of reporting reliably on their cognitive processes, including the reasons for their actions. A review article by Nisbett and Wilson (1977), in which the authors concluded that individuals have little or no direct introspective access to higher order cognitive processes, generated considerable controversy, with critics asserting that Nisbett and Wilson's position is stated in a nonfalsifiable fashion and is based on incorrect interpretations of the experimental evidence (Smith and Miller, 1978). Ericsson and Simon (1980) argue that the inaccurate reports found by some researchers result from requesting information that was never directly heeded, thus forcing subjects to infer rather than remember their mental processes.

However, even Nisbett and Wilson conceded that although people may not be able to observe directly their cognitive processes, they will sometimes be able to report accurately about them. "Accurate reports will occur when influential stimuli are salient and are plausible causes of the responses they produce ..." (p. 231). This implies that in the study of why a person did not commit a crime it should be established, before asking about reasons, that opportunities to commit the offence occurred in a given time period and that the person was aware of legal sanctions and understood what they meant. The issue of public knowledge of sanctions is a problem emphasised by Henshel and Carey (1975). It is possible that the apparent ineffectiveness of some legal sanctions is a product of public ignorance rather than the lack of deterrent potential.

Given the widespread publicity about RBT and the high level of police enforcement, RBT must be regarded as a salient stimulus and a plausible explanation for the behaviour of the great majority of licence holders who drink. This is not to say, of course, that the mere act of publicity and enforcement proves the success of RBT, but that the conditions required by Nisbett and Wilson (1977) for people to be able to report accurately on RBT as a possible cause of their actions would appear to be met.

It is concluded that Gibbs (1975) was too pessimistic in his conclusions about the impossibility of obtaining a direct measure of deterrence based on questioning respondents about the reasons for their behaviour. Attempts to develop such measures are certainly not "naive", although possibly more care should be exercised in asking respondents about reasons than in asking about their experience or their behaviour. In the present study the main measure of deterrence is based on a question about strategies which respondents are employing *because of RBT* to avoid drinking and driving. This question does not even ask directly about reasons, but focusses instead on behaviours which the respondent claims are part of their response to RBT. Given that interviews were conducted within a few months of the introduction of RBT when there was a very high degree of public awareness, the conditions required for responses to this question to be accurate would seem to be assured.

Elaborating the Deterrence Model for RBT

The Model in Summary

In this section the deterrence model proposed earlier in this chapter is applied in detail to the effects of RBT in New South Wales. The model predicts that as the police commence random testing and as the media publicity commences, people become aware of RBT and possibly experience it personally, perhaps by driving past an RBT operation. This experience, or awareness, is interpreted in terms of the individual's previous experiences, beliefs and knowledge and he (or she) forms a perception of the likelihood of being tested and, more generally, the chances of being arrested for drinking and driving. It is predicted that the more intense the exposure and the more varied it is in form, the higher will be the subjective probability of arrest for drinking and driving.

The perception of arrest certainty is in turn evaluated in terms of the individual's personal values and previous experiences, and this evaluation influences the extent to which attempts are made to avoid drink-driving on occasions when it is a possibility. The relative frequency of such attempts is a direct measure of the degree to which the individual has been deterred. It is predicted that the higher the subjective probability of arrest, and the more worrying the prospect of arrest appears to the individual, the more likely he is to be deterred and modify his drinking and/or driving. Finally, the more frequently the individual adopts strategies to avoid drinking and driving, the less often will he drive over the limit, and the less likely he will be to be involved in a serious or fatal traffic crash.

In the discussion of prospect theory, a model of decision making was proposed in which the drink-drive decision will typically be framed as a choice between losses. If an individual drives over the limit, there is the loss entailed in getting caught, a loss which is far from certain, together with a certain loss resulting from feelings of guilt. On the other hand, if the individual does not drink and drive there are two certain losses: the costs involved in arranging alternative transport and the cost of appearing incompetent in one's own eyes or in the eyes of one's peers. This theoretical model corresponds implicitly to an additive statistical model; in particular, it is assumed that the operation of legal sanctions is not contingent on how guilty one feels or on the social stigma flowing from not committing the offence. The possibility that this assumption should be modified is considered below.

The Effects of RBT on Non-legal Sanctions

The model allows that legal sanctions may have an effect not only through fear of punishment, but also through effects on informal social sanctions or feelings of guilt. For example, in recent years in New South Wales efforts have been made to increase the effectiveness of the breathalyser law by depicting the drink-driver as a "slob" rather than as a hero, and by emphasising the degrading and stigmatising aspects of arrest (Henderson and Freedman, 1976). Such an emphasis runs counter to prevailing community attitudes to drinking and driving (which was why the campaign was run), and thereby serves to remind us that drinking and driving takes place within a social environment in which the illegal act is frequently rewarded, not punished.

The scholar who has dealt most thoroughly with this aspect of the phenomenon is Joseph Gusfield (1981a, 1981b, 1984). Reference has already been made to his ethnographic study of drinking-driving and the context of bars Gusfield (1981a). On the face of it, Gusfield's work is not concerned at all with deterrence, but with the context of social drinking. However, its relevance to the present topic becomes apparent when one considers how a legal innovation like RBT might affect behaviour. According to Gusfield (1981a), a crucial distinction in the study of drinking patterns is not how much drinkers consume but whether they are portrayed in their own eyes, and in those of their peers, as competent or incompetent drinkers. One determination of the competence of people in American (and Australian) culture is their ability to undertake ordinary risks, and so driving after drinking is part of the test of competence. There is an implicit assumption that adequate drinkers do not get caught and can avoid having an accident.

For Gusfield what needs to be explained is why people *don't* drive after drinking, and it is here that exculpatory defences, legitimate excuses, come into play. One exculpatory defence is the

responsibility to work; another is past arrests for drinking-driving. These circumstances make the avoidance of driving understandable and reasonable, and allow the image of competence of the drinker to be preserved. In view of this, it is quite reasonable to argue that RBT has achieved its (apparent) impact in New South Wales by allowing many drinkers to maintain their image of competence while reducing their level of drinking. In effect, the presence of police carrying out RBT provides a powerful exculpatory defence, since there are in principle few steps the drinker can take to avoid being pulled over. Since it could happen to anyone, there is no disgrace in not drinking or in not driving. It seems important therefore that a study of the impact of RBT should allow a test of this hypothesised effect (see Herbert, 1982).

It is not clear that RBT will have the immediate effect on moral attitudes that it would be expected to have on informal sanctions. Nor is it clear that moral attachment to the law has as much effect on behaviour in Australia as Norström (1981) suggests it does in Sweden. Petersen (1982) notes that none of his sample of convicted offenders questioned the legitimacy of drink-drive laws, and they regarded the offence as serious because it could have led to death or injury. But as Gusfield (1981b) has argued, the drink-driver also has another understanding of his behaviour, which is linked to the world of his everyday life. He calculates the risks, and knows that he can get home without mishap. He does not reject the immorality of the behaviour, but he operates in a different framework to that of the abstract, other-worldly logic of law. In the light of these attitudes, it is hard to see how RBT, as part of the legal reality, would immediately effect a change in beliefs about the immorality of drinking and driving. What is more likely is that as compliance with the law becomes a habit for other reasons, beliefs about the wrongness of the offence might be reinforced and might in turn have a greater influence on behaviour.

Interactions Between Perceptions of Legal Sanctions and Other Factors

If deterrence research has yielded few undisputed conclusions, it has been responsible for the generation and testing of a large number of hypotheses. Most of these hypotheses relate to the conditions under which a deterrent effect may or may not be expected, and are therefore conveniently expressed as *interactions* between sanction perceptions and other factors. These postulated interactions are of three types: an interaction between perceptions of the chances of arrest and perceptions of the severity of penalties; interactions between peer group norms and/or moral attachment to the law and perceived sanctions; and interactions between a variety of demographic factors and sanction perceptions.

Perhaps the most theoretically central hypothesis is that which predicts an interaction between perceptions of arrest certainty and perceptions of penalties. The argument is that if people do not expect to get caught severe penalties will be no deterrent, and conversely if the penalties are regarded as inconsequential a high perceived likelihood of arrest will not deter. As Cohen (1978, p.94) has observed, this idea is "simple, obvious, and central to the notion of deterrence", yet only a minority of studies have tested for such an interaction.

Given the conceptualisation of legal and non-legal sanctions as forces acting on the individual like vectors in a parallelogram of forces, it is appropriate to raise the possibility of interactions between legal and non-legal sanctions. However, in the literature these possible effects tend to be discussed in terms of discrete groups of people rather than in terms of statistical interactions between variables. As Grasmick and Green (1980,1981) and Grasmick and Appleton (1977) point out, there are two arguments in the social science literature which relegate the threat of legal sanctions to a position of secondary importance in a general theory of social control. One argument is that the threat of legal sanctions is a deterrent only for those individuals whose peers would impose informal sanctions if the person were exposed as a law violator (Zimring and Hawkins, 1973). In the case of drinking and driving, as we have seen, this effect is problematic. The second argument is that the threat of legal sanctions influences the behaviour only of those individuals who are not morally committed to the law (Zimring and Hawkins, 1968). For drinking and driving, the interaction corresponding to this situation is more plausible.

The arguments concerning interactions between sanction perceptions and characteristics of respondents (age, sex and so on) are rather confusing. With one notable exception, deterrence theory itself does not generate predictions concerning different levels of deterrability in different population subgroups, but plausible arguments adducing such differential effects can be derived

from other theoretical perspectives. One possibility is that some individuals labelled as deviant will become more deviant, creating a countervailing force to deterrence. If this kind of effect is more likely among certain groups, such as "bikie gangs", then an interaction between sanction perceptions and the relevant social characteristics might be expected.

Firmer predictions of an interaction effect can be made for previous contact with the law. A particularly interesting group in any study of general deterrence consists of those who have already suffered legal punishments, for the offence(s) under study or for other offences. Deterrence theory would suggest that these people should be more sensitive or responsive to sanction threats than those who have never tangled with the law. Reconviction studies appear at first glance to contradict this prediction, since the invariable finding is that offenders penalised severely are no less likely to be reconvicted than those who received a light or nominal penalty (Homel, 1981a). However, these studies of recidivism bear only on the issue of marginal specific deterrence (one penalty compared with another); they tell us nothing about the absolute impact of arrest, conviction and punishment. In one study bearing on this issue, Tittle (1980a) concluded that "those who have been arrested are more deterred by their perceptions of sanctions than are those who have not been arrested" (p. 321). If supported in future research this result is of the utmost importance, since it implies that conclusions about the ineffectiveness of penalties in the sense of absolute specific deterrence may have been wrongly drawn from the studies of marginal specific deterrence. In other words, it may not matter much (from a deterrence perspective) what you do to people once you've caught them, but the actual act of arrest and punishment may itself be a deterrent. The present study allows a test for the interaction between previous drink-drive convictions and perceptions of sanctions, and is therefore capable of shedding light on this issue for the offence of drinking and driving.

In conclusion, there are strong theoretical grounds for testing for a variety of interaction effects. The most critical interactions are those between perception of arrest certainty and perception of penalty severity and between perceptions of sanctions and the possession of a conviction for drinking and driving. Others can be incorporated to test specific hypotheses about the effects of non-legal sanctions or of sociodemographic variables.

The Relationship Between Actual and Perceived Legal Sanctions

The discussion of interaction effects has been concerned with the relationship between Pp (perceptions of legal punishments) and De or Dr (attempts to avoid drink-driving, or the involvement by individuals in the offence). Although this relationship has received most of the attention in the literature, with the possibility of interaction effects promising to generate a lot more research, several authors have stressed the importance of understanding more about the relationship between Lp, the *actual* legal punishments obtaining in a jurisdiction, and Pp, the perceptions of those punishments. Since it only makes sense to think of Lp at the aggregate level (e.g.: the arrest rate in a jurisdiction, or the proportion of drink-drivers jailed), investigation of the relationship between Lp and Pp raises a critically important theoretical question: should deterrence be conceptualised as occurring at the aggregate or at the individual level?

Although it is easy to formulate a definition of deterrence which refers to an individual's decision rather than to aggregate crime rates, it can be argued that in order to have social policy implications deterrent effects should manifest themselves at the aggregate as well as at the individual level. Gibbs (1979) argues that the theoretically most appropriate units for analysis are ecological, not individual, since "objective properties of punishments are characteristics of a jurisdictional unit, not of individuals. Moreover, unless the research incorporates objective properties of punishment, it cannot be a complete test of the deterrence doctrine, nor have obvious policy implications" (p. 662). Although the majority of empirical investigations of deterrence have been conducted at the level of political units, most commentators (while accepting the force of Gibbs' argument) seem agreed that nearly all of these studies entail insuperable problems of interpretation. These problems include the impossibility of determining causal directions, the difficulty of eliminating competing explanations for observed correlations, and the reliance on crude estimates of actual sanctions rather than those perceived by the general public (Anderson, 1979; Ross and LaFree, 1984; Tittle, 1980a, b).

The problem, then, is that it is difficult to conceptualise or measure objective legal threats at the individual level, but an individual level analysis is desirable in order to trace the links between

perceptions of sanctions, attempts to avoid drink-driving, and drink-drive behaviour. However, the problem is not insurmountable: in general, two approaches seem viable. Firstly, there seems to be no reason why individuals selected from a variety of jurisdictional units could not be surveyed, and objective properties of punishments in each jurisdiction incorporated as one of the predictors in an individual level analysis. It is true that this variable would be constant for all individuals within a given jurisdiction, but since it would vary from area to area there seem to be no theoretical or methodological impediments to such an analysis. Secondly, as proposed in the model described in this chapter, attention could be focussed on respondents' *exposure* to crimes and arrests or to information about crimes and arrests. It may well be that personal experience with or observation of law enforcement has a significant impact on perceptions of legal sanctions, or that exposure to formal or informal publicity about crime and punishment has an influence. This necessitates the introduction of the variable *Ex* between *Lp* and *Pp*.

Both approaches to the problem have been employed in the present study. One of the many advantages of studying drinking and driving and random breath testing is that objective sanctions can be easily quantified, both through the personal exposure of individuals to random testing or to publicity about random testing, and through records of the number of random breath tests conducted in different areas of the state. However, in the general literature on deterrence there appears to be only one study in which the authors have attempted to link actual and perceived certainty of punishment at the individual level. Parker and Grasmick (1979) investigated the effects on arrest perceptions of newspaper crime stories and personal experiences with crime and the personal experiences of one's acquaintances. They found that people's estimates of the official arrest rate for burglary were influenced by their experiences as victims, particularly by the number of arrests which they knew took place as a result of these experiences, *provided* they knew of at least one arrest. Newspaper stories did not appear to influence perceptions.

In summary, following the approach adopted by Parker and Grasmick (1979), the introduction of the exposure variable *Ex* is proposed as the natural solution to the problem of linking objective legal sanctions in an area with perceptions of those sanctions. As Henshel and Carey (1975) have emphasised, sanctioning outcomes (such as arrest rates or levels of punishment) are not typically part of the pragmatically necessary knowledge required in our society, and it cannot be assumed that because (say) police in an area are active in breath testing motorists that this will be translated automatically into perceptions of a high chance of arrest. The intervening variable of knowledge or exposure is what influences such perceptions.

Other Influences on Perceptions of Sanctions

Tittle (1980a) has stressed the importance of shifting focus to the question of how perceptions of sanctions are formed. Indeed, he regards this issue as a top priority for future research, and speculates that objective properties of sanctions may turn out to be relatively minor elements in the formation of perceptions. In his own research he has recently investigated the effects of gender (Richards and Tittle, 1981) and socioeconomic status (Richards and Tittle, 1982), but as with some of the arguments about interaction effects, the grounds for investigating these variables are found outside deterrence theory. For example, Richards and Tittle (1981) suggest that differential stakes in conformity may be one explanation for the higher chances of arrest perceived by women in comparison with men. In the present study no explicit predictions along these lines are made, but the possible influences of a range of sociodemographic variables on perceptions of arrest certainty and penalty severity are investigated in the analysis.

There is one concrete prediction about influences on perceptions of sanctions which can be derived from deterrence theory. It is predicted that people who have committed an offence but have escaped punishment will have lower perceptions of the chances of arrest than those who have not committed the offence. This is referred to as the *experiential effect* in the literature (Minor and Harry, 1982; Paternoster, Saltzman, Waldo and Chiricos, 1982), and in a sense it is a variation on the exposure effect discussed above, since it reflects the effects of a *lack* of exposure to the strong arm of the law. The prediction does not refer to individuals who have committed the offence and been punished (the convicted group), since their experience is fundamentally different from that of the group who have violated the law with impunity. The prediction for the convicted group, as argued above, is that the relationship between perceived arrest certainty and drink-drive behaviour (or attempts to avoid drink-driving) is stronger than for those never convicted.

Perceptions and Evaluations

The theoretical importance of distinguishing perceptions from the weight attached to these perceptions has been discussed in the context of prospect theory. Tittle (1980a) has expressed the point nicely:

Severity is not just a matter of perception, it is basically a question of subjective evaluation. It is far-fetched to imagine that individuals will have correct cognitions of the magnitude of formal sanctions, but it is even more absurd to assume they will interpret those cognitions on a common continuum of dreadfulness. (p. 324).

Grasmick and Green (1980) have developed a method of questioning which avoids the complications involved in recording the details of individual perceptions of penalties but which goes directly to subjective evaluations. In their study, respondents were asked to imagine that they had been convicted and a punishment decided. They were asked to imagine what the penalty probably would be (without telling the interviewer) and to "indicate how big a problem that punishment would create for your life." This method has been employed in the present study.

It appears that no study has explicitly incorporated questions which distinguish perception of arrest likelihood from evaluations of that perception. That such a distinction could be useful is illustrated by Grasmick and Milligan's (1976) discussion of their finding that young drivers were less deterred from speeding offences than older drivers. Consistent with the hypothesised impact of labelling suggested above, they argue that as part of a deviant role expected of young drivers they accept whatever risk they perceive of being caught and punished and are not deterred by it. The present study of RBT probes the distinction between perceptions and evaluations in two ways: firstly, the process of apprehension and arrest is carefully unpacked in a series of questions so that perceived loopholes in law enforcement are identified, and secondly a question is included which explicitly asks how *worried* the respondent would be about getting caught (as opposed to how *likely* he or she regards it).

A Schematic Representation of the RBT Deterrence Model

The deterrence model applied to the introduction of RBT in New South Wales is set out in Figure 2.1. This diagram provides a framework for the analysis of the RBT survey data (Chapter 5). A full description of the RBT design is presented in Chapter 4, but for present purposes it is sufficient to note that two waves of interviews were carried out, the first in February 1983, ten weeks after the introduction of RBT, and the second in April 1983, six weeks later. The diagram relates most directly to the April survey, in which more extensive data were collected, although aspects of the longitudinal component of the study are also represented in the diagram.

The elements of the basic deterrence model are police enforcement (Lp), exposure to random testing (Ex), perceptions of sanctions (Pp), attempts to avoid drink-driving (De), and future drink-driving behaviour (Dr). Police enforcement and exposure to tests refer to the period between the introduction of RBT and the present (actually April 1983 in the data analysis), while perceptions of sanctions and attempts to avoid drink-driving refer to the current situation. Police enforcement, which is measured by the number of random tests per thousand licence holders carried out in each of the ten areas sampled, is assumed to determine the likelihood that an individual will have been exposed to random testing, which in turn is assumed to influence current perceptions of arrest certainty and hence attempts to avoid drinking and driving. Although it is difficult to see how it could happen, it is also possible that the level of police enforcement could have a direct effect on perceptions of arrest certainty, perhaps through aspects of exposure not measured in the present study. Therefore this path is represented in the diagram by an arrow with a question mark. Similarly, it is possible that being exposed to random testing has a direct effect on attempts to avoid drinking and driving. Once again, this could only be because of limitations in the measures of perceptions of arrest certainty, since it is hard to imagine how exposure could affect behaviour other than through such perceptions.

It is possible, of course, that any of the paths within the basic model are spurious, in the sense that they could reflect the operation of other variables. So, for example, if low status

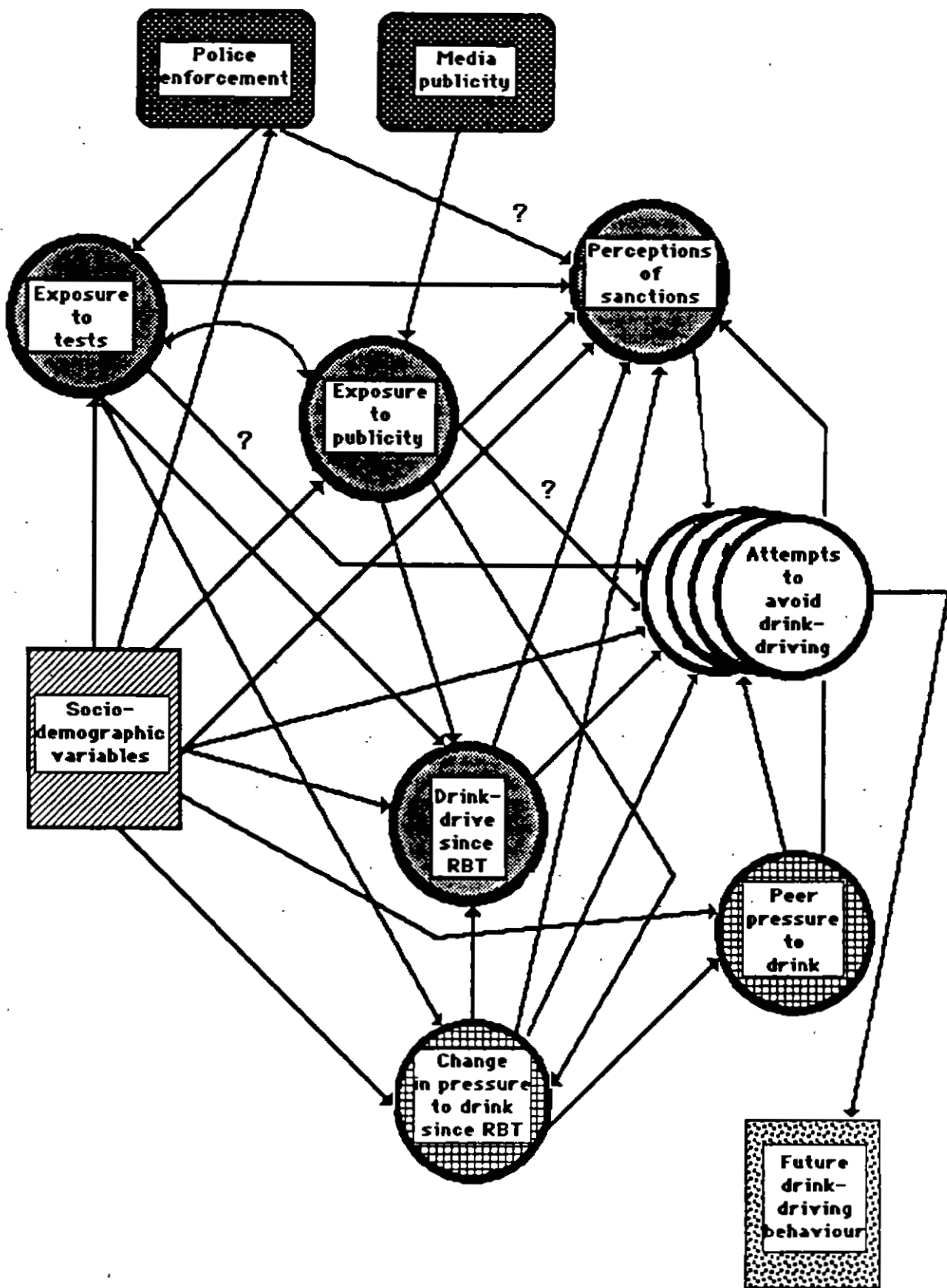


Figure 2.1. Deterrence Model Applied to the Introduction of RBT

individuals are more likely to rate the chances of arrest as high and are also likely to do more driving, a positive correlation between exposure and perceptions of arrest certainty may not reflect deterrence but the effects of social class. For this reason the socio-demographic variables (age, sex, occupation, level of drinking and so on) play an important role as covariates. They are also important in their own right, since significant associations between them and elements of the deterrence model shed light on possible differential effects of RBT in different population subgroups (hence the value of testing for interactions). Consequently, the socio-demographic variables are represented as having direct effects on all groups of variables in Figure 2.1, including the levels of police enforcement. The reason for this last mentioned path is that police may well tailor their enforcement of RBT to the social characteristics of an area, particularly the incidence of heavy drinking and the relative frequency of public as opposed to private or at-home drinking. In this connection it should be noted that the socio-demographic variables box represents both individual and aggregate level characteristics. Ideally these two levels should be distinguished, but in the interests of simplicity they have been analysed as a single group of variables.

Deterrence researchers have frequently found that those respondents who have successfully committed an illegal act see their chances of being caught as less than do respondents who have not committed the act (the experiential effect). This possibility has been covered in the present study by including drinking and driving since the introduction of RBT as an influence on current perceptions of sanctions. Drinking and driving in the last three months is in turn assumed to be influenced not only by exposure to RBT and exposure to publicity (via unmeasured perceptions of arrest certainty at a time earlier than the April interview) but also by perceived changes in the social pressure to drink (and to drink and drive) brought about by RBT.

In the model, perceived change in social pressure affects all the variables which relate to the current situation: perceptions of sanctions, attempts to avoid drink-driving and perceived pressure from drinking companions to keep drinking. This last variable (peer pressure) in turn affects both perceptions of legal sanctions and the extent to which the respondent takes steps to modify his or her travel and drinking habits. (In fact these last two paths could plausibly be argued to operate in the opposite direction as well, but for simplicity - and because peer pressure is not the main focus of the study - these possibilities are not represented in the diagram.) Perceived change in peer pressure, which in some ways is more theoretically relevant than the other peer pressure variable, is assumed to be a function of exposure to RBT (including publicity) in interaction with socio-demographic variables such as age, sex and level of drinking.

Further elaboration of the deterrence model is necessary to take into account the effects of the formal media campaign. Unfortunately, in contrast with police enforcement it is difficult to quantify the levels and types of publicity in different areas, since a retrospective content analysis of TV, radio and newspapers is required. However, the exposure of individuals to these forms of publicity can be recorded, and the effects of this exposure on other elements of the model (particularly perceptions of arrest certainty and the severity of penalties) can be incorporated in the model.

Self-imposed guilt feelings occasioned by drink-driving, which may be regarded as a type of sanction additional to state-imposed penalties and peer-imposed stigma, are not represented in Figure 2.1. This is not because guilt feelings are not considered important, but because resources for the study were limited and, as argued earlier, it was not clear that RBT would have the immediate impact on moral attitudes that it would be expected to have on peer pressure. Since a choice had to be made with respect to which material to omit, the decision was made to probe moral attitudes through a question on reasons for not drinking and driving, and not to include these responses in the overall quantitative model. A more extensive study should include further questions on beliefs about drink-driving, with a view to developing a reliable measure which could be incorporated in the quantitative model.

It is important to note that Figure 2.1 is not strictly a path diagram, although careful attention has been paid to the probable causal ordering of the variables represented. Most of the variables depicted in the diagram actually represent *groups* of variables, and in some cases interaction terms are implied as well. In addition, two of the boxes represent variables which are "off-stage" in the analysis: no measure of formal media publicity is included, and there is in the main analysis no measure of future drink-driving behaviour, although the analysis of the longitudinal data includes such a measure.

Although not a formal path diagram, Figure 2.1 does purport to represent hypothesised causal relationships, and therefore the analyses based on it may be open to the same criticisms as

path analysis (Gibbs, 1978; Kempthorne, 1978). The essential point made by the critics is that so-called causal models cannot provide a basis for inferences about causes when applied to data on the synchronic association between variables (i.e. where the values of the variables are for the same points in time). In general, it is agreed that causal relationships can only be inferred from *changes* in one variable and concomitant changes in another. However, it is at this point that we can take advantage of the fact that RBT constitutes, in effect, an experimental intervention of considerable magnitude. Most of the variables represented in Figure 2.1 actually measure changes in some phenomenon resulting from RBT (itself a change in the social environment). For example, the key dependent variables in Figure 2.1 are changes in drinking and travel behaviours reportedly occasioned directly by RBT. Similarly, the measures of exposure to RBT or to publicity about RBT may be regarded as measures of change, since such exposure is a new phenomenon brought about by RBT. A strong correlation between these two sets of variables would therefore constitute evidence that the intensity of RBT enforcement affected the extent of behaviour change.

A second point which should be noted is that the variables in Figure 2.1 cannot really be regarded as synchronic, although they were all derived from interviews conducted at approximately the same time. Modifications to drinking and travel behaviours, as well as perceptions of sanctions and peer pressure to drink, may be regarded as pertaining to the present, while exposure, changes in peer pressure and drink-drive behaviour apply to the period between the introduction of RBT and the present. Since by definition nobody was modifying their behaviour *because of RBT* before RBT was announced, the number of strategies currently being used by someone to avoid drinking and driving is simultaneously a measure of change, relative to pre-RBT behaviour, *and* a measure of current behaviour. The same argument can be put for perceptions of the chances of being randomly tested, but less certainly for the general measure of subjective arrest probability. It follows therefore that we are on much stronger ground for inferring causal relationships than we would be if we were using purely synchronic data. Nevertheless, the inferential base can be strengthened even further by means of the longitudinal data which are also analysed in Chapter 5.

Summary

The deterrence model described in this chapter specifies how legal punishments could influence drink-drive behaviour through a process of exposure to enforcement, evaluation of the meaning of such exposure, calculation of arrest likelihood and perception and evaluation of the severity of threatened penalties. Although some form of calculation is central to the deterrence model, individuals need not behave according to the prescriptions of utility theory in order to be deterred. Whatever the exact psychology of the decision making process, the drink-drive decision involves a weighing of the legal threat and the pangs of conscience against the inconveniences entailed in alternative modes of action and the likely loss of status in the eyes of one's peers. The drink-drive decision is normally framed as a choice between losses, so there will be a strong tendency for drinking and driving to occur on a regular basis, since the certain losses entailed in the decision not to drink and drive will offset the merely possible costs incurred in breaking the law.

The central variables in the model are open to measurement only through the disclosure by respondents of their motivations and interpretations. Individuals who are exposed to punishment or to police activity do not automatically modify their behaviour. A process of evaluation takes place, whereby these experiences are interpreted and given a meaning. In addition, whether or not someone has been deterred can, in principle, be determined only through questioning him or her. (However, in some cases reasonable inferences can be drawn from readily available data, such as the relative severity of punishment; see Homel [1980a].)

It is predicted that compared with motorists without a conviction for drinking and driving, previously punished individuals will be more responsive, if not more sensitive, to the threat of further legal punishments. However, no other predictions are made about differential responsiveness to legal threats, although it is clearly necessary to test for the possibility of interactions between legal sanctions on the one hand and sociodemographic variables and non-legal sanctions on the other. Through such empirical research, it may be possible to extend the model and improve its predictive power.

The general model has been applied in this chapter to the introduction of RBT in New South Wales. The goodness-of-fit of the model as a description of the effects of RBT is the subject of the

empirical research reported in Chapters 4 and 5. In the next chapter, the literature on the general deterrence of the drinking driver is reviewed. The major purposes of the review are to investigate the evidence for deterrence and the nature of the deterrence process, using as a framework the model developed in this chapter; to identify gaps in previous deterrence research; and to identify the methodological problems which have limited the probative value of previous research.

3. THE EVIDENCE FOR DETERRENCE

In the past 15 years there has been a considerable upsurge in research on deterrence, although there are studies, particularly of recidivism, dating back 50 years or more. The literature falls into five main categories. One category, maybe the largest, consists of the studies of the marginal specific deterrent impact of sentences imposed by courts, using recidivism as the criterion for success. The earliest and most common approach to the study of general deterrence involved the analysis of crime rates and properties of legal sanctions measured at the level of political jurisdictions. A second type of study of general deterrence, which has achieved prominence in the last decade, is that based on a survey methodology and focussed on the relationship between self-reported criminality and perceptions of legal sanctions. General deterrence, particularly of motoring offenders, has also been investigated through what are usually called quasi-experimental studies, which capitalise on sudden changes in the law and use data, such as traffic crashes, which are not subject to the evidential problems characteristic of crime statistics or survey data. A final category consists of experimental studies, which have been addressed both to specific and general deterrence.

Experimental studies are few in number and will be dealt with only in passing in this review, since most are not relevant to the deterrence of drink-drivers. Similarly, the majority of ecological/correlational studies have not been concerned with drinking and driving, and in any case they have been extensively reviewed elsewhere (Beyleveld, 1978; Blumstein, Cohen and Nagin, 1979). In addition, the problems involved in interpreting many of these studies are so great that their capacity to shed light on the deterrence question is strictly limited (Gibbs, 1975; Ross and LaFree, 1984).

Given the objectives of this study, most attention in this chapter will be paid to the perceptual research, with particular emphasis on studies of drinking and driving. Because there is a debate in the perceptual literature about the validity of conclusions concerning deterrence, it is necessary to devote some space to methodological problems generated by the survey research. Studies on the deterrence of the drinking driver will be dealt with in most detail. These studies include the research in which quasi-experimental techniques have been used to examine the effects of legal interventions on traffic crashes, as well as those which have been based on survey or other techniques. The purpose of all stages of the literature review is to assess the evidence for deterrence and its manner of operation, and to identify major methodological problems.

Perceptual Research

Perhaps the most promising line of research for investigating the validity of the deterrence doctrine is that based on sample surveys, since surveys, as Tittle (1980a) and Anderson (1979) have noted, allow the perceptual and psychological factors deemed so important in the deterrence process to be thoroughly probed. In addition, surveys permit the measurement of aspects of the social environment within which people evaluate sanctions and make decisions about criminal acts. Indeed, the survey is one of the few research tools which allow the measurement, and therefore statistical control, of those features of the social environment of the respondent which might modify the nature of the deterrent process or which might point to an alternative to deterrence as an explanation for correlations between perceptions of sanctions and involvement in criminal behaviour.

On the whole, the survey research which has been conducted appears to support the deterrence doctrine. That is, it has been found that people with higher perceptions of the chance of arrest report fewer infractions of the law (Anderson, 1979; Grasmick, Jacobs and McCollom, 1983; Richards and Tittle, 1982; Tittle, 1980a). A number of commentators, however, have argued that this support is the product of methodological artifacts (e.g.: Minor and Harry, 1982; Paternoster, Saltzman, Waldo & Chiricos, 1982) and that we are in fact no closer to closure on this issue than we were before the perceptual research began. While this pessimistic conclusion may not be entirely warranted, it is certainly true that close attention must be paid to problems of method before the contribution of the perceptual research to the deterrence literature can be assessed.

Problems of Measurement and Causation

In simplest form, the deterrence surveys have four objectives: to measure perceptions of legal sanctions (the independent variables), to measure criminal behaviour (the dependent variables), to establish a negative correlation between these two sets of variables, and to demonstrate that this correlation is due to deterrence and not to some other mechanism. The basic problems relate therefore to measurement and to causation.

Problems of measurement in self-report surveys of crime and delinquency have been the subject of a very large literature. Some issues specific to the design of the questionnaire used in the present study (such as the measurement of alcohol consumption) are dealt with in Chapter 4. However, as part of this overview of the results of survey research it will be valuable to touch on some of the arguments concerning the measurement of both sanction perceptions and deviant behaviour. This will lead us into the problems involved in establishing causation.

Hypothetical versus actual perceptions. A particularly serious problem in the use of surveys to probe the influence of sanction perceptions on criminal behaviour is that there may well be a disjunction between perceptions of sanctions in hypothetical and actual situations. Self-complete questionnaires require, by appeal to the imagination or memory of the respondent, the construction (or reconstruction) of situations in which the respondent is faced with legal or non-legal sanctions or with the choice of whether or not to commit the offence. There is always an element of the hypothetical in such a process, since it is impossible through the use of standard questions to match the subtle variety of choices and environmental contingencies experienced by individuals in real situations. Even a completely open response type interview which allowed the detailed documentation of commonly occurring situations would be subject to doubts, since it is always possible that there is little relationship between, for example, a respondent's perception of the chances of arrest when sitting at home being interviewed and the perception of arrest likelihood when actually faced with a choice between legal and illegal behaviours. The comments of one of Petersen's (1982) drink-drivers, quoted on page 28, indicate that this is a real possibility.

In defence of surveys, Tittle (1980a) has argued :

... that over time people develop patterns of response to life situations so each situation is not seen as unique ... people have habits by which they deal with problematic situations ... Hence if a person usually responds to real life sanction threats in a particular way that person is likely to display that pattern of responding even in the contrived situations posed in an interview. (p. 34).

These comments are reminiscent of the argument about standing decisions which was put forward in the last chapter as one way in which legal sanctions may deter potential offenders. The issue was particularly troublesome in Tittle's (1980a) research, since his dependent variable was the respondent's personally estimated probability of future deviance, under a hypothetical condition where there is a strong desire to commit the offence. The present study avoids the need for such a hypothetical measure by employing instead a measure based on current steps being taken to avoid drinking and driving, together with reports of past drinking and driving behaviour. The assumption is that the validity and reliability of survey measures can be maximised by focussing on concrete behaviours occurring within a relatively short time period prior to the interview. Nevertheless Tittle's defence is still relevant, since questions probing perceptions of sanctions (legal or non-legal) necessarily entail a hypothetical element.

Self-reports of deviant behaviour. The response validity of self-reports of deviant behaviour is obviously open to question. It is generally accepted that there are three conditions for successful interviewing on any topic (Cannell and Kahn, 1968): the required information must be accessible to the respondent, he or she must understand the respondent's role and the informational transaction required, and there must be the motivation to take the role and fulfill its requirements. Of these three conditions the most important is, by common consent, the respondent's motivation. The respondent is seen as having a need to maintain self-esteem, to be perceived by the interviewer as a worthy person who does not violate important social norms (Cannell and Kahn). Given the stringency of these conditions, it is not surprising that the general conclusion from methodological research is that most interview data is subject to substantial invalidity. In particular, prestigious behaviour tends to be over-reported, while deviant or even mildly socially unacceptable behaviour may be subject to underreporting. Even such a widespread and acceptable practice as alcohol

consumption is known to be substantially underreported (Cannell and Kahn, 1968; Permanen, 1974).

Fortunately, it seems that the invalidity and unreliability of measures of self-reported delinquency and criminality are not quite as bad as one would imagine. Both retest and internal consistency reliability indices have been at least acceptable (Nietzel, 1979), and a number of validity checks have produced encouraging results (Hindelang, Hirschi and Weis, 1979; Nietzel, 1979; Tittle 1980a). Comparison of "known" criminal groups (such as incarcerated drug addicts) with "ordinary citizens" yield differences in self-reported crime in the expected direction, and checks against officially recorded crime and against the reports of informants (such as an adolescent's peer group) have in a number of studies (although not all) suggested accuracy levels of the order of 80% (Tittle, 1980a). Much of the debate about self-reports of crime has concerned the relationship between criminality and social class (Hindelang et al., 1979; Tittle, Villemez and Smith, 1978) and in this connection Kleck (1982) has argued that lower-class respondents are more likely than middle-class respondents to give dishonest or incomplete answers. In reply, however, Tittle, Villemez and Smith (1982) argue that the opposite is more likely to be the case (since middle class respondents have a higher stake in conformity), and that in any case the data are not available to decide with any assurance. The debate continues.

The psychological research on interviewing suggests that since respondent motivation is the key to response validity, behaviours which are only moderately deviant should be reported more accurately than involvement in serious crime. One behaviour which has come to be viewed as moderately deviant by both adults and juveniles in recent years is smoking. In a recent article, Akers, Massey, Clarke and Lauer (1983) demonstrate using both a randomised response technique and a biochemical measure of smoking that adolescent reports of smoking are very accurate. This demonstration is important for the present study for two reasons: drinking and driving may not be regarded by many people as markedly more deviant than smoking and, in principle, drinking and driving behaviour can also be checked using a biochemical indicator (the blood alcohol level), as in roadside surveys.

An important feature of drinking and driving is that it is an offence committed by a large number of people fairly often, and is not in practice regarded as a particularly heinous crime (Gusfield, 1981a). We would expect, therefore, that respondent motivation to conceal drink-drive episodes would not be as great a problem as for more serious offences, although the research of Locander, Sudman and Bradburn (1976) suggests a considerable degree of underreporting of *convictions* for drink-driving. However, it is possible that the most serious threat to validity arises from the simple act of *forgetting* occasions of impaired driving. In any case, the close agreement between the results of the roadside survey data (McClean, Holubowicz and Sandow, 1980) and the Victoria self-report data (Sloane and Huebner, 1980) which was demonstrated in Chapter 1 supports the contention that although drink-drive incidents may be concealed or forgotten, the underreporting is not seriously biased by social factors such as age and sex.

In summary, the dependent variable of self-reported criminality appears from the literature to be rather more robust, in terms of validity and reliability, than might initially be expected. There are some grounds for believing that self-reports of behaviours which are viewed as only mildly deviant (such as minor acts of delinquency, smoking and drink-driving) are more valid than reports of serious offences, although it is likely that arrests, even for minor offences, are substantially underreported. There is also evidence that self-reports of drink-driving are probably relatively free of bias due to social factors, particularly age and sex.

Perceptions of legal sanctions. The validity of measures of perceptions of sanctions is more problematic than the validity of self-reported criminality, since there are no clear objective standards for comparison. A loose or null association between objective sanctions in a jurisdiction and perceptions of those sanctions does not bear on the validity of the perceptual measures, since we cannot be sure that the assumption in the deterrence model of a close association is in fact correct. There are however three issues related to validity which have been discussed in the literature: the desirability of distinguishing between perceptions of sanctions and the evaluation of those perceptions, the appropriateness of other-referenced measures, and the time ordering of measures of perceptions and reports of criminal behaviour.

The distinction between perceptions and evaluations has been thoroughly discussed in Chapter 2. In the present study, one question about penalties goes straight to evaluations by asking respondents to indicate how big a problem the expected penalty would be for them (Grasmick and

Green, 1980). Moreover, the measurement of arrest certainty involves questions about each aspect of the law enforcement process, as well as a question on how worried people would be about being tested. However, apart from the research by Grasmick (Grasmick and Bryjak, 1980; Grasmick and Green, 1980) and Tittle (1980a), little attention has been paid to this problem in the perceptual literature.

In a number of research projects, respondents have been asked to estimate the probability of arrest for "people in general" or for "a person like yourself". However, as Grasmick and Green (1980), Tittle (1980a) and Zimring and Hawkins (1973) have argued, consistency with the utilitarian paradigm requires that perceived certainty be measured by asking a respondent to estimate the probability that he (or she) would be arrested if he (or she) committed the offence. Zimring and Hawkins cite evidence that delinquent boys may believe they possess a "magical immunity mechanism" (p. 102), since they estimate their personal chances of arrest as being lower than the general chance. Moreover, studies in which both types of measures are employed indicate that perceptions of personal risk are more powerful predictors of illegal behaviour than the aggregate measures (Grasmick and Green, 1980).

To the extent that personal probabilities are to be preferred, the data reported by South and Stuart (1983) are open to question. As part of an evaluation of RBT in Victoria, these authors asked questions about "a man driving home on a week day after drinking in a hotel for several hours." Although over the past few years there has been a statistically significant increase in the perceived chances of arrest for drinking and driving when not obviously drunk, it is not clear how answers to questions based on this hypothetical situation relate to personal arrest probabilities or to individual behaviour. Since drink-drivers generally consider that driving over the limit is something they can handle but no one else, the hypothetical question is probably a very poor index.

By far the most controversial feature of the perceptual research is the time ordering of perceptions and involvement in illegal acts. Probably the majority of studies, particularly those conducted in the early seventies, have been cross-sectional in design, and have therefore asked about *current* perceptions of sanctions and *past* criminal behaviour (Anderson, 1979). A negative correlation between these two variables has been taken as evidence of deterrence, but it is now widely recognised that in fact such a correlation probably reflects *experience* rather than deterrence. That is, people who commit a crime and get away with it (by far the most likely outcome) come to perceive the chances of arrest as less certain than those who have not committed the offence in the period specified by the interviewer. A cross-sectional design might be satisfactory if it can be shown that perceptions are stable over time, so that current perceptions can "stand in" for the respondent's perceptual state at the beginning of the period of questioning. Unfortunately, recent research indicates that this assumption is not correct (Minor and Harry, 1982; Paternoster, Saltzman, Waldo and Chiricos, 1982).

Clearly what is required is that sanction perceptions be measured at the beginning of the time period over which involvement in illegal activity is recorded. However, the required design - a panel or longitudinal study in which respondents are repeatedly interviewed - is very expensive. For this reason the majority of workers have employed one or more alternative strategies. A common approach to the problem has been to ask about expected future criminal behaviour (Grasmick and Green, 1980; Jensen and Stitt, 1982; Tittle, 1980a). Teevan (1976) asked about perceptions of sanctions at an earlier time. However, as Anderson (1979) and Paternoster et al. (1982) have pointed out, neither method deals adequately with the problem of causal order since each requires that a new and untested assumption be put in place of the assumption of perceptual stability. Significantly, Greenberg (1981) in a re-analysis of data from the cross-sectional study of Grasmick and Green (1980), argued that the correlations claimed by Grasmick and Green to be evidence of a deterrent effect could be due to experience or to the operation of extraneous factors.

The present study of RBT attempts to deal with the problem in two ways: firstly, measures of attempts to *avoid* drinking and driving which may be regarded as synchronic with the perceptions of sanctions are developed, and secondly a panel design is used to analyse the impact of sanction perceptions on drinking and driving behaviour. It is worth noting, however, that longitudinal designs are subject to a number of difficulties in addition to their cost, and are therefore not a perfect solution. Apart from the fact that respondents are lost from one time to the next, "if the relationship between sanctions and behaviour is processual and ongoing, even a longitudinal approach will not eliminate the causal ambiguity of deterrence research" (Anderson, 1979, p.133). Granted that longitudinal studies are probably the best design available, it is rather ominous for

proponents of deterrence that two of the most recent such studies (Minor and Harry, 1982; Paternoster et al., 1982) have found no evidence for deterrent effects, although they found strong evidence for experiential effects.

Interaction Effects in the Deterrence Process

In Chapter 2, the possibility of interactions between sanction perceptions and other variables was discussed. Some survey research has been designed to investigate whether these interactions occur in practice. In evaluating the evidence for these hypothesised interaction effects, it should be recalled that none of the studies cited below was based on a longitudinal design, so it is necessary to exercise some caution in interpreting the findings.

Grasmick and Bryjak (1980), using the refined measure of penalty severity described above, produce some evidence for a significant interaction between perception of arrest certainty and perception of penalty severity, although one can quibble with their method of analysis (particularly their use of one tailed tests). Cohen (1978), in a study of the deterrence of speeding among military personnel, found no evidence at all for such an interaction and neither did Hollinger and Clark (1983) in a study of deterrence in the workplace. (Hollinger and Clark did find a significant penalty effect, over and above the effect of perceived certainty, but the model was additive.) Tittle (1980a) found no direct evidence for the hypothesised interaction, although his analysis did suggest the existence of "thresholds" below which perceptions of certainty and severity have no effect. Earlier studies summarised by Tittle (1980a) produced results as equivocal as those cited above.

The validity of a model which is additive in terms of the effects of legal and non-legal sanctions has been investigated in a number of studies, none of which unfortunately was focussed on drinking and driving (although Grasmick and Green [1980] used driving under the influence as one of a number of offences from which they constructed composite scales). Grasmick and his colleagues (Grasmick and Appleton, 1977; Grasmick and Green, 1980; 1981) have concluded that there is at best only weak evidence for an interaction with threat of social disapproval, and no evidence for an interaction involving moral commitment to the law. Grasmick and Green (1980) cite five earlier studies which also support the conclusion of no interaction with variables related to peers, a conclusion also reached by Tittle (1980a). However, there is at least one study (Rankin and Wells, 1981) which did find an interaction with peer group characteristics (the number of delinquent friends possessed by an individual), although it should be noted that this study used an other-referenced measure of sanction perceptions.

The evidence concerning interactions between sanction perceptions and characteristics of respondents (age, sex and so on) is extremely confusing. Grasmick and Milligan (1976), for example, draw on labelling theory and on differential association theory to explain their finding (using an other-referenced measure of perceptions) that young drivers were less deterred from speeding offences than older drivers. However, the finding of an age differential has by no means been unanimous. Two other articles (Grasmick and Milligan, 1976; Hollinger and Clark, 1983) support the argument that the young are less deterrable than the old, but three (Jensen, Erickson and Gibbs, 1978; Meier, 1979; Tittle, 1980a) find no differences by age. The evidence with respect to the relative deterrability of men and women is equally equivocal. In a recent review, Hollinger and Clark (1983) cite two studies which found a sex difference, one concluding that men are more deterrable, the other concluding the opposite. Hollinger and Clark themselves could find no interaction with sex, a result consistent with those of Jensen et al. (1978), Meier (1979) and Tittle (1980a).

Apart from age and sex, only socio-economic status and previous arrests have received more than passing attention as characteristics of individuals which could condition the deterrence process. Grasmick, Jacobs and McCollom (1983) present evidence that for offences less serious than those reported routinely by the FBI, high SES persons perceive a lower certainty of legal punishment than low SES persons, and are less deterred by the threat of sanctions. They draw on what they call "radical criminology" to explain this finding, arguing that lower class persons are "more likely to be scrutinized and therefore to be observed in violation of the law" (Chambliss, 1969, p. 86). It is interesting that among the offences they studied was drinking and driving, although they summed over eight offences to produce composite scales.

Probably the most important interaction revealed in the literature is that between perceptions

of arrest certainty and convictions for a criminal offence (Tittle, 1980a), with the convicted group being more responsive to fear of arrest. More research is needed to confirm this interaction, which suggests the operation of absolute specific deterrence.

Determinants of Perceptions of Sanctions

The research into interaction effects is concerned with the relationship between perceptions of sanctions and involvement in illegal behaviour. It appears that this relationship is not affected by non-legal sanctions, but may be moderated in some circumstances by characteristics of individuals, such as socioeconomic status or previous arrests.

The relationship between objective and perceived legal sanctions. There are a few studies which have examined the stage earlier in the causal chain, namely influences on perceptions of sanctions. Consistent with his emphasis on objective properties of punishments as characteristics of a jurisdictional unit, Gibbs has carried out an aggregate level analysis correlating objective certainty of arrest, public perception of the certainty of arrest, and official crime rates (Erickson and Gibbs, 1978). The method was rather unusual; aggregate level studies invariably compare crime rates in different areas, usually states, but Erickson and Gibbs compared types of crime in the same jurisdiction. They did this in order to incorporate the perceptual variable, which was constructed by averaging the perceptions of arrest certainty for 10 types of crime among respondents in a survey of 1,200 Arizona residents. (Thus all correlations were computed from the data for the 10 offences.)

They found that, as predicted by deterrence theory, there was a positive (although not strong) correlation between objective and perceived certainty of arrest and that the crime rate varied inversely with both the objective and the perceived probability of arrest. However, the relationship between the crime rate and objective certainty appeared to be mediated not by the perceptual variable but by social condemnation. While appearing to cast doubts on the validity of the deterrence model, it must be remembered that this pattern of correlations at the aggregate level does not preclude the possibility of the perceptual variable playing a mediating role at the individual level, although such a possibility does not appear to be recognised by Erickson and Gibbs.

As argued in Chapter 2, it is necessary to recognise that exposure to law enforcement intervenes between the objective legal sanctions and perceptions of them. However, this appears to have been recognised by only a few researchers, among them Parker and Grasmick (1979) and Henshel and Carey (1975). There appear to be very few studies which have been at all concerned with the crucial relationship between objective and perceived sanctions, and the way such a relationship may be mediated.

Other influences on perceptions of sanctions. A number of researchers have demonstrated that members of the public overestimate the chances of arrest for a variety of crimes (Cohen, 1978; Parker and Grasmick, 1979; Richards and Tittle, 1982). This phenomenon certainly applies to drinking and driving, especially during special enforcement campaigns (Ross, 1982), and may perhaps be explained in terms of the properties of the decision weight function discussed by Tversky and Kahneman (1981). In any case, the disjunction between real and imagined threat levels suggests the operation of factors additional to actual law enforcement in the formation of sanctions. Factors considered in the literature include age, sex and socioeconomic status. The evidence is most consistent for socioeconomic status, with Cohen (1978), Richards and Tittle (1982) and Grasmick, Jacobs and McCollum (1983) all finding that lower status respondents estimated the chances of arrest at a higher level than their higher status counterparts. As noted above, Grasmick et al. (1983) suggest that low SES persons encounter more agents of social control and are more deterred from committing less serious offences, thus explaining the higher levels of involvement in these offences reported (at least in one study) by high status respondents.

The roles of other factors in the perceptual process have received only perfunctory attention in the literature. Apart from Cohen (1978), there appear to be no studies which have investigated age as a predictor of sanction perceptions (Cohen found a null relationship). Richards and Tittle (1981) investigated sex differences in perceptions, and found "that women perceive systematically higher chances of arrest than do men, and that differential visibility and differential stakes in conformity seem to be the most promising accounts for these differences" (p. 1182). They argue that this finding may account for the apparent anomaly of lower violation rates reported by women

despite lower objective chances of arrest and punishment.

It should be clear from these citations that investigations of the perceptual process promise to shed considerable light on the social distribution of criminal behaviour and criminal labels. Since much additional work needs to be done in this direction, the present study was designed to allow a systematic investigation of the predictors of sanction perceptions and evaluations of those perceptions. Before leaving this discussion of the perceptual process, however, it should be recalled that one powerful influence on perceptions appears to be previous involvement in illegal behaviour (Minor and Harry, 1982; Paternoster et al., 1982). This phenomenon has been discussed above as the experiential effect, since people who learn from experience that they can commit crime and get away with it lower their perceptions of the likelihood of arrest. Minor and Harry found an interaction effect which suggests an interesting modification to this process: the experiential effect (for two offences) was found primarily among those who initially had a high perception of risk. In other words, those with initially low estimates of risk have little further to learn from experience. These findings point to involvement in illegal behaviour, as well as contact (or lack of contact) with the police, as important variables in the perceptual process.

Overview of Perceptual Research

The review of the perceptual research reveals the complex nature of the problems entailed in demonstrating that perceptions of legal sanctions influence involvement in illegal behaviour. Although the majority of studies have produced evidence supportive of the deterrence model, methodological problems are sufficiently serious to prevent firm conclusions. Probably the most serious problem is that of causal order: most studies have correlated current perceptions of legal sanctions with reports of past criminal activities, thereby probing experiential rather than deterrence effects. Other problems include the use of other-referenced questions and the use of indirect measures of illegal behaviour (e.g.: estimated likelihood of future criminality), and the failure to distinguish between perceptions and evaluations of sanctions. One strength of the research appears to be the relatively high reliability of self-reports of illegal behaviour, especially when the behaviour is (like drinking and driving) considered only mildly deviant.

The evidence concerning the deterrence process is also rather confused. The factors influencing perceptions and evaluations of legal sanctions are not well understood, and the relationship between objective legal actions and subjective evaluations of these actions has seldom been explored. The mediating role of exposure to law enforcement has seldom even been recognised. The research on interaction effects is consistent, on the whole, with a simple account of the deterrence process in which legal sanctions operate in the same manner for all population subgroups and at all levels of intensity of non-legal sanctions, but much more research on a variety of offences occurring in a diversity of social situations is required to establish this conclusion firmly.

In the next section these issues are explored further in the context of drink-drive research.

General Deterrence of the Drinking Driver

Studies of Traffic and Drink-drive Law Enforcement

With some notable exceptions the literature on deterring the drinking driver has developed in isolation from the kind of research discussed in previous sections, and consequently it has a tendency to be atheoretical and "mission oriented" (Ross, 1982, p. 99). In particular, there is a dearth of studies dealing with *the deterrence process*, the linkages between actual law enforcement, perceptions of arrest risk, and drink-drive behaviour. It should be clear by now that in order to put the deterrent impact of legal innovations beyond doubt, it is necessary to demonstrate that the perceived risk of apprehension (or maybe the perceived severity of penalties) has increased, and that this increase has had an effect on drinking and driving behaviours. Yet as Ross (1982, p. 108) has observed, few published evaluations of "Scandinavian-type legal innovations" (i.e., *per se* breathalyser laws) have included a systematic study of perceptual variables.

Although much of the drink-drive literature has been isolated from the more general deterrence literature, it should not be concluded that drink-drive research is automatically inferior in quality. Indeed, as we have already noted there are several reasons why a focus on the offence of drinking and driving facilitates an examination of key questions concerning deterrence. One advantage is that in serious injury and fatal crash statistics we have relatively valid and reliable measures of the dependent variable, drinking and driving behaviour, although such surrogate measures are not perfect (Noordzij, 1983). A second advantage is that sudden, publicised changes in drink-drive law enforcement have taken place in a number of jurisdictions, allowing quasi-experimental designs to be employed. For all their faults these designs are a vast improvement on the correlational analyses of ecological data which have so dominated deterrence research (Blumstein, Cohen and Nagin, 1979). A third advantage, stressed by Ross (1982), is that in much of its domain traffic law is virtually the only mechanism of social control, so that if changes in law enforcement correspond to changes in traffic crash rates the causal mechanism may more easily be argued to be deterrence rather than the inhibiting effects of conscience or social pressure to conform. A further advantage, of direct relevance to the present study, is that because opportunities to drive whilst impaired present themselves relatively often to licence holders who drink, it is possible to quantify the steps which such people are taking to avoid committing the offence. Thus drink-drive research allows the construction of a new kind of dependent variable which forms a further link in the hypothesised causal chain linking police enforcement with traffic crashes.

Given the importance of traffic accidents as a public problem, and given the prominence of law enforcement as a way of securing safety on the roads, it is not surprising that there is a considerable (although frequently obscure) literature devoted to an evaluation of police activity. One stream is concerned with the general question of the efficacy of police enforcement of traffic law, but is not focused particularly on the drink-driver (e.g.: C. Cameron, 1977; M. Cameron and Sanderson, 1982; Hauer and Cooper, 1977; Rothengatter, 1982; Saunders, 1977; Shoup, 1973). The general, although not unanimous, conclusion from this type of review seems to be that enforcement does have a deterrent impact and is often effective in preventing accidents, but that different offences require different strategies. The study reported by Buikhuisen (1974), in which he demonstrated that a police blitz resulted in a doubling of the renewal rate of worn tyres, is a classic of its kind, and is probably the best example in the literature of how traffic offences facilitate controlled experimentation. Indeed in many respects this experiment, more than any other study, furnishes us with compelling evidence that deterrence actually can be achieved in practice, although as Beyleveld (1979a) has observed it is not completely clear that the blitz and associated publicity did not achieve some of its effect through an appeal to conscience rather than through fear of prosecution.

In a wide ranging review of the effectiveness of police operations on the road, Cameron and Sanderson (1982) conclude that general deterrence operations aimed at "fixed offences" (like bald tyres or drink-driving) appear more effective than such operations aimed at "transient offences" (like speeding). They observe for example that traditional, but visible, speed enforcement operations appear to have very localised and short-term effects, and doubt their cost-effectiveness. By contrast, their analysis of the Melbourne RBT blitzes (examined in more detail in the next section) encourages them to believe that such visible enforcement aimed at drinking and driving is very cost-effective.

The differing requirements for effective police enforcement, depending on whether fixed or transient offences are the target, illustrate the dangers of treating traffic law enforcement as a unitary phenomenon. Clearly it will be necessary to restrict attention to studies which deal only with drinking and driving, although it is also clear that the implications for deterrence research of the general literature on traffic law enforcement have never been fully investigated (Ross, 1982). However, even the literature on drink-drive countermeasures is vast, and only some of it is directly concerned with general deterrence. As T. Cameron (1979) has noted, the countermeasures literature falls into three broad categories, revolving around (a) public education campaigns, (b) laws and enforcement programs, and (c) rehabilitation programs. Nothing more will be said in the present review about education and rehabilitation programs, except to report the common conclusion that, on their own, they do not appear very effective (Cameron, 1979; Samuels and Lee, 1978).

Focussing on laws and enforcement programs, it is necessary to distinguish measures designed to control either drinking or driving, as opposed to those which are designed to prevent

the combination of the two. As an example of the literature of the first kind, there are by now many publications reporting evaluations of the raising or lowering of the legal drinking age in North America (e.g.: Vingilis and De Genova, 1984). Such publications are beyond the scope of this review despite the common finding of an impact on traffic crashes, since raising the drinking age is not a strategy which applies to the whole population and in any case the preventative mechanism is more akin to incapacitation than deterrence (although obviously deterrence could play a part in the enforcement of the drinking law). In the remainder of this section, we will focus on the literature directly relevant to the effects of legal sanctions on drink-driving behaviour. The rapidly growing body of Australian publications on random breath testing is reserved for special attention in the next section.

The drink-drive literature. In the past decade, a number of books and articles have appeared in which the effectiveness of the enforcement of drink-drive law has been reviewed. These include Raymond (1973), Tomasic (1977), T. Cameron (1979), West and Hore (1980), Ross (1982), Johnston (1982c), Jonah and Wilson (1983), and Snortum (1984). The present review is based partly on an analysis of these publications and partly on an evaluation of a number of source documents which seem of special relevance to a study employing a survey methodology. Particular attention is paid to those studies in which a coherent theoretical framework has been employed.

What features should be included in any such framework? Gusfield (1984) laments the limited character of sociological and cultural studies of drinking and driving, and the lack of attention in the literature to the social environment and to institutional variables. One author who has gone some distance toward incorporating a few of these factors in a quantitative model of drinking and driving in Sweden is Norström (1978, 1981, 1983). Norström's work is also of particular interest because he is one of the few researchers who have investigated the perceptual aspects of the deterrence of drinking drivers. He reports two studies of the impact of drink-drive law enforcement: one conducted at the aggregate level and one at the individual level (Norström, 1983). His aim is to contrast the potential of law enforcement to combat drink-driving with the potential of alterations to the opportunity structure underlying drinking and driving. The assumption behind this latter approach is that higher levels of alcohol consumption, and more extensive use of motor cars, produce a higher frequency of drink-driving.

Both sets of analyses lent support to the opportunity model, with alcohol consumption being a more powerful predictor than motoring. However simple deterrence received no support at all, since in both analyses both objective and subjective risk of detection were of negligible predictive value. In the individual level model the most important variable, apart from alcohol consumption, was moral attachment to the law. Norström concluded that (in Gibbs' terms) the Swedish law influenced behaviour through habituation or normative validation.

There are however some problems with Norström's methods which weaken the conclusion of no simple deterrent effect. Firstly, as the author himself recognises, not all the measures were completely satisfactory. The aggregate level analysis used as dependent variable the percentage of licence holders sentenced for drinking and driving, rather than the actual rate of drinking and driving in each region. Since police enforcement practices could differ systematically between regions, this variable is a biased indicator, despite the control for the level of urbanisation of each area in the analysis. Secondly, although the author recognizes the importance to deterrence theory of linking objective and subjective risks of detection, and then linking the latter to drink-driving behaviour, there are no measures in the individual level analysis of personal exposure to breath testing (Sweden introduced a form of RBT on an experimental basis in 1974 [Ihrfelt, 1978], two years before Norström collected his data). Such exposure variables form a crucial link between the objective levels of enforcement and subjective estimates of the risk of detection.

Perhaps the most serious methodological problem is the ambiguity of causal ordering in Norström's models. Given the arguments of Paternoster et al. (1982) and Minor and Harry (1982), unless perceived risk can be shown to be stable over time, the measure of risk should be obtained sometime *before* the measure of drinking and driving. Since subjective risk and drinking and driving behaviour were apparently recorded at the same time, inferences concerning the meaning of any correlation (or lack of correlation) are somewhat uncertain.

Studies of Simple Deterrence

The studies of Gusfield (1981a, 1981b) and Norström (1978, 1981, 1983) remind us of the broad social context within which drink-drive laws operate and of the many ways in which law enforcement may affect drink-drive behaviour. However, the remainder of this review will focus on studies concerned with simple deterrence, a more tractable problem and one which has received most of the attention.

Laurence Ross has evaluated the deterrent impact of drink-drive laws and law enforcement by drawing on published data from a number of jurisdictions around the world (e.g.: Britain: Ross, 1973; Scandinavia: Ross, 1975; France: Ross, McCleary and Epperlein, 1982). He has also published a review of the field (Ross, 1982). As Snortum (1984) has noted:

Ross's review (1982) is selective not only in his exclusive focus upon simple deterrence but also in his emphasis upon studies employing interrupted time series analysis as an evaluation procedure. Indeed, this methodological selectivity is quite appropriate in light of Ross's interest in drawing direct causal inferences about intervention effects. (p. 137).

The term "simple deterrence" refers to the direct appeal to fear rather than to the educative and other effects of sanctions: "a legal threat of punishment is influential in preventing threatened behaviour to the extent that the punishment is perceived to follow commission of the illegal act certainly, severely, and swiftly" (Ross, 1982, p. xxv). The review, and his own research, is concerned with the evidence for the behavioural impact of certain, swift and severe punishments. Since there are practically no studies which focus on celerity (legal punishments are seldom swift), the specific cases of official interventions reviewed cover the introduction of Scandinavian-type laws, police crackdowns, and increases in the severity of the legal threat of punishment. The purpose of both police crackdowns and per se (Scandinavian) laws is to increase the perceived risk of arrest for impaired driving.

Ross' analysis of the impact of the British Road Safety Act of 1967 best illustrates his approach (Ross, 1973, 1982). The 1967 Act brought two major changes to existing British legislation: it created an offence equivalent to the New South Wales offence of driving with the prescribed concentration of alcohol (.08) and it permitted police to conduct screening breath tests in a variety of situations, including accidents. Initially the government had proposed that random breath tests be allowed, but such a principle was at that time unprecedented, even in Scandinavia, and was so strongly resisted on civil-libertarian grounds that the government withdrew this provision from the proposed law. Nevertheless the controversy generated an enormous amount of publicity and in Ross' judgement helped to achieve and maintain a perception of increased threat.

Interrupted time series analysis of crash and fatality rates, adjusted for mileage, during the period 1961 to 1970 strongly supported the claim that the Act had a deterrent effect on drinking and driving. That the change was due to the law rather than to some simultaneous historical event was indicated by the sharp drop (66%) in fatal and serious injury crashes on weekend nights (when drinking and driving is at its peak), and by the fact that there was no change in such crashes during weekday commuting hours (when alcohol is rarely involved in serious crashes). Ross (1973) presents additional data to support the deterrence interpretation (miles travelled, sales of alcohol, reported changes in drinking patterns, etc.). He goes on to point out, however, that "although evidence is strong that the Road Safety Act was initially effective, it is now equally clear that this effect dissipated within a few years" (Ross, 1973, p. 31).

This pattern of a temporary impact is characteristic of all the legal innovations reviewed by Ross (1982), except that increases in penalty severity without a corresponding increase in certainty could not be shown to have had any deterrent impact even in the short term. He points out that in fact the chances of apprehension for drinking and driving in Britain, and anywhere else, are so low as to be almost negligible. He argues that the deterrent effect of Scandinavian-type laws and enforcement campaigns is due to an exaggerated perception of the probability of arrest of violators.

Ross' emphasis on the role of exaggerated fears of arrest in causing the initial success of legal interventions is of theoretical interest, since there is some evidence from the prospect theory literature and from the simulation study of Summers and Harris (1979) that slight actual increases in arrest probability will be transformed into substantial subjective probabilities. The argument also has important practical implications, since obviously the situation after a legal intervention is

unstable, with the driver quickly learning that "in an unintentional and well meant fashion, his government was engaged in deception" (Ross, 1982, p. 108).

Ross' explanation for the evanescence of the deterrent effect found in all jurisdictions which have introduced sudden and publicised changes in drink-drive law or police enforcement is both plausible and well argued, yet there is surprisingly little perceptual data available to clinch the argument. Ideally each specific innovation would have been accompanied by a series of surveys conducted both before and after the change in the law, but this design has only very recently been used (Job, 1983; Ross, 1984). In particular, the hypothesised decline in subjective arrest probabilities has never been documented. The present study contains the results of a modest attempt to fill this gap in our knowledge by comparing the perceived chances of being randomly tested on two occasions six weeks apart.

Reactions to Ross' research. Because of the unique research advantages of studying traffic offences, Ross' works (particularly the British study) are of great importance, and indeed seem generally to be regarded as cornerstones of the empirical deterrence literature (Beyleveld, 1979; Cook, 1977; Snortum, 1984). Nevertheless, some of Ross' methods and conclusions have generated considerable controversy, particularly his reliance on the methodology of interrupted time series and his assertion that the deterrent effectiveness of the tough Scandinavian laws is not proven ("the Scandinavian myth": Ross, 1975; Ross, 1978).

Klette (1979) has completely dismissed Ross' Scandinavian research on the grounds that the two main conditions for using the interrupted time series analysis, namely a sharp introduction of the legal change and valid measures of crashes over an extended time period surrounding the study, were and still are lacking. In a more conciliatory tone, Andenaes (1978) has presented some evidence for the deterrent effectiveness of Norwegian laws, while also arguing for the moral and educative impact of these laws. It needs to be kept in mind, however, that Ross (1975) never concluded that the Scandinavian laws had no deterrent effect, simply that the case was not proven: "The effectiveness of the Swedish and Norwegian laws is shown to be a matter of speculation and introspection" (Ross, 1978, p. 58).

Probably the most persistent critics of Ross' methods and conclusions (including those concerning Scandinavia) have been econometricians Harold Votey and his colleagues (Phillips, Ray and Votey, 1984; Votey, 1978; Votey, 1982; Votey, 1984; Votey and Shapiro, 1983). The debate between these two camps parallels, for drink-drive research, the debate between economists and sociologists in the seventies concerning capital punishment and other aspects of deterrence (Blumstein, Cohen and Nagin, 1979; Ehrlich and Mark, 1977). The essence of Votey's approach can best be communicated by summarising his most recent paper, which is concerned with the apparent deterioration of deterrent effects found in all the studies reviewed by Ross (Votey, 1984). He argues that the decline over time in the effects of a legal intervention, apparent in time series plots of traffic crashes, is no evidence that such a deterioration is actually taking place. Such a conclusion would require that all exogenous forces which could affect the number of crashes be invariant over the series, a most unlikely possibility. These forces include mileage driven and alcohol consumption (the opportunity structure investigated by Norström), as well as vehicle mix (e.g.: the ratio of motor bikes to four wheel vehicles) and resources devoted to law enforcement.

According to Votey (1984):

... none of the studies cited by Ross ... take into account the many exogenous factors influencing accident levels or even standardize for variations in enforcement intensity ... The threat of punishment may be deterring drunken driving, but if the population of drinkers is increasing as more persons drink, or if the average drinker consumes more, the threat may only moderate the rise in drinking-driving. (p. 126).

Thus Votey argues that if these exogenous forces operate in the manner described, then if a legal intervention is regarded as an interrupted time series and examined simply by visual inspection, a researcher is almost certain to make a Type II error, accepting the null hypothesis of no deterrent effect when in fact there is one.

The paper by Phillips, Ray and Votey (1984) in the same issue of *The Journal of Criminal Justice* represents an actual attempt to introduce some of the controls discussed by Votey (1984) through the development of an econometric model of highway casualties in Britain. Their statistical methods include the Box-Jenkins transfer function-intervention model, a technique close in spirit to

interrupted time series, but differing in the way in which causal relations between the indicator of drinking and driving and sanctions is sorted out. They conclude that:

... the British Road Safety Act of 1967 had a significant effect in reducing casualties but was a minor factor compared to vehicle traffic and rainfall. The impact it did have occurred when the law went into effect - not before, say due to publicity - and persisted. (p. 113).

Underscoring this last point, they found that the effect of the law was *not* transitory, but that its effect on serious injuries was relatively small, explaining only 2 or 3% of the variance.

Cohen (1984) and Snortum (1984), in the same issue of the journal, comment on the paper by Phillips et al. (1984). Cohen is very critical, arguing that "... the analysis suffers from sufficient methodological flaws to seriously limit confidence in the results" (Cohen, 1984, p. 150). Chief amongst her criticisms is that the sanction variable is inappropriately specified (the raw number of arrests was used), the intervention variable is inadequately formulated, and there are insufficient controls for other explanatory variables. Snortum (1984) is less extreme in his criticisms. While conceding the force of Votey's argument about the need to control for contextual influences upon alcohol-impaired driving, he nevertheless (as evidenced in the quotation above) regards the interrupted time series approach as the most appropriate for drawing direct causal inferences about the effects of interventions.

Ross himself has replied (Ross, 1982) to some of Votey's earlier criticisms of the Scandinavian research by arguing "... that an arbitrary selection of input variables and a variety of debatable assumptions concerning their formal status negate the elegance of the mathematical models and statistical procedures used to process them" (pp. 67-68). In a recent paper with McCleary (Ross and McCleary, 1983), he strongly defends the "time-series quasi-experiment" as the best way of cheaply controlling for typical threats to internal validity, such as history (specific events coincident with but unrelated to the intervention cause the observed change) or maturation (natural growth processes unrelated to but temporally coincident with the intervention cause the change). Particularly relevant to the evaluation of the time series of fatal crashes for New South Wales is their observation that change in a time series is not evidence of causality unless the change can be detected in the first postintervention observation.

It is clear that the issues raised by Votey and his colleagues are going to generate considerably more argument in the future. These researchers seem to have made out a good case that the interrupted time series approach, while appropriate for determining the short run impact of an intervention, is less useful in determining long term effects. Moreover, Snortum is surely correct in his comment that the best reason for accepting the temporary nature of deterrent effects is Ross' observation that (especially) in Britain and France the laws were enforced and publicised in a half-hearted manner or on a one-shot basis. However, the major conclusion to be drawn from the recent debate is that additional *kinds* of data need to be collected. No matter how sophisticated the statistical analyses, inferences concerning deterrence will always remain less than certain on the basis of traffic crash data alone. In particular, Ross' hypothesis that the perceived certainty of arrest declines over time after a legal intervention needs direct confirmation through surveys.

More recent research. Ross' 1982 review covers the great majority of good quality studies published up till that time. The results of a few evaluations of drink-drive interventions have been published since Ross' book, including Sykes (1984), Mercer (1984), Peck (1983) and Bloch (1983). With the exception of Mercer's study, which revealed the crucial importance of media publicity, these studies tend to support the general conclusion of an initial deterrent impact, followed (at least in the case of the California law reviewed by the latter two authors) by a decline in deterrent effectiveness. In addition, Ross has updated his book by reviewing the published evaluations of several recent American efforts (including those in California) to deter the drinking driver (Ross, 1984). The overall conclusions Ross draws from this review echo those of his earlier study, namely that well publicised campaigns emphasising the certainty of arrest have a short term deterrent impact. Moreover, extremely severe penalties generate distortions in the criminal justice system without achieving notable safety benefits.

Simple Deterrence: Perceptual Research

To Australian readers the "sobriety checkpoints" used in some American states and discussed by Ross (1984) are of particular interest. These checkpoints are mounted by stopping all cars, or a systematic sample of cars, at designated highway locations, interviewing the drivers, and testing those individuals whose behaviour generates suspicion that they may be impaired by alcohol. Thus they fall short of RBT, but are akin to the "roadblock" methods used in Western Australia and New Zealand (Hurst and Wright, 1981). Williams and Lund (cited in Ross, 1984) speculate that the perceived chances of arrest arising from these procedures are still too low to convince drivers to abstain. In an evaluation of checkpoints in the states of Delaware and Maryland, it was found in a telephone survey that respondents in the checkpoint areas estimated higher likelihoods of arrest than residents in the control areas, but that there were no differences in reported drinking-and-driving behaviour between the two sets of areas. Ross concludes that the evidence on the deterrent effectiveness of checkpoints is encouraging but not persuasive.

One further study discussed by Ross (1984) is of particular interest, since an attempt seems to have been made to measure deterrence directly through a question about occasions when drink-driving was a choice. In 1981 Maine introduced a complex drink-drive law claimed by the Governor to be the "toughest drunk driving law in the nation". Evaluators surveyed adults in Maine, from periods before and after the inception of the law, and comparable samples from the control state of Massachusetts. There were changes in the perceived risk of drink-drivers being stopped, charged, tried and convicted, and increases in the perceived severity of penalties. Maine drivers were more likely than Massachusetts drivers to report occasions when they chose not to drink and drive, but surprisingly there were no significant before and after changes in the number of such occasions in Maine. A second wave of surveys found declines in the perceived expectations of punishment, especially among young drivers, and yielded evidence of renewed drinking and driving. However, it is not clear whether the same people were interviewed the second time, a highly desirable condition if deterrence effects are to be firmly established.

Vingilis and Salutin (1980) report the results of an enforcement campaign in one borough of Toronto, Canada, which was similar in form to the sobriety checkpoints discussed by Ross (1984). The evaluation illustrates the importance of the reference point of potential drink-drivers' perceptions. A three-wave telephone survey (one wave before and two during the campaign) showed significant increases in public knowledge of drinking and driving and of the program in the experimental area. The subjective perception of arrest risk was increased for the "average driver" but not for "myself". However, there was no strong evidence for the deterrent effectiveness of the campaign, which is an interesting conclusion in view of the literature reviewed earlier in which it is argued that perceptions of personal risk are more powerful predictors of illegal behaviour than other-referenced measures (Grasmick and Green, 1980). It could be argued that in the absence of an increased personal arrest risk a deterrent effect could not have been expected.

An other-referenced question has been one basis for the evaluation of RBT in Victoria, Australia (South and Stuart, 1983). This is unfortunate, given the theoretical weakness of these measures. It is of interest, however, that Klette (1979) (also cited in Snortum, 1984) has used a question in Sweden which is almost identical to the Victorian question, and has obtained very similar results. In September 1974, before the introduction of RBT in January 1975, 26% of the sample estimated that the hypothetical driver faced at least a 10% chance of being detected. This figure rose to 30% in March and April 1975, 34% in November 1975, and 38% in November 1977. A gradual increase has also been observed in Victoria, where RBT was introduced in a manner very similar to that in Sweden.

It might be concluded that although an other-referenced question does not predict an individual's behaviour, it does reflect generalised perceptions of the chances of arrest, and hence has some value in evaluation. In this connection, it is significant that Klette obtained higher estimates of risk from older drivers and from those who had been exposed personally to traffic controls or who had seen others checked.

A study by Mercer (1984) highlights the importance of publicity when a legal intervention is introduced. He evaluated a four-week roadcheck and enforcement campaign in British Columbia. Because of a newspaper strike and some other factors, the campaign did not receive much media publicity. A telephone survey of a sample of adults over 15 in the province was taken a week before the blitz and a week after it. There was no difference either before and after the blitz or

between the newspaper strike and no-strike areas in terms of perceived likelihood of apprehension, and in fact despite a doubling in the numbers seeing or being stopped in a roadcheck, the public did not seem aware that a blitz was on. Once again, however, the questions on perceived risk involved a hypothetical drink-driver, not one's personal risk. The author concluded that unless the public knows that there is a blitz on, the blitz roadcheck becomes just another roadcheck, and deterrent effectiveness is lost.

In conclusion, it is encouraging to see the increased attention being devoted to study of the perceptual elements in the deterrence process. However, many of the lessons which could be learned from a study of the general sociological literature on deterrence do not appear to have penetrated the drink-drive field to any great extent. One could cite as examples the need for longitudinal surveys to chart variations in risk perceptions over time and also to unravel the direction of causality between perceptions of sanctions and driving whilst impaired, the desirability of personal rather than other-referenced measures of arrest risk, and the need to pay much closer attention to the assumed causal chain linking actual enforcement levels to drink-driving behaviour.

Random Breath Testing in Australia

In July 1976, Victoria introduced RBT. Since then, both territories and all but two states have followed suit: the Northern Territory in February 1980, South Australia in October 1981, the Australian Capital Territory and New South Wales in December 1982, and Tasmania in January 1983. Although rigorous evaluations are as yet lacking for most states, enough information has accumulated to make a separate examination of RBT in Australia a worthwhile exercise. Moreover, as we saw from the review of the international experience with general deterrence, the style of random testing in Australia is sufficiently distinctive to make inappropriate the uncritical application of results from foreign research.

In considering the Australian literature on RBT, it is necessary to distinguish research which describes the *operation* of RBT from that which is concerned about its *effectiveness*. The works of Cashmore and Vignes (1984b) and Hendtlass, Bock and Ryan (1981) fall largely into the former category, and will not be considered explicitly in this review. However, although the present emphasis is on the effectiveness of RBT, it should be recognised at the outset that while the term "random breath testing" is used in all states, the phenomenon itself varies considerably from jurisdiction to jurisdiction. The manner of its implementation in New South Wales was described in Chapter 1, but unfortunately no other state or territory has enforced the law so energetically or publicised it so widely.

Victoria. Victoria has been widely cited as the state which has most effectively solved its drink-driving problem through the use of RBT (so much so that its perceived success has almost taken on the status of a "Scandinavian myth"), but unfortunately the conditions under which it was introduced make evaluation extremely difficult. In the early months, random testing was conducted for only 10 hours a week, and was restricted to the Melbourne metropolitan area (RACV Consulting Services, 1983). Testing has always been at a much lower level than in New South Wales, with the total number of tests in 1982 being a mere 72,957 (RACV Consulting Services), compared with the nearly one million tests in New South Wales in the first year (1983). In fact the only evidence that RBT has had any effect in Victoria comes from evaluations of the effects of scientifically planned police blitzes in selected areas of Melbourne (Cameron, Strang, and Vulcan, 1980; Cameron and Strang, 1982), which is not the usual manner of its enforcement.

During a seven week period late in 1978, Victoria police carried out each week an average of 100 hours of RBT on Thursday, Friday and Saturday nights in one of four sectors of Melbourne. Over the period of the experiment, all four sectors were systematically blitzed. The authors reported large reductions in fatalities and serious casualty accidents at night in the areas tested, with residual effects for at least two weeks after testing. Unfortunately, their method of analysis involved comparing the 1978 statistics for each sector with the figures for the same period in 1977. As Darroch (1981) has pointed out, there is evidence that for the weeks of the blitz the 1977 figures were abnormally high, suggesting that the figures presented by Cameron et al. (1980) exaggerate the impact of the blitz. The basic problem is that threats to internal validity, such as history or regression to the mean (Ross and McCleary, 1983), cannot be controlled through the use of only one comparison year. Cameron and Strang (1982) recognised the problem, but argued that their

resources were inadequate to construct and analyse a separate set of time series for each sector of Melbourne included in the experiment. As a compromise, they included the previous two years as controls in later analyses of the above experiment and two subsequent ones. However, this strategy was in turn criticised by Johnston (1982c), who carried out his own analysis of the proportion of drivers killed in the period 8.00 p.m. to 4.00 a.m. over a 13 year period, with equivocal results.

Ross (1982) concluded that although the evaluation was not as methodologically strong as one might like, the results reported by Cameron and Strang (1980) resemble those reached in most other studies of short-term enforcement efforts. The operative word here, however, is *enforcement*, since it is quite possible that similar blitzes without using RBT could achieve comparable effects (Hemel, 1980b; Hemel, 1981b). In fact this possibility has been conceded by Cameron and Strang (1982) in a discussion of a similar experiment in Western Australia, where RBT does not presently operate. The study by Sykes (1984) of a police drink-drive blitz in a local area of Superior, Wisconsin, although subject to the same kinds of methodological criticisms as Cameron et al. (1980), also supports the argument that RBT is not a necessary ingredient of a successful short-term enforcement campaign. The argument that the Melbourne RBT blitzes did in fact achieve a deterrent effect is supported by a decline in the proportion of drivers in single vehicle crashes with an illegal BAC, and an increase in the perceived risk of detection by police of a drinking driver whose driving is not obviously impaired.

Tasmania and the territories. Little information about the impact of RBT is available for the territories. Campbell (1984) reports a 32% decline in fatalities in Tasmania during the first year of operation of RBT, relative to the mean for the previous six years, as well as a decline in the proportion of dead drivers with alcohol in their blood. Although not rigorous evidence, these data are comparable with the New South Wales experience. More extensive information is available for South Australia.

South Australia. As Bungey and Sutton (1983) note, in many respects South Australia's experience with RBT has been unique in Australia, since it was opposed not only by specific interest groups but by one of the two major daily newspapers. Because of the publicity generated by the controversy, RBT seems to have had greater impact shortly *before* it commenced operation than afterwards. On the other hand, an aspect of the South Australian experience which makes it very similar to that of Victoria is the low level of enforcement and the limited official publicity. Despite the controversy surrounding the law, the percentage of the population in favour of the law rose, from 55% one month before RBT, to 63% 11 months after it was implemented (Fischer and Lewis, 1983). Nevertheless these levels of support are well below those recorded in New South Wales (see also Australian Bureau of Statistics, 1984b).

South Australia is fortunate in having the Road Accident Research Unit located at the University of Adelaide, and only the South Australian RBT campaign has been evaluated using one of the theoretically most attractive tools: random roadside surveys (McLean, Holubowycz and Sandow, 1980; McLean, 1984). The first such survey was run seven months before the introduction of RBT, the second five months after RBT, and the third a year after that. The percentages over .08 were 2.7, 2.3 and 2.7 respectively. The reversion to pre-RBT levels was not quite as complete when the percentages of drivers with any alcohol were examined, leading McLean (1984) to conclude that initially RBT had an effect on all drinking drivers but that a year later the residual effect was concentrated among light drinkers, some of whom gave up drinking altogether when they were driving. These data are consistent with self-reports of decreased drinking and driving recorded by Fischer and Lewis (1983). McLean (1984) also reports a marked reduction in casualty accidents during the hours 10.00 p.m. to 3.00 a.m. in 1981, compared to the two previous years, and an increase in 1982, but not to the earlier levels. In addition, there was a reduction in the proportion of hospital casualties who had been drinking.

McLean (1984) is of the view that RBT in South Australia did have an initial, slight effect, which in itself is remarkable since in the first 18 months it operated at the lowest possible level: one unit in the metropolitan area and one in the country. Moreover, there are still limitations on where RBT can be conducted, so that there has been a 40% increase, in relative terms, in the proportion of accidents on back streets between 10.00 p.m. and 3.00 a.m. on Friday and Saturday nights as drivers seek to evade the police. McLean concludes that even if the impact of RBT in New South Wales is not permanent, in the first 18 months of its operation much more has been achieved than in the three years of the South Australian experiment. This conclusion is consistent with the crash statistics for South Australia presented in Figure 1.4.

New South Wales. Cashmore (1983) and Cashmore and Vignes (in press) report the results of several surveys of attitudes, knowledge and behaviour. Compared with pre-RBT figures, they found increasing acceptance of RBT, especially among women, increased approval of the .05 level, especially among women, a high rate of exposure to RBT in the early months, and changes in drinking and driving behaviour as a result of RBT. Many of their results are very close to those reported by the present author (Homel, 1983a), most of which appear in some form in this report. One point made by Cashmore and Vignes (in press) which is worth emphasising is that the same level of exposure to RBT was achieved in twelve weeks in New South Wales as in Victoria in two years.

Job (1983) has reported the results of two surveys commissioned by the New South Wales Traffic Accident Research Unit which are able to throw light on the impact of RBT on attitudes to drink-driving, perceptions of arrest certainty and drinking-driving behaviour. Both surveys were confined to Sydney, and were much more detailed than those reported by Cashmore and Vignes (in press). Since the first survey (993 respondents) was conducted a month before the introduction of RBT, and the second (988 respondents) six months after, a comparison of the two allows changes associated with the introduction of RBT to be assessed. The two samples were matched by starting point, improving their comparability. Unfortunately, the measures of arrest certainty and of drink-driving behaviour which are available for both surveys are rather indirect, complicating the interpretation of results. Job reports that in response to a question on the factors influencing the respondent's decision not to drive after drinking - the possibility of an accident or the possibility of being stopped by the police - the proportion nominating the police rose from 33.6% to 47.1%. This certainly suggests that RBT had the effect of increasing subjective arrest probabilities, but a more direct question which asked respondents to estimate in some way the risk of apprehension would have strengthened the evidence. In particular, it would have been desirable to have had a question which did not put the respondent into the hypothetical position of not driving after drinking.

Even more difficult to interpret are the responses to the question: "If you personally were going to drive, what is the *largest* amount of beer you think you *could* drink and *still be safe* to drive? ... How often have you driven when you've had *more* than this amount?". Job (1983) reports that the percentage answering "never" rose from 43.1% to 48.1%, but it is not clear that this indicates a decline in drink-driving since RBT, since "never" theoretically covers the whole of one's life. The most satisfactory way of eliciting this information would have been to ask about the number of drink-drive incidences in (say) the past three months. Nevertheless, the data probably do indicate some *diminution in the frequency of drinking and driving*, especially since the answers to other questions suggested an increase in attempts to avoid driving with the prescribed concentration of alcohol.

While the matching technique was a useful strategy, it is a pity that repeat interviews with the same people could not be arranged. Apart from the increase in statistical power, only through repeat interviews is it possible to show that changes in perceptions of sanctions are correlated with changes in drinking-driving behaviour, a necessary demonstration if the operation of simple deterrence is to be put beyond all reasonable doubt. However, it must be said that although Job's (1983) paper only contained the results of a preliminary analysis, on the whole the data presented do indicate moderate but not spectacular changes in perceptions and behaviour. A possible reason why differences were not more marked is that by November 1982 (the date of the first survey) publicity about RBT (then only a month away) had already begun to have an effect.

Currently the most compelling evidence that RBT in New South Wales has had a deterrent impact comes from an analysis of road deaths and injuries (see Figure 1.3). At the time of writing, a time-series analysis along the lines advocated by Ross (1982) or Votey (1984) had not been published, but Kearns and Goldsmith (1984) have carried out a careful analysis of the 1983 statistics, using the previous six years as benchmark. Given that the series in Figure 1.3 appears stationary over that six year period such a procedure seems reasonable, although the present author would prefer to see an analysis which explicitly models the data over as long a period as possible and fully allows for the stochastic nature of traffic crash data.

According to Kearns and Goldsmith (1984):

The most definite conclusion that can be drawn from this analysis is that the introduction of random breath testing in New South Wales has significantly reduced traffic crashes. The greatest observed reduction has been in fatal crashes. For this subgroup the effect was greatest for motor vehicle

occupants and for crashes at night and at weekends. ... The results detected in this analysis generally confirm the effects one would intuitively expect from a reduction of drink-driving. (p. 93).

Through a comparison of the monthly data for 1983 with the monthly means for the previous six years, their analysis suggested that there was no wearing off of the effects of RBT over 1983. Moreover, the ratio of male to female fatalities in 1983 was not significantly different from the expected ratio, which can be argued to be consistent with expectations from RBT since the blood alcohol distributions of men and women killed do not differ substantially. Perhaps surprisingly there was a 37.9% decline in fatalities among those aged 20-24 years, which was about the greatest reduction recorded for any age group. This suggests that at the very least RBT has had a marked effect in this group, even if they have not been *more* deterred than older drivers. As a final piece of evidence, the proportion of dead drivers in 1983 with illegal blood alcohol levels was significantly below the proportion expected from the previous three years.

Summary of RBT effects in Australia. What conclusions can be drawn from this brief survey of the effects of RBT in Australia? First, it needs to be remembered that RBT is enforced differently in every state, and that because it has apparently not worked in one jurisdiction doesn't mean it can't work if a different approach is adopted. Having said that, it does appear that in order for RBT to achieve a simple deterrent effect, it is necessary that it be enforced and publicised along New South Wales lines. There simply isn't any evidence for the deterrent effect of RBT *as such* in Victoria, and the evidence from South Australia suggests that a weak intervention achieves very little. Perhaps the most valuable feature of the South Australian evaluation was the use of roadside surveys, which together with the increase in crashes on back roads highlighted the level of avoidance behaviour. However, there are no data from South Australia on perceptions of sanctions, rendering conclusions about deterrence, or the lack of deterrence, weaker than is desirable.

The most intriguing aspect of the Victorian research is the gradual decline in the road toll and the gradual increase in the perceived risk monitor over the past few years. However, there is no apparent connection between specific legal interventions and the index scores, and there are no data linking changes in perceived risk with changes in drink-driving behaviour. Consequently, conclusions concerning deterrence are impossible, and in the absence of long term data on changes in such things as moral attitudes and the sources of these changes, explanations in terms of the educative effects of the law must remain in the realms of speculation.

Although by the standards discussed in previous sections the case for the effectiveness of RBT in New South Wales cannot yet be said to have been proven, certainly a good case has been made out that at least in the first year it operated as an effective deterrent. The analysis of crash data, which is the strongest evidence, is supported to some extent by survey data on perceptions and behaviour. One piece of evidence missing from the jigsaw is data from roadside surveys. Unfortunately the caution which we saw so characterised the initial outlook of the government, even after the hard political decision had been made, led them to reject such a survey *before* the introduction of RBT, on the grounds that it would look too much like the real thing and antagonise the public. Having rejected an initial survey, the government's course was set and no amount of pressure has been able to bring about a change in policy on this issue.

Conclusion

Although the perceptual research on deterrence is deficient in a number of respects, it is superior to drink-drive research in providing a description of how the deterrence process might operate. On the other hand, the quasi-experimental drink-drive research has provided some of the clearest evidence that legal innovations can have marked deterrent effects, at least on a short term basis. What is needed now is research which combines the best features of both traditions; that is, research which capitalises on sudden, well publicised changes in the law, but which goes beyond the analysis of traffic crash data by exploring directly the perceptual foundations of deterrence.

In Chapter 4 such a design applied to the introduction of RBT in New South Wales is outlined. The design builds on the experiences of earlier researchers, and incorporates measures of aspects of the deterrence process (such as exposure to law enforcement) which hitherto have been somewhat neglected.

4. RESEARCH QUESTIONS AND METHOD

This chapter has two objectives: to set out the research questions for the study in detail, and to describe the methods. Methods of analysis as well as the sample design and the questions in the interview schedule are described. The rationale for each step is set out, and the decisions concerning method related back to the methodological issues discussed in the last chapter. The problems involved in constructing reliable and stable measures are given close attention throughout the chapter. Since the study has a longitudinal component, it is possible to determine the test-retest reliabilities of some of the key measures.

The Research Questions

In Chapter 1, data on fatal traffic crashes in New South Wales and some other Australian states were presented (Figures 1.3 and 1.4). While not proving that RBT in New South Wales has achieved a deterrent impact, these data do suggest that RBT has had some effects which need to be explained. Detailed statistical analysis along the lines recommended by Ross and McCleary (1983) is required before it can be accepted that the introduction of RBT in New South Wales really did coincide with a drop in fatal crashes of greater magnitude than in other states. However, even a highly significant result would not prove that a general deterrent effect has been operating; it would simply add to the plausibility of the claim, particularly if effects were more noticeable for nighttime or single vehicle crashes (Ross, 1973).

One way of increasing the plausibility of an explanation in terms of general deterrence is to focus on the elements of the causal chain which must link police enforcement with traffic crashes if a general deterrent effect has been operating. A model describing how such a process could take place was outlined in Chapter 2. Among the key elements of the model are exposure of an individual to law enforcement, the perception by that individual of the chances of arrest and the unpleasantness of punishment, and changes in behaviour as a response to these perceptions and evaluations. The model applied to the introduction of RBT is set out in Figure 2.1 on page 41.

The review of the literature in the last chapter highlighted the strengths and weaknesses of previous deterrence research, particularly as applied to drink-driving. It is significant that the drink-drive investigations have, for the most part, relied on types of data (e.g.: roadside surveys and traffic crash statistics) and on a methodology (quasi-experimental time series designs) not generally available in the correlational/ecological or survey/perceptual studies. Nevertheless there are some significant omissions from the drink-drive research, the most serious being the failure to document perceptions of sanctions. This might be seen as part of a more general problem with the field: a failure to detail *the process* of deterrence which is assumed to underlie correlations between legal innovations and observed declines in traffic crashes.

The causal chain reflecting simple deterrence. A number of research questions arise from the model depicted in Figure 2.1, and from the literature reviewed in Chapter 3. Not all these questions can be investigated in the present study, since some variables of interest were not able to be measured. The most important variable for which a measure is not currently available is official publicity, broken down by area and by type of media. It is therefore not possible to test the relationship between the intensity of official (and unofficial) publicity and exposure to that publicity.

In order to establish a general deterrent effect of RBT, it is necessary to demonstrate that there is a causal chain linking police enforcement (an aspect of L_p) with drink-drive behaviour (D_e and D_r), via perceptions of the likelihood and unpleasantness of punishment (P_p). Therefore the major questions are: (i) Can exposure to police enforcement be predicted reliably from official levels of police RBT activity ($L_p \rightarrow Ex$)? (ii) What is the relationship between the intensity of police enforcement experienced by motorists in an area and the perceived likelihood of being tested, or of being arrested for drink-driving ($Ex \rightarrow P_p$)? (iii) Is exposure to publicity or exposure to police testing the primary determinant of perceptions of sanctions? (iv) Which type of publicity - TV, radio or print - has the greatest influence on perceptions of sanctions and on drinking and driving behaviours? (v) Which form of exposure to police activity - being tested personally, driving past

RBT operations, or knowing other people who have been tested - has the greatest influence on perceptions of sanctions and on drinking and driving behaviours? (vi) What is the relationship between perceptions of sanctions and modifications to travel and drinking behaviours (Pp -> De)? (vii) Is fear of arrest or perception of the severity of punishment the chief influence on drinking and driving behaviours?

Correlations between elements of the hypothesised causal chain cannot of course be taken as proof of a causal relationship. In the RBT analysis, there are two ways in which causal inferences can be made more plausible. Firstly, many of the variables being correlated represent changes in some quantity. For example, exposure to RBT enforcement could only take place *after* the introduction of RBT. Before RBT, its value was zero. Similarly, official radio and TV publicity did not begin until after RBT, although there were many newspaper articles which preceded the law. Much of the knowledge of RBT in the present survey therefore represents the impact of publicity through the electronic media.

The second way in which causal inferences can be made more plausible is through the introduction of statistical controls for socio-demographic variables such as age and sex. The value of these controls is that if correlations between key theoretical variables (such as exposure to testing and perceptions of arrest certainty) remain significant after adjustment, the evidence for a causal relationship is strengthened. For example, a correlation between being personally tested and arrest certainty may simply reflect the fact that young men drive more often, are more likely to be tested, and are more likely to have a realistic idea of the chances of arrest. Therefore, a general research question is whether the relationships listed above can survive adjustment for the effects of sociodemographic variables.

Informal sanctions. Among the ways in which RBT may influence drink-driving behaviour is through a reduction in the pressure some people may feel to start or continue drinking in a group situation. Therefore an important research question is whether the relationship between exposure and the behavioural variables is mediated primarily through perceptions of arrest certainty and severity of punishment or through perceptions of changes in informal sanctions, such as pressure to drink.

Who has been most exposed to RBT and most deterred? The sociodemographic variables are useful not only for controlling the relationships between elements of the hypothesised deterrence model, they are important as descriptors of the target population. Major questions are: (i) Which groups in the population have been most exposed to RBT enforcement, both personally and through the experiences of others? (ii) Which groups in the population have been most exposed to RBT publicity (TV, radio and print)? (iii) Which sociodemographic variables predict perceptions of sanctions and changes in drinking and travel behaviours? In particular, has the reaction of young men been comparable with that of the rest of the motoring population?

Interaction effects. Many hypotheses are possible concerning interactions between variables. Major questions are: (i) Do fear of arrest and perceptions of the severity of punishment interact with each other, so that neither has an influence on drinking and driving behaviours if the value of the other is very low? (ii) Do exposure to police enforcement and exposure to publicity interact in their effects on perceptions of sanctions (e.g.: is the effect of TV publicity greater if someone has been personally tested as well)? (iii) Are there interactions between different forms of publicity (e.g.: is the combined effect of TV and radio greater than either alone)? (iv) Does the effect of arrest certainty on modifications to drinking and driving behaviours depend on the strength of informal sanctions which encourage drinking after driving? (v) Is there an interaction between arrest certainty and the possession of a conviction for drink-driving? In particular, are the relationships between arrest certainty and changes in drinking and travel behaviours more pronounced for those with a conviction than for those without? (vi) Are there interactions between arrest certainty and other sociodemographic variables, especially age, sex, alcohol consumption and socioeconomic status?

Changes over time. There is a further set of research questions which arise out of the hypothesis advanced by Ross (1982) that fear of arrest, and therefore the deterrent effectiveness of the law, decline after an initial peak coinciding with the introduction of measures like RBT. (i) Do perceptions of the chances of arrest decline over time? (ii) Do motorists make fewer attempts over time to avoid drinking and driving? (iii) Do changes in the perception of arrest certainty predict changes in drinking and travel behaviours? (iv) Are such relationships affected by other factors, such as peer pressure to drink?

Drink-drive behaviour. The longitudinal component of the design also affords an opportunity to examine actual drink-drive behaviour, and its relationship with exposure to RBT and perceptions of sanctions at the beginning of the period over which drink-drive behaviour is measured. Many of the research questions parallel those discussed above. Major questions are: (i) Do perceptions of arrest certainty and perceptions of penalty severity predict involvement in drink-driving? (ii) Is there an interaction between the two components of sanction perceptions? (iii) Does exposure to RBT influence drink-drive behaviour through perceptions of sanctions? (iv) Is there an inverse relationship between attempts to avoid drink-driving and the subsequent incidence of drink-driving behaviour (De → Dr)?

Method

Design of the Sample and Sampling Procedures

Two features of the sampling method are of fundamental importance. First, the study was carried out in two stages, with 185 respondents from the first stage being reinterviewed six weeks later. This longitudinal aspect of the study allows changes over time to be investigated, and also allows an analysis of the relationship between perceptions of sanctions at the first stage and drink-drive behaviour in the six weeks between surveys. The second important feature of the design relates to variations in police activity. In the first stage, only Sydney residents were interviewed, but in the second stage the sampling frame was extended to include eight towns and cities outside Sydney. These regional centres were selected in such a way as to maximise variation in the intensity of police enforcement over Easter, 1983. This was done to facilitate the analysis of the relationship between objective levels of enforcement on the one hand and exposure to RBT, perceptions of arrest certainty and modifications to behaviour on the other.

In planning the study it was assumed, on the basis of the international experience with drink-drive countermeasures reviewed in Chapter 2, that the effects of RBT would be reasonably short-lived, perhaps lasting only a few months or a year (Homel, 1983a). Since RBT was introduced on December 17, 1982, it was expected that by late February the initial scare would be starting to wane, but that the extensive publicity campaign planned for Easter would boost its deterrent impact.

Given that in late February a lull in the effects of RBT was expected, changes in perceptions or in behaviour reported by the 185 reinterviewed respondents between interviews can be interpreted in the following ways: (a) An increase or no change in arrest certainty or in attempts to avoid drinking and driving would presumably reflect the effects of the Easter campaign, and would show that a wearing off of the effects of RBT was not inevitable, at least in the short term; (b) A decrease in arrest certainty or in attempts to avoid drink-driving would be the strongest result since it would imply a wearing off effect despite additional publicity and enforcement over Easter.

A longer time period between surveys would have had the advantage that there would have been more behaviour change (and more self reported drinking and driving) in the interval, making analysis more reliable. On the other hand, a longer interval would have entailed more attrition in the number of respondents (Anderson, 1979), and the accuracy of items relying on memory may have been reduced.

Details of first stage sampling. The first wave of interviews was conducted in the last week of February 1983, 10 weeks after the introduction of RBT. The sample consisted of 400 residents of Sydney aged 18 years and older, and interviewing was carried out by Australian National Opinion Polls (ANOP) using a questionnaire designed by the author. Households were selected by stratified area sampling, using a cluster size of two. Political subdivisions were stratified according to Liberal/Labor voting patterns, which are a good measure of socioeconomic status. Within selected subdivisions starting addresses, proportional in number to the number of voters, were selected at random from the electoral roll. Interviews were attempted at the selected addresses and at one house next door, alternating the direction from the starting address.

Since strict probability sampling procedures were employed at all stages, households at which contact could not be made were *not* immediately replaced. If no one was at home at the first call, the interviewer was instructed to call back twice before abandoning that household. When a contact was made, the interviewer listed all males 18 years and older in the dwelling, starting with

the oldest, and then all females in a similar manner. One person was selected for interview using a random number grid. Interviews were completed at 69% of sampled dwellings. Most of the non-respondents were not at home at each of the three calls. Of the 400 adults interviewed 314 were licensed drivers, 255 of whom drank at least once a year. Questions relating to knowledge of and exposure to RBT were asked of all respondents, but questions about perceptions of sanctions and drinking and driving behaviour were asked only of drinking licence holders.

Details of second stage sampling. The second set of interviews was conducted during the week commencing April 9, the weekend after Easter and six weeks after the first stage. The second survey consisted of three components. Firstly, 185 of the 255 drinking licence holders interviewed in February were reinterviewed; secondly, a new sample of 200 residents of Sydney was drawn, matched with the initial sample by starting point; and thirdly, 400 residents of eight regional centres throughout NSW were interviewed. For the second stage interviews, the questionnaire was enlarged to probe in more detail perceptions of police enforcement, exposure to RBT and some other issues.

The success rate for the repeat interviews was only 73% (185/255). With up to six call backs to each dwelling, this was lower than anticipated. It seems that quite a few respondents had moved house in the six weeks between interviews, although whether the rate was abnormally high is difficult to determine. Fortunately, however, with one exception the 70 respondents not contacted a second time did not differ significantly from the 185 who were contacted again in terms of information available from the February interview. The single significant difference was total alcohol consumption on a drinking day: those not followed up drank an average of 5.1 standard drinks, while those reinterviewed drank an average of only 3.9 standard drinks (a *standard drink* is defined below). Even here, however, the difference was only marginally significant ($p = .046$), and was not apparent when frequency of drinking was examined or when a joint index of frequency and quantity was constructed. There was also a tendency for 21-24 year old respondents to be under-represented, but again this was not statistically significant ($p = .15$). Therefore on the whole the follow-up sample is a random subsample of the full February sample, with a tendency for heavy drinkers and young people (these groups not necessarily being conterminous) to be under-represented.

To facilitate comparisons between the two stages of the survey, the 200 dwellings selected in Sydney in April were matched with the 400 selected in the first stage by taking the same 200 starting points, but proceeding in the opposite direction. The second sample of 200 dwellings can also be regarded as a random sample of Sydney dwellings and can be compared with the 400 households sampled in areas outside Sydney at the same time.

The 400 non-Sydney interviews conducted in April were carried out in eight regional centres, selected on the basis of the intensity of police enforcement of RBT over the Easter period. The eight cities and towns are listed in Table 4.1, together with the number of interviews conducted in each, the number of Easter random breath tests conducted throughout the police districts containing each centre, and a police rating of the relative intensity of enforcement in each district over the Easter period.

The figure of 4,167 tests for the central-west police district, which includes Bathurst, actually reflects an intensive blitz centred on Bathurst and the Mt. Panorama racing circuit, where motorbike races are held every Easter. There is no doubt that Bathurst and its environs were the object of by far the most intensive enforcement of any region over the Easter period. However, as noted in the table, both Newcastle and Lismore (on the north coast) recorded above average figures. The figure for Lismore is particularly interesting, since the high level of enforcement which it represents followed a period of relatively low levels of activity in the north coast region.

Towns close to the borders with Victoria or Queensland were not included, to avoid the possible contaminating effects of differing drink-drive laws in these states. In retrospect, it may have been an advantage to have included at least one of these towns, since cross-border drinking and driving would have been an interesting phenomenon to document. Moreover, in the early months of RBT some border towns were not exposed to the same levels of TV publicity as the rest of NSW (since time was not booked on inter-state stations), introducing an additional variable the effects of which could have been investigated.

The response rate for the April interviews was about the same for the Sydney sample as in February (70%), but the average response rate outside Sydney was higher, at about 80%. However, the two Sydney samples differed rather more than expected in terms of the percentage of

Table 4.1. Cities and Towns Sampled Outside Sydney in April, 1983

<i>Town</i>	<i>Sample Size</i>	<i>Number of Easter Random Tests</i>	<i>Intensity of Enforce- ment (Police Rating)</i>
Newcastle	49	3076	High
Bathurst	50	4167	Very high
Lismore	50	974	High, but very low previously
Wollongong	51	1435	Low
Goulburn	50	894	Average
Wagga	50	877	Average
Tamworth	50	743	Average
Dubbo	50	213	Average

licence holders and percentage of licence holders who drank (Table 4.2). For reasons which are not immediately apparent, the second Sydney sample consisted of fewer such people than the original sample of 400. (The difference in the proportions of licence holders is not quite significant, but the proportion of licence holders who were drinkers in the second survey is significantly smaller than in the February sample.) It is possible that the explanation lies in the matching procedure, since starting points for the second sample were based on successful interviews at the first stage, but it is not clear why any ensuing bias would have caused the lower percentages.

Table 4.2. Breakdown of Samples by Licence Status and Drinking Status

	<i>February Sydney (N=400)</i>		<i>April Sydney (N=200)</i>		<i>April Outside Sydney (N=400)</i>	
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
Licence holders	314	78.5	143	71.5	328	82.0
Drinking licence holders	255	63.5	101	50.5	241	60.3

Measures

The questions used in both stages of the study can be organised under five headings, all of which are represented in Figure 2.1 on page 41. These five groups of variables, together with available information on their validities and reliabilities, will be described in this section. The first group of variables, almost all of which are common to both stages of the survey, are labelled as sociodemographic in Figure 2.1. The second set relate to exposure to RBT publicity and enforcement, the third set to perceptions of sanctions, the fourth to drinking and driving behaviours (which includes drink-driving since RBT and attempts to avoid drink-driving), and the last set of variables relate to peer pressures to drink.

The first four of the five groups of variables were represented on the February questionnaire. In the April interviews, the February questions on exposure, perceptions of police activity, alcohol use and drinking and driving behaviours were repeated exactly. In addition, these

issues were explored in more detail by means of additional questions, and the questions on peer pressure and convictions for drink-driving were added. The questionnaires and showcards used in both stages of the survey are reproduced in the Appendix, but to avoid constant cross-references, the exact wording of most questions will be given in this chapter. (In the discussion below, FQ refers to a February question, AQ to an April question.)

Sociodemographic variables. *Licence status* (FQ4: current driver or rider licence holder; disqualified; not licenced and not disqualified). For purposes of analysis, disqualified drivers (of whom there were only two or three) have been grouped with licence holders. *Sex* and *Age* (grouped into seven categories, from 17-20 to 65+). *Education* (the highest level of education reached so far: less than three years high school; three or more years high school; gained HSC/LC/matric.; gained Uni degree/College diploma). *Occupation* (senior professional/ business /academic; upper (skilled) white collar; lower (semi-skilled/unskilled) white collar; skilled blue collar; semi-skilled or unskilled blue collar; pensioner/retired; student; housewife/home duties; unemployed; refused). Occupation was not assessed according to any hard and fast rules, but was based on what people gave as their main occupation. Generally speaking, people working 20 hours a week or more were classified into an occupational category.

Quantity and frequency of alcohol consumption. This was based on two questions: FQ7 (frequency of drinking, divided into 11 levels from 3+ times a day to never drink) and FQ8 (quantities of alcohol consumed on an average drinking day, broken down by type of drink). The responses to FQ8 were converted into the numbers of standard drinks of each type (normal strength beer, low alcohol (LA) beer, wine, port/sherry, spirits and other) and the total number of standard drinks. A standard drink was defined as a middie (285 mL) of normal strength beer, and this was regarded as equivalent to a nip (one ounce) of spirits, two ounces of port or sherry, a glass (four ounces) of wine, and a schooner (1.5 middies) of LA beer. A bottle of wine was coded as six glasses.

There is a great deal of discussion in the literature about the validity and reliability of self-reports of alcohol consumption. Permanen (1974) reviewed much of the survey literature and showed that, on average, estimates of consumption derived from surveys were about half the estimates based on sales statistics. Part of the reason for this is that some heavy drinkers (such as those on "skid row") are less likely to be included in conventional sampling frames than lighter drinkers, and also even when included in the sampling frame they are harder to locate and maybe more likely to refuse an interview if it is known to be related to drinking. However, Permanen argues that the main problem is underreporting, due presumably to the stigma connected with the use of alcohol and with the behaviour connected with alcohol use. Since the present study does not aim to estimate *absolute* levels of consumption, but is concerned more with an ordering of individuals into broad categories, underreporting may not be a serious problem if it occurs to about the same extent in different subgroups of the population. Unfortunately, as Permanen points out, given the different norm sets and role definitions prevailing in the community, it would be surprising if some groups did not underreport to a greater extent than others.

In a more recent paper, Popham and Schmidt (1981) present data which suggest that the level of underreporting is much greater for heavy drinkers than for light and moderate drinkers. The degree of underreporting is non-linear when considered in relation to an individual's true level of drinking. If sustained, their argument would imply that heavy drinkers cannot be identified with any degree of confidence using survey methods. However, a number of researchers have responded to Popham and Schmidt, arguing that the data presented do not support their strong conclusion (de Lint, 1981) and that in fact heavy drinkers can and do report their alcohol consumption to a survey interviewer with sufficient accuracy to place themselves in the appropriate consumption category (Mulford and Fitzgerald, 1981).

It seems clear that survey methods do not allow a reliable classification of people into more than a few categories. In the present study, the two alcohol questions were combined into a quantity-frequency index with six categories, following the method discussed by Caetano and Suzman (1982). The method is summarised in Figure 4.1.

As Caetano and Suzman point out, any attempt to reduce a phenomenon as complex as alcohol consumption to a single measurement will result in the loss of information. However, given the literature discussed above, the use of finer categories would attract criticism concerning validity. Notwithstanding the obvious virtues of a small number of categories reflecting both quantity and frequency of consumption, Caetano and Suzman present data showing that such a categorisation is

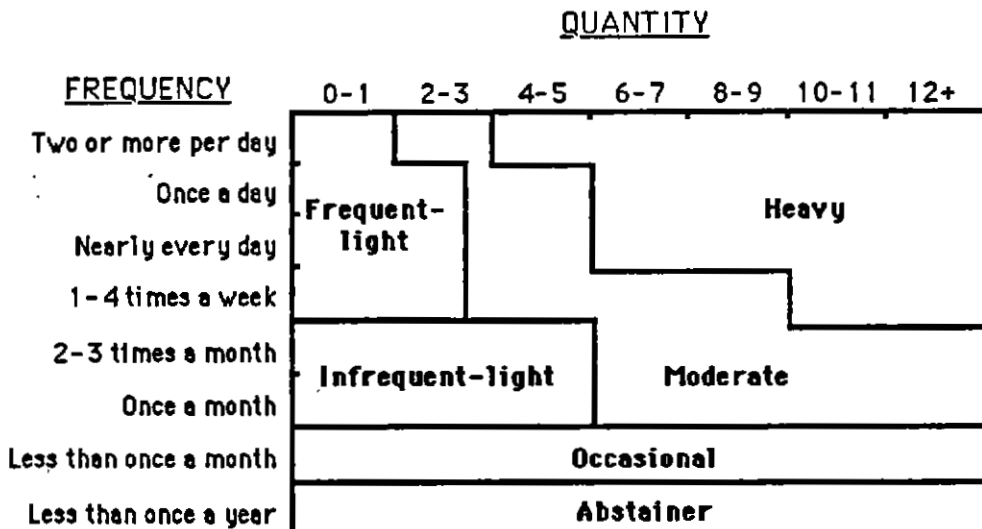


Figure 4.1. Quantity-Frequency Index of Alcohol Consumption

insensitive to changes in alcohol consumption over time in a longitudinal sample. For the purpose of detecting change, finer measures such as frequency of drinking occasions and the number of drinks per month are required. This suggests that although the quantity-frequency index should be the major measure of consumption, it should be supplemented by the use of finer measures which, although subject to validity doubts, may be more sensitive to small variations, cross-sectionally or longitudinally. In the present study, total drinks on a drinking day and total beer consumption on a drinking day have been employed in this subsidiary fashion.

The reliability of the alcohol consumption measures may be assessed by examining the association between scores obtained in February and April in the sample of 185 Sydney residents who were interviewed twice. The figures for the quantity-frequency index are set out in Table 4.3.

Table 4.3. Association Between Scores on the Quantity-Frequency Index, February and April

April	February					
	Frequent-light	Infrequent-light	Moderate	Heavy	Occasional	ALL
Frequent-light	50	6	14	2	0	72
Infrequent-light	6	13	0	0	6	25
Moderate	15	4	24	4	0	47
Heavy	3	0	4	12	0	19
Occasional	2	4	0	0	6	12
Abstainer/less than once per year	3	2	1	0	4	10
ALL	79	29	43	18	16	185

Although the marginal distribution did not change much between the two surveys, it is clear that there is considerable instability in individual category membership. Only 56.2% of the 185 respondents stayed in the same categories, and some changes were quite marked. The high rates of transfer between frequent-light, infrequent-light and moderate are perhaps to be expected (indicating that we should not put too much weight on these distinctions), but more worrying are the six heavy drinkers (a third of the total) who became moderate or frequent-light in April (and the seven who went in the opposite direction), as well as the six light or moderate drinkers who became abstainers or very occasional drinkers (less often than once a year). Of course these changes in reporting could reflect real changes in behaviour, but given the short period between interviews the influence of response error is probably greater. In fact an analysis of those who changed their levels of drinking up or down, in terms of their exposure to RBT in the six weeks between interviews, suggests that exposure to RBT, or lack of exposure, was completely unrelated to changes in reported levels of drinking.

An examination of the frequency of drinking supports the interpretation of random response errors, since 55 dropped to a lower category and 41 moved up ($p = .15$; Sign test). The most unreliable categories were the extremes (twice a day or three or more times a day) and the in-between categories (nearly every day and two to three times a month). The correlation between the two measures of total standard drinks on a drinking day was acceptable, at .80 (Figure 4.2), and a paired t test indicated no shift in mean consumption levels (mean difference = .005, $s = 2.61$, $p = .98$). However the test-retest correlations for the consumption of individual beverages were less satisfactory (normal strength beer = .59, LA beer = .20, wine = .52, port/sherry = .49 and spirits = .20).

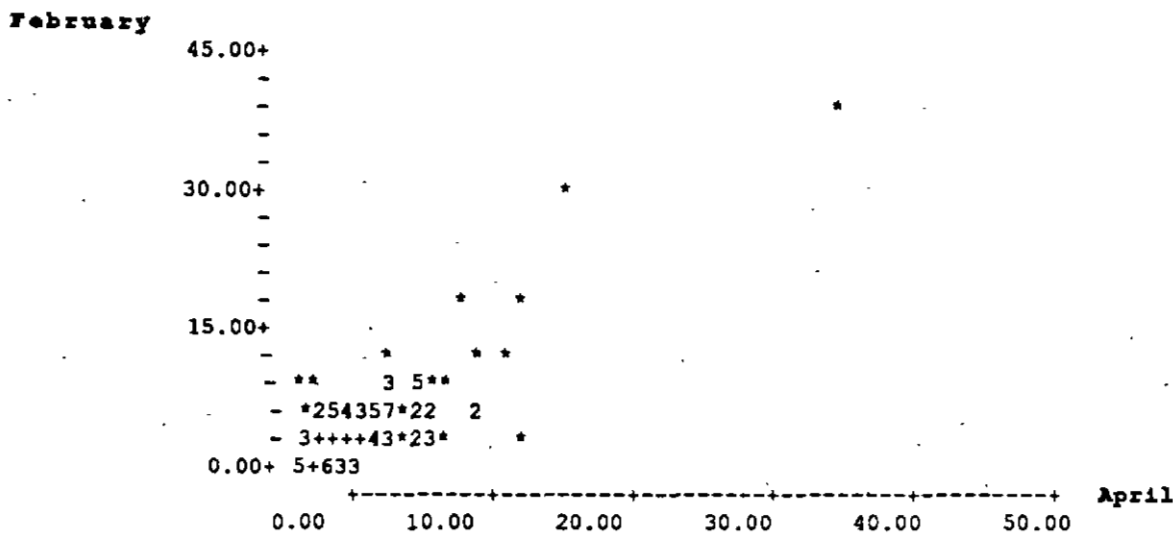


Figure 4.2. Scatter Diagram of Total Standard Drinks Consumed on a Drinking Day, February and April (N=185)

An additional sociodemographic variable probed in the April survey was *convictions for drinking and driving* (AQ19): "Over the years, about a quarter of a million people in New South Wales have been convicted for drinking and driving. Have you ever been convicted for drinking and driving?" (yes, no, unsure, won't say).

Exposure to and knowledge of RBT. *Knowledge* (FQ1: "Over the last three months or so, have you seen, heard or read anything about new methods the government is using to deal with drinking and driving in New South Wales?" If "yes", "What new ways have you become aware of for dealing with drinking and driving? Any others?") The questions on *exposure* (FQ2, asked of all respondents) were preceded by a definition of RBT and a reminder of when it was introduced. "Have you been pulled over by the police *at random* and asked to take a breath test - or have you been a passenger in the car when the driver has been asked to take a random breath test?"

Have you driven or have you been driven past police carrying out random breath testing? Has anyone you know been randomly breath tested? Have you seen, heard or read any publicity about random breath testing?" (Yes, no or unsure to each question.)

The questions on exposure can be checked to some extent for validity and reliability. The first question (FQ2[a]) asked about the direct experience of being tested, and can therefore be checked against police statistics on the actual number of tests conducted in Sydney till the end of February. Of course the comparison is not perfect, since FQ2(a) also asked about the experience of passengers. However, with appropriate adjustments the survey figure of 9.5% (out of 400 respondents) can be compared with the official figure of 87,936 tests conducted up to and including February 28 (the Monday after the bulk of interviewing was carried out). Expressed as a proportion of licence holders resident in the Sydney Statistical District (approximately 1.75 million), the police figure becomes 5.1%. In order to achieve the 9.5% response to FQ2(a), it would be necessary for cars pulled over by RBT operators to contain an average of 1.8 occupants. This is perhaps a little high, since the best estimate available from the Traffic Accident Research Unit seat belt wearing surveys conducted in Sydney over weekends is about 1.5 occupants per vehicle. However, RBT is concentrated in the evenings, at times when people are often out in groups for entertainment, so an average of 1.8 occupants may be accurate. In any case, the 1.5 figure yields a 7.7% response, which is still well within a 95% confidence interval for FQ2(a) ($9.5 \pm 2.9\%$, ignoring the 31% non-response).

Since the exposure questions were repeated in April, it is possible to throw some light on their test-retest reliabilities. Of the 185 drinking licence holders interviewed twice, the same number (21, or 11.4%) in both interviews claimed to have been tested or to have been a passenger in the car when the driver was tested. Unfortunately, only ten respondents gave the same answer twice. Eleven who gave an affirmative response in February changed their answer to "no" in April. What are we to make of this? It is possible that the question was misunderstood by some people, and was taken to apply in the second interview to the six week period since the last interview. However, nothing in the wording of the question (which was exactly the same both times) should have encouraged such an interpretation. It is much more likely that the 11 respondents simply forgot that they had been tested. Perhaps also the inclusion of passengers reduced the reliability of the question, since passengers may be less likely to remember the experience than drivers. An examination of the characteristics of the 11 errant respondents suggested that in most respects they were indistinguishable from the majority. Their only distinctive features were lower than average occupational status and, to some extent, lower levels of achievement at school.

These figures should serve as a salutary warning that even apparently simple and concrete questions in surveys, particularly addressed to less well educated respondents, may yield responses of limited reliability. One solution is to ask a series of questions around a theme, according to no individual question pre-eminent status. It is important, therefore, to examine the consistency of responses to the other questions on exposure to RBT. Paradoxically the picture is rather brighter for these less directly personal questions. Of the 94 respondents who in the February interview claimed to have driven past police carrying out random testing, only 18 said "no" in April. Similarly, of the 108 people who said in February that they knew someone who had been randomly tested, 21 changed their response in the second interview. Nine respondents gave inconsistent answers to both these questions, so it is not surprising that analysis of both groups suggests a similar set of characteristics associated with contradictory responses. These characteristics were: being male, being young (21-24), finding it hard to resist pressure to drink, *especially* now that we have RBT, needing a car for work and having a previous conviction for drinking and driving. It is possible that RBT operations were less likely to impinge on the consciousnesses of people with one or more of these characteristics and that they were therefore less *deterable*, but such an inference would be to run ahead of the analyses reported in later chapters. In the meantime, the possibility that inconsistent responses are not equally likely to be proffered by all interviewees should simply be kept in mind.

In the April interview some additional questions were asked about exposure to RBT. Those who had driven past or who had been driven past police carrying out random testing were asked two further questions. AQ3(a): "About how often have you driven or have you been driven past police carrying out random breath testing?" (once, twice, three times, four or more times, unsure). AQ3(b): "How long is it since you *last* drove past or were driven past, police carrying out random breath testing?" (a few days ago, about a week ago, about a fortnight ago, about a month ago,

about two months ago, about three months ago, over three months ago, unsure). Answers to these two questions were combined into a *recency-frequency index* with 10 categories: not driven past at all; driven past up to three times, the last time only a few days ago; driven past four or more times, the last time only a few days ago; driven past once, a week or fortnight ago; driven past two or three times, a week or fortnight ago; driven past four or more times, a week or fortnight ago; driven past once, a month or two ago; driven past two or three times, a month or two ago; driven past four or more times, but a month or more ago; driven past one, two or three times, but at least three months ago. The 29 possible categories in this variable were reduced to 10 in line with the observed frequencies in the cells. In addition, an attempt was made to maintain the psychological significance of fine distinctions in the recency and frequency of observations of RBT activity.

Following the question previously asked about people known to the respondent who had been randomly tested, the *number known* was elicited (AQ4[b]): "About how many people you know have been randomly breath tested?" (one, two, three, four or more, unsure). Following the question on *publicity* asked previously, respondents were asked: "Over the past fortnight or so, have you seen or heard any advertising about random breath testing?" IF YES: "Were they TV ads, radio ads or ads in newspapers? What do you remember from the ads ... What did they say or show you? What was the main message they were trying to get across? Anything else?" These responses were scored by summing the total number of items recalled across all media, and also by recording through which of the media the respondent had been exposed to publicity.

Perceptions of the chances of being tested/arrested and perceptions of penalties. *Tested/arrested*: FQ3 was adapted from a question which has been asked regularly in surveys in Melbourne (South and Stuart, 1983), and which has been discussed in Chapter 3 (page 48). "I'd like you to consider the following situation. A person is driving home on a weekday after drinking in a hotel for several hours. It is about 10.30 at night and his blood alcohol level is above the legal limit. His driving is not obviously affected and he is not breaking any other traffic regulations. His trip home takes about 30 minutes over suburban main roads. Are his chances of being stopped by the police lower, about the same, or higher than they were before the introduction of random breath testing?" This is a question of the other-referenced variety, which as noted in Chapter 3 have generally been found not to be very good predictors in previous deterrence research. It was included to allow some comparison with the Victorian data. FQ5: "From this card (SHOWCARD 1), how would you rate your chances of being pulled over by the police for a random breath test some time in the *next month*?" (extremely likely, quite likely, even chance, quite unlikely, extremely unlikely, unsure.) FQ6: "If you had been asked that question the day random breath testing was introduced, how do you think you would have answered?" (same responses as above.)

Penalties, FQ13: "Did the penalties for drinking and driving change when random breath testing was brought in?" IF YES: "In what ways did they change?" The question on penalties was phrased so that no information was given to the respondent about the increases in penalties which were enacted when RBT was introduced. The probe was designed to identify those respondents who were aware of the increases. The reason for asking the retrospective question on the chances of being tested was to gain an insight into the extent to which respondents considered that they had shifted from their initial reactions to RBT. For purposes of analysis this is treated as a measure of *perceived change in perception of the chance of being tested*.

The importance of developing a reliable measure of *perceptions of the chances of arrest* has been stressed a number of times. This is a little different from the perceived chance of being randomly tested, since it involves other aspects of the enforcement process as well. In the April questionnaire, these aspects were probed in a series of questions. In order to understand the thinking behind the development of the index of subjective arrest probability, it is necessary to recall the distinction between probabilities (or subjective probabilities) and decision weights (Tversky and Kahnemann, 1981). Someone may, for example, exaggerate the personal implications of low perceived probabilities, or they may regard with equanimity a high perceived risk of being tested. Secondly, it is necessary to appreciate that being arrested for drinking and driving is the culmination of a process that involves several earlier steps, and that each of these steps has a certain perceived likelihood of occurring which may affect the weight attached to the perceived chances of a step earlier in the chain. Thus, for example, a motorist may regard the chances of being randomly tested in the next month as quite high, but may also believe that he stands a good chance of talking his way out of a positive breath analysis. Thus the perception of the

chances of an event higher in the chain may effectively cancel the impact on decision making of the perception of the chances of an event earlier on. Bringing together the concept of arrest as a chain of events and the concept of decision weights attached to perceived probabilities for each stage creates a very complex measurement problem.

An approach was adopted in the present study which led to the development of an index of *perception of arrest certainty*. The reason for this term is that all questions used in the formation of the index deal with the process leading up to the arrest of a motorist driving with the prescribed concentration of alcohol. The index entails abandoning any attempt to develop a measure of perceptions distinct from a measure of evaluations of those perceptions. The method rather is to probe perceptions of as many stages and aspects of the arrest process as can be reasonably distinguished in an interview, create a summed score from answers to each of the questions, and interpret a high score as indicating both a high perceived probability of arrest (if one were to drive with the prescribed concentration of alcohol) and a high evaluation of this perception (in the sense that it ought to be an important factor, if deterrence theory is correct, in the decision not to drink and drive). The index can therefore be given an operational meaning even though it conflates two theoretically distinct concepts.

The eight questions asked fall into three groups. One of the new questions directly probed the evaluative rather than the perceptual aspect of being tested (AQ28): "If you did drink and drive, how worried would you be about being asked to take a random breath test ... not at all worried, not very worried, quite worried, or very worried?" The focus here is on the anxiety caused by the thought of being tested, rather than on the perceived chances of being tested. A second group of questions probed the general issue of the chances of apprehension if one were to drive over the limit. One of these questions (AQ7) was the repeat of the other-referenced question asked in February. The two new questions of this type (AQ20 and AQ23) asked about the personal perceived chances of being caught if the respondent drove regularly over .05 (refer to the Appendix for the exact wording). The third group of questions explored perceptions of various stages of the enforcement process and the extent to which respondents believed they could "fall between cracks" in the system. AQ9 was a repeat of the question on the perceived chances of being tested in the next month; AQ24 asked about the chances of being arrested if found by the police to be over .05; AQ29 asked how easy or hard it is to avoid police carrying out random testing; and AQ30 asked about the chances of being pulled over if one drives past police (on their side of the road).

The eight questions described above were designed to provide a broad base for a single measure of perceptions/evaluations of police enforcement of drink-drive law, while forming at the same time a pool of items from which selections could be made for specific analyses. In using the term "perception of arrest certainty" it should be understood that the *weights* attached to aspects of this perception are also included, in a complex way, in the measure, although as discussed above, analytically the weight function is distinct from the actual (subjective) probabilities. Indeed, in ordinary conversation with people it is very difficult to maintain these kinds of theoretical distinctions. In this regard, it is worth noting that despite the care with which they were selected some respondents saw the eight questions as being very similar; so similar, in fact, that they objected to answering what they saw as the same question several times over. To some extent this was the effect intended, since it was hoped that scores would be unidimensional and at least moderately correlated. Unfortunately these hopes were not fully realised, since the correlations were on the whole rather weak.

In computing the correlations, it is necessary to deal with "unsure" responses, of which there were quite a few to some questions. It is also necessary to decide whether to use all points on the scale, or simply to differentiate extreme responses from the more common. One tactic for dealing with "unsure" responses is to exclude those subjects from the analysis, but in this case that would reduce the sample size to unacceptably low levels (in excess of 100 cases would have to be discarded). In any case, it can be argued that an "unsure" response is valuable information, since it indicates that the respondent is undecided between alternatives and therefore does not perceive the risk of detection as being either very high or very low. In addition, the idea of concentrating on extreme responses is attractive, since such a procedure improves the face validity of an index constructed by summing individual item responses. For these reasons, it was decided to score each question on a three point scale, with "unsure" and "middle range" responses forming the mid-score. The questions used in construction of the index, together with the methods of categorisation, are set out in Table 4.4.

Table 4.4. Method of Construction of Index of Perception of Arrest Certainty (April Survey, $N = 517$ Drinking Licence Holders)

Item	Low Probability Category	N of Cases	High Probability Category	N of Cases	No. Unsure
AQ7	lower chance of testing since RBT	24	higher chance of testing since RBT	550	13
AQ9	extremely unlikely to be tested	96	extremely likely to be tested	44	14
AQ20	100 or 1000 times without being caught	48	not at all without being caught	86	53
AQ23	probably or definitely not be caught	68	definitely would be caught	105	11
AQ24	quite or extremely likely to be arrested	31	certain to be arrested	242	12
AQ28	not at all worried	40	very worried	268	6
AQ29	very easy to avoid police	29	very hard to avoid police	112	95
AQ30	quite or extremely unlikely to be pulled over	50	extremely likely to be pulled over	74	18

Correlations between these items were nearly all positive, but the average magnitude was only .079. The summated index had a reliability (alpha) of .41, and no item appeared to be redundant. Lest the low correlations be thought a consequence of reducing each item to a three point scale, it should be noted that the correlations between full responses to six of the questions in a reduced sample of 473 cases (excluding all "unsure" answers) were very little higher. Tabulations of the questions reveal a high number of discordant answers, so that alternative measures of correlation (such as gamma) do not improve the situation appreciably. It seems that despite the similarity of many of the questions, interviewees generally saw them as probing different aspects of police enforcement and responded accordingly. In fact the low correlations tend to confirm the value of probing separately each aspect of enforcement.

Perceptions of the severity of penalties were covered by three questions, none of which were asked in the first survey. AQ25 probed another perceived "crack" in the system: "If you were arrested for drinking and driving, how would you rate your chances personally of being let off by the court without any penalty?" (extremely likely, quite likely, even chance, quite likely, extremely unlikely, zero, unsure). It might be thought unlikely that any offender would be let off without penalty, but in fact in New South Wales about 5% of offenders each year are dealt with in precisely this manner by magistrates in open court, under S. 556A of the *Crimes Act* (Homel, 1983b). The effects of this policy on general deterrence have never been scientifically examined.

The next question (AQ26) was adapted from Grasmick and Green (1980), and was designed to measure directly the subjective evaluation of penalty severity, rather than the perception of what the penalty would actually be. As Grasmick and Green (1980) and Tittle (1980a) have argued, it is the degree of fear of a penalty which is the crucial quantity theoretically: AQ26: "For this question, I would like you to imagine that you had been arrested for drinking and driving, and that the court had found you guilty and imposed a punishment. *Think* about what that punishment would be for you. From this card (SHOWCARD 10), in general, how big a problem would that punishment be in your life?" (no problem at all, hardly any problem, a little problem, a big problem, a very big problem, unsure). The final question was also designed to probe the dreadfulness of punishments, but this time by contrasting two specific penalties: AQ27: "Which punishment would you personally find harsher: imprisonment for two weeks, or disqualification from driving for six months?" This question was taken directly from Buikhuisen (1974), with the purpose of replicating his finding for Dutch drink-drive offenders that about half would prefer imprisonment.

Drinking and driving behaviour. *Driving while intoxicated*. FQ9: "Have you ever

driven when you felt you had had *too much* to drink?" (yes, no, unsure). FQ10: "Since random breath testing was brought in just before Christmas, have you driven when you felt you had had *too much* to drink?" (yes, no, unsure). This was followed by an unstructured probe designed to elicit reasons either for drinking and driving or not drinking and driving since RBT. Questions F9 and F10 were repeated in the April survey, so it is possible to examine the consistencies of responses among the 175 drinking licence holders who were reinterviewed (the 10 respondents who became less than annual drinkers were not questioned again about drinking and driving behaviour). Of 91 respondents who admitted in February that they had committed the offence sometime in the past (49.2% of the sample), 11 denied it in April. A further 16 gave inconsistent responses in the other direction, and could therefore legitimately be regarded as new offenders, except that 14 of them denied having committed the offence during the six weeks between interviews. Thus a total of 25 out of 175 respondents (14.3%) must be regarded as having given inconsistent answers to FQ9 on the two occasions. With regard to FQ10, a total of 20 respondents admitted in February to driving while under the influence since the advent of RBT, and 16 of these told the same story in April. In other words, four gave inconsistent responses.

The consistencies of responses to these two questions are not as high as one would hope, but they compare favourably with the consistencies of responses to the exposure questions, suggesting that the source of error is not so much the attempt to conceal the commission of illegal or socially unacceptable acts, but more the simple process of forgetting (or not being bothered to try and remember). In addition, it should be noted that both questions required the respondent to make a subjective judgement concerning his or her state of inebriation at some date in the past, and also a judgement about the effects of this level of alcohol consumption on driving performance. It is quite likely that someone could recall the same incident on two different occasions but, without dissembling, make two different decisions about whether they had really had too much to drink. In other words, without the kind of objective procedures employed by Sloane and Huebner (1980), there is a certain level of unreliability inherent in questions about drink-driving behaviour.

Attempts to avoid drinking and driving. Respondents were first asked how they had reacted to RBT when it was first brought in, using a detailed check list of behaviours (FQ11), and then how they were reacting *now* (FQ12). "When they first brought in random breath testing just before Christmas, what effects did it have on you at the time? From this card (SHOWCARD 3) what if anything did you do at the time? And what about *now* ... what effects is random breath testing having on you now? What (SHOWCARD 3) if anything are you doing now?"

FQ12 emphasised the immediate impact of RBT, and was designed to operationalise as far as possible the theoretical quantity *De* discussed in Chapter 2. Without explicitly asking people about the reasons for their behaviour, the question was intended to get at changes in behaviour caused by RBT. A limitation of the question is that only *types* of responses to RBT are probed, and not the total number of occasions in (say) the last month when the respondent took action to avoid driving after drinking. Although there are no major theoretical impediments to a measure based on drinking occasions, to get accurate answers it would probably be necessary to ask respondents to keep a diary over a period of some weeks. The wording of FQ12 was adopted as the most practical, given the resources available for the study. Nevertheless it needs to be recognised that by focussing on types of strategies rather than on occasions when drink-driving was a risk, there is a danger that a person who employs a single strategy frequently may not score as highly as someone who tries a few approaches only once or twice.

One advantage of the timing of the surveys is that it is likely that in the early days of RBT many people were experimenting with alternate drinking and travel arrangements, and therefore at that time there was probably a fair correlation between the number of strategies being adopted and total occasions when driving over the limit was avoided. It should also be remembered that the method used distinguishes between people doing something as a response to RBT and people not doing anything.

The question about initial reactions to RBT (FQ11) paralleled the question on perceptions, and should be regarded as a measure of *perceived changes in behaviour* since the inception of RBT.

Four scores were derived from the check list: the number of changes to travel arrangements initially and currently, and the number of changes to the amount of drinking or the place of drinking, initially and currently. The items contributing to the construction of the travel and drinking indices are set out in Table 4.5.

Table 4.5. Items Contributing to the Measures of Number of Modifications to Travel Arrangements and Number of Modifications to Drinking Behaviour

<i>Modifications to Travel Arrangements</i>	<i>Modifications to Amount or Place of Drinking</i>
<ul style="list-style-type: none"> * Not using the car as much • Driving more carefully at all times * Stopped driving to places where you will be drinking * Driving more carefully after drinking • Using taxis more often after drinking * Using public transport more after drinking • Staying overnight after drinking * Having someone else drive you home after drinking • Sleeping in car instead of driving home after drinking • Using special buses or drive home schemes organised by clubs or pubs (<i>April survey only</i>) 	<ul style="list-style-type: none"> * Drinking at home more often, drinking away from home less * Carefully limiting your drinking when driving * Stopped drinking altogether when driving * Drinking more soft drinks when driving • Switched to low alcohol beer when driving * Drinking at places closer to home than before

In the April survey, the question on drink-driving since the introduction of RBT was augmented in a number of ways. Those who admitted to driving under the influence were asked (AQ14(b)): "About how many times would that be?" (once, twice, three times, four times, five or more times, unsure). Those who claimed not to have driven under the influence since RBT were asked (AQ14(c) and AQ14(d)) to nominate from a card the statement which "best describes" their reasons for not drinking and driving, and then their second most important reason for not drinking and driving. The statements (SHOWCARD 3) were: "drinking and driving is wrong, drinking and driving leads to accidents, drinking drivers stand a good chance of being caught and punished." The purpose of this question was to determine the relative importance of moral attachment (Norström, 1981) or concern about safety, as opposed to fear of punishment. The three alternative statements were derived from analysis of responses to the open-ended question asked in the first interview.

Driving when one believes one has not had too much to drink is not the same as *driving under the legal limit*. Drinking licence holders in the April interviews were therefore asked (AQ18): "Since random breath testing was brought in just before Christmas, have you driven when you felt you were over the legal limit of .05?" (yes, no, unsure, refuse). (This question was preceded by a check that the respondent was in fact aware of the legal limit - nearly all were.) Tabulation of responses to this question against responses to AQ14(b) (driving while impaired) revealed a surprising degree of consistency. All but four of the 73 April respondents who admitted to driving with too much to drink also admitted to driving over the .05 limit, and these four may legitimately be regarded as having a personal limit which is lower than .05. Interestingly, 40 of the 109 motorists who admitted to driving over .05 gave a negative response to AQ14, suggesting that their personal limit is higher than .05 and thereby confirming the value of the .05 question. In order to summarise the information available from AQ14(b) and AQ18, a *combined measure of drink-drive behaviour since RBT* was constructed: not driven over .05; driven over .05 but not over personal limit; driven over the personal limit once; driven over the personal limit two or more times.

Social pressure to drink. In addition to the questions on formal sanctions for drinking and driving, *informal sanctions* for not drinking in a group situation were explored in one question in the April survey (AQ21): "I would like you to imagine that you are at a place with a group of friends, and that everyone at that place, that is, all your friends, are all drinking alcoholic drinks. Now thinking of that situation where everyone is drinking alcohol, I would like you to tell me from this card (SHOWCARD 6) how hard or easy you personally would find it to drink less alcohol than

your friends?" (extremely hard, very hard, quite hard, quite easy, very easy, extremely easy, other, unsure). This question was adapted from Sloane and Huebner (1980). A second question probed the theory that RBT had had an impact on the pressure to drink through the provision of an acceptable reason for saying "no" (AQ22): "Now that we have random breath testing, is it easier or harder for you to drink less alcohol than your friends when they are all drinking alcohol?" (easier, harder, no difference, unsure).

Statistical Analysis

For purposes of analysis it is convenient to divide the study into two sections. The major section contains the analysis of the relationships between variables derived from the April interviews, using Figure 2.1 (page 41) as a framework. This part of the study could be called the *cross-sectional analysis*, except that as noted in Chapter 2, not all variables can be regarded as synchronic in the sense in which Gibbs (1975) used the term. A number of the variables, including exposure to RBT enforcement and modifications in behaviour as a response to RBT, are interpreted in this analysis as measures of change. The focus of the April survey analysis is on modifications to drinking and travel arrangements and on the variables in the causal chain which predict these modifications.

The second stage of the analysis is focussed on changes occurring between the two interviews, and might therefore be called the *longitudinal analysis*. There are two central questions in this analysis: whether there is any evidence of a decline in the deterrent effectiveness of RBT over the six weeks period, and whether there is any evidence for a relationship between changes in the perceptions of the chance of being randomly tested and driving while intoxicated between February and April. Since the data for the longitudinal analysis are restricted to a subset of the February questions, the analysis is more limited than the April survey analysis.

The major value of Figure 2.1 is to provide a framework for the analyses reported in Chapter 5, each of which is based on a variant of the linear model (regression, multivariate analysis of variance or logistic regression). In effect, a form of path analysis has been carried out, but on one set of dependent variables at a time. Thus in the first analysis the relationship between the level of official police enforcement in an area and an individual's chances of being exposed to RBT is explored (several aspects of exposure are the dependent variables), while in the second analysis perceptions of arrest certainty are the dependent variables. However, not all groups of variables have been analysed as dependent variables, since the focus of the study is on the factors which comprise the basic deterrence model, rather than on factors like peer pressure which are, from this limited perspective, simply covariates.

Why path analysis is inappropriate. It was pointed out in Chapter 2 that although Figure 2.1 is an attempt to depict causal relationships between elements of the deterrence process, it is not strictly a path diagram since groups of variables rather than individual variables are represented and interaction terms are implied as well (for example, between perceived arrest certainty and penalty severity). It may be appropriate at this point to explain in more detail why path analysis was considered an inappropriate statistical technique.

Firstly, many of the variables included within the general types depicted in Figure 2.1 cannot be ordered in any clear causal fashion. For example, attempts to avoid drinking and driving may entail modifications to travel arrangements or modifications to drinking practices. One type of response does not obviously cause the other, yet a form of analysis is required which takes into account the correlation between the two forms of behaviour. Multivariate analysis achieves this objective, while path analysis leads only to unnecessary complications (like non-identified models).

Secondly, traditional linear models analysis is superior to path analysis because many of the variables are measured not at the interval but at the nominal level. They should therefore be represented as dummy variables in a linear model when treated as independent variables, and analysed using log-linear or logistic models when treated as dependent variables. At present this is very difficult to do in path analysis, although progress is being made at the theoretical level in incorporating log-linear model approaches into path analysis (Winship and Mare, 1983).

Thirdly, path analysis typically requires that ordinal variables, such as perceived severity of penalties, be assigned arbitrary numerical values (e.g.: 1 to 3 or 1 to 5) to allow the computation of correlation coefficients. Although sometimes useful for descriptive purposes, when ordinal

variables are used as independent variables in a model such coding imposes an unwarranted constraint of linearity which is avoided by the use of dummy variables. When ordinal variables are used as dependent variables the threshold logistic model (Bock, 1975), which is described below, is much to be preferred.

Finally, as noted previously, path analysis does not allow interaction terms to be incorporated in the model. Some interactions, such as that hypothesised between perceptions of arrest certainty and penalty severity, are of fundamental theoretical importance. These interactions are best investigated through the incorporation of conventional interaction terms in a linear model.

In summary, path analysis is not considered to be the best analytical procedure for the present data, despite the fact that a causal model is depicted in Figure 2.1. As Wolfe (1980) has pointed out, the major value of path analysis is not so much the algebraic equations and their solutions but the obligation on the researcher to express and present ideas in explicit form. This is the purpose of the theoretical model described in Chapter 2 and the analytic model set out in Figure 2.1.

Linear models analysis. Path analysis is of course an application of the linear model. However, the linear models employed in this report are simpler in form, being variants of the *generalised general linear model* (Nelder and Wedderburn, 1972; Timm, 1975). The general linear model includes as special cases univariate and multivariate analysis of variance and multiple regression. Generalised linear models include dependent variables with distributions belonging to the univariate or multivariate exponential families, such as the binomial (logistic regression), the Poisson (log-linear models), and the multinomial (multivariate logistic models).

There are a number of practical consequences of the use of the linear model concept in preference to specific techniques like analysis of variance (ANOVA) or multiple regression. One consequence is that predictor variables can be represented in all models in a form which is appropriate to their levels of measurement. Thus a numerical variable such as the arrest index can be included as a numerical score in a model which also contains dummy variables corresponding to ordinal and nominal scale variables. Moreover, interactions between numerical and nominal or ordinal variables can be investigated (this is normally considered in the context of testing for parallelism in analysis of covariance, but the application of the concept is very much wider than this).

Ordinary least squares procedures were of course used when (as with the arrest index) the dependent variable was numerical. For binary response variables logistic models were employed (Cox, 1970). As noted above, the threshold model estimated by iterated reweighted least squares (Bock, 1975; Gilmour, 1984; Nelder and Wedderburn, 1972) was used for ordinal variables, such as the perceived probability of being randomly tested in the next month. In the threshold model there is assumed to be a process underlying the allocation of respondents to categories which is scalar valued and distributed continuously. There are assumed to be certain values on the continuum called *thresholds*, such that the response categories correspond to the intervals from $-\infty$ to $+\infty$ defined by the threshold values. This is a more satisfactory model for ordinal variables (such as Likert scales) than one based on ordinary least squares in which the responses are gratuitously assigned arbitrary numerical values. In fact the most appropriate scaling of the categories is a by-product of the analysis, since the threshold values are estimated from the model. Frequently an equal interval scale is not appropriate (Bock, 1975).

Following what has now become conventional usage (Fienberg, 1980), deviances from log-linear models (logistic, threshold, etc.) will be denoted by G^2 , and the Pearson goodness-of-fit statistic by X^2 . Both statistics have an asymptotic chi-square distribution under the null hypothesis.

Model building procedures. The emphasis in the RBT analysis is on the relationships between sets of variables in Figure 2.1, building up to a full model of predictors for the dependent variable(s) in question. The full model is then reduced to a *minimal adequate subset* (Aitkin, 1974, 1978) by fitting models in various orders and deleting variables which are not significant. The actual order of fit depended very much on the context; sometimes the variables which were most significant either as individual predictors or when adjusted for all other variables were given priority, but in most cases orderings suggested by Figure 2.1 were explored as well. Automatic procedures like backward elimination were not employed. Aitkin's criterion for a reduced model was used in order to guard against Type I errors. The method is a fairly conservative simultaneous testing procedure which involves the calculation of the error rate for the full model (i.e. the probability of at least one Type I error). The level of significance of individual terms was generally

set at .025, so if there were (say) 19 terms in the full model the family error rate would be $1 - .975^{19} = .38$.

The aim of the model reduction procedure is to produce a model with the minimum number of terms necessary to explain the variance in the response. A model is *adequate* if the sum of squares (or deviance) for omitted terms is not significantly large by the simultaneous test procedure, and a model is *minimal adequate* if no proper subset of it is adequate. Since the procedure is conservative, sometimes variables which are statistically significant below the .05 level have been retained in the model when they should have been omitted according to Aitkin's criterion. These variables are indicated in the text, and are not given the same weight in interpretation as the more highly significant variables.

5. RESULTS

Overview

In this chapter, data from the February and April surveys are analysed. The analysis of the April data is presented first, using Figure 2.1 as the framework and focussing on the elements of the hypothesised causal chain through which respondents are influenced to modify their pre-RBT drinking and travel practices. The research questions were set out in detail in Chapter 4. In summary, the major objective of the analysis of the April data is to verify that the correlations predicted from the simple deterrence model actually occurred. In particular, the aim is to demonstrate that motorists living in areas in which RBT was intensively enforced reported a higher than average level of exposure to RBT; to demonstrate that the higher the level of exposure to RBT (both through police activity and through publicity) the higher the subjective probability of being randomly tested and of being arrested for driving while intoxicated; and to demonstrate that subjective test and arrest probabilities were positively correlated with the number of ways in which respondents modified their drinking and travel practices.

The major findings of the analysis of the 517 drinking licence holders interviewed in April are that these correlations are all present in the data, and that the correlations survive adjustment for the influence of sociodemographic variables like age, sex and alcohol consumption. In addition, the correlations survive adjustment for peer pressure to drink. While the majority of respondents reported that since RBT it was easier to reduce alcohol consumption in a group situation, this change in perceived pressure acted as an additional predictor of modifications to drinking and travel behaviours, not as an alternative to perceptions of sanctions.

The analysis of the data from the 185 respondents who were interviewed twice provided strong support for the finding of a simple deterrent effect from the April data. In addition, however, there is evidence of a decline in the perceived probability of being randomly tested over the six weeks between interviews, although there was no decline overall in the number of attempts which respondents were making to avoid drinking and driving. The analysis of driving while intoxicated between interviews provides further support for the deterrence model, but in a surprising fashion: the perceived severity of punishments appeared to be a better predictor of such behaviour than the perceived probability of being randomly tested.

Descriptive Analysis of the April Data

Before reporting the results of the multivariate analyses which were used to explore the paths of the deterrence model, it will be useful to summarise some of the simpler features of the survey findings. In this preliminary section the main focus will be on the distributions and correlates of variables which in later analyses constitute the independent variables, and are therefore (in those sections) treated as "givens". Since all but four variables (occupation, need for a car, index of quantity and frequency of drinking, and area of residence) can be treated as numerical, ordinal or binary variables, it will be convenient to refer for descriptive purposes to the matrix of correlations (Table 5.1). As indicated in the discussion of the appropriateness of path analysis, these correlations are not suitable for a rigorous statistical analysis, since in most cases they entail the assigning of arbitrary numerical values and involve the constraint of linearity. However they do allow an overview of the major relationships between variables, and can where appropriate be supplemented by other statistics. Their usefulness can be enhanced by computing them as *pooled within area correlations*, rather than as simple correlations; in other words, computing the correlations separately within each area, and then taking a weighted average. This means that the effect of the sampling structure on the pattern of correlations is taken into account (in fact the effect of the adjustment is very slight).

Correlations in Table 5.1 which are significant at .05 (greater than or equal to .09 in absolute value) are marked with one asterisk, and those significant at .001 (greater than or equal to .14 in absolute value) are marked with two. The method of scoring in most cases exactly follows the category descriptions in Chapter 4 and the Appendix. Thus, for example, being personally tested is

scored 1 (yes) and 2 (no). The categories of AQ22 (social pressure since RBT) were reordered to make the variable ordinal (1 - easier, 2 - no difference, 3 - harder), and several dichotomies (0,1) were created from the publicity and awareness questions (TV, radio, papers, and awareness of RBT), with the high score in each case representing the presence of the attribute. Given the limited range of values of most variables, and the arbitrary method of scoring, it is not surprising that most correlations are of only slight to moderate magnitude.

Knowledge of and Exposure to RBT

In all, 385 men and 400 women were interviewed during the April survey. Of the total of 785 respondents, 185 were Sydney residents who had been interviewed previously, 200 were new Sydney residents matched with the original sample of 400, and 400 were residents of eight towns and cities throughout New South Wales (Table 4.1). There was a total of 656 licence holders of whom (as noted) 517 drank alcohol at least once a year (Table 4.2). In interpreting the various percentages quoted below, it should be recalled that the 785 respondents comprise a mixture of random samples of different sizes, rather than a single probability sample of the whole state, and that therefore the percentages may be subject to some error as estimates for the state population. Strictly speaking, each statistic should be broken down by region and reported accordingly. Adjustments for area differences are made in subsequent sections, but for present purposes such a procedure would be unnecessarily complicated and tedious (although it should be recalled that the correlations in Table 5.1 are adjusted). Nevertheless, the fact that the figures are generally averaged across samples should be kept in mind.

Awareness of RBT three months after its inception was very high. Only 41 respondents (5.2%) could not nominate *any* new methods the government was using to deal with drinking and driving (AQ1[a]), and 653 (83.2%) mentioned RBT without prompting. It is noteworthy that about one respondent in five (21.0%) mentioned the reduction in the prescribed concentration of alcohol from .08 to .05 as a new initiative, when in fact the lower level had obtained for two years. Perhaps this indicates that such laws are not even noticed by many people until enforcement becomes a real possibility.

The level of awareness of RBT in Sydney was 82.3%, about the same as the figure of 81.8% recorded six weeks earlier. However, there were some marked regional variations, with a score of 100% in Bathurst but only 58.8% in Wollongong. The high figure for Bathurst undoubtedly reflects the effects of the enormous police blitz during the Easter motorbike races, but the Wollongong figure is a little harder to explain. Wollongong is an industrial city just south of Sydney with a high proportion of non-English speaking immigrants, and possibly the media publicity was less effective there than elsewhere. It should also be noted that the level of police enforcement in Wollongong during the first part of April (and particularly over Easter) was rated by the police as "low" (Table 4.1), suggesting a direct correlation between awareness and intensity of enforcement. The correlation between the police figures for the first half of April (per thousand licence holders) and level of awareness was in fact .53. The only other significant correlate of awareness was level of education, with the more poorly educated being slightly less aware (80% compared with 88%).

In contrast to the rate at which RBT was spontaneously mentioned, when asked directly if they had seen, heard or read any publicity about RBT (AQ5), 95.2% of respondents answered in the affirmative. This discrepancy is, of course, to be expected. The first question probably under-estimates the percentage of those aware of RBT since the respondent must be able to remember, *without prompting*. On the other hand, the direct question probably yields a percentage which is too high since the respondent may feel he or she *should* have heard of the law (especially since it is important enough to run a survey about) or may confuse RBT publicity with other publicity about drinking and driving. On balance, the open-ended question is probably more useful to those wishing to know how far the new law has penetrated public consciousness. After all, if the law is to have an effect on a person's behaviour, it should be able to be recalled without difficulty. It is also worth noting that the impact of publicity can be quite ephemeral. Among the 185 Sydney residents who were reinterviewed, reported exposure to publicity actually declined from 97.3% to 91.9%, despite the quarter million dollars spent over Easter (15 respondents who said in February that they had seen or heard RBT publicity changed their response in April).

Table 5.1. Correlations Between Components of the Deterrence Model (N = 517)

<i>Personal Exposure to RBT and Exposure Through Publicity</i>									
	<i>Personally Tested</i>	<i>Often Driven Past</i>	<i>Recently Driven Past</i>	<i>Number Known</i>	<i>TV</i>	<i>Radio</i>	<i>Papers</i>	<i>Items Recalled</i>	<i>Awareness</i>
Often Driven Past	-.22**								
Recently Driven Past	-.12*	-.42**							
Number Known	-.18**	.19**	.03						
TV	.03	-.04	-.02	.08					
Radio	-.07	.08	-.06	.17**	.17**				
Papers	.05	-.01	-.06	.06	.06	.20*			
Items Recalled	-.05	-.07	-.02	.01	.57**	.16**	.20**		
Awareness	.03	.00	.00	.01	.00	.10*	.07	.02	
Frequency of Drinking Beer	-.03	.05	.00	-.05	-.03	-.04	-.05	.00	-.01
LA Beer	-.09*	-.01	.00	.08	.08	.12*	-.02	-.02	-.03
Wine	.03	-.01	-.05	.08	-.03	-.05	.02	-.02	-.02
Port	.08	.04	.07	-.11*	-.04	-.05	.02	-.02	.03
Spirits	-.01	.04	-.05	-.01	-.03	.08	.01	.00	-.02
Total Alcohol	-.06	.02	.05	.04	-.03	.01	-.06	.02	.00
Peer Pressure	-.09*	.02	.03	.09*	.05	.11*	-.02	-.03	-.03
Change in Pressure	.03	.03	.01	-.10*	-.05	.01	-.01	-.04	.05
Sex	.04	-.05	-.01	-.03	.10*	-.04	-.04	.01	.03
Education	.02	-.04	.01	-.10*	-.05	-.10*	-.02	.04	.06
Age	.06	.06	.03	.03	-.09*	-.05	-.05	-.10*	.10*
Ever Drink-drive	.16**	-.29**	-.25**	-.20**	-.02	-.10*	.07	-.05	-.01
Drink-drive Convictions	.05	-.06	-.11*	-.14**	.00	-.04	.01	.03	.02
Drink-drive Since RBT	.04	.01	-.06	-.02	-.04	-.06	-.08	-.01	-.01
Travel Modifications	-.08	.16**	.06	.20**	.05	.08	-.01	.02	-.09*
Drinking Modifications	-.12*	.12*	.10*	.20**	.13*	.04	.04	.07	.09*
Total Modifications	-.01	.05	.08	.15**	-.02	.04	.05	.00	-.04
Caught/No Penalty	-.08	.11*	.11*	.21**	.08	.06	.05	.04	.04
Perception of Penalties	-.12*	.11*	.11*	.13*	-.06	.08	-.08	-.05	.10*
Arrest Certainty	-.02	.13*	.08	.11*	.04	.06	.06	.00	.01
	-.02	.11*	.08	.21**	.05	.12*	.04	.01	.11*

Drinking Behaviour

	<i>Frequency of Drinking</i>	<i>Beer</i>	<i>LA Beer</i>	<i>Wine</i>	<i>Port</i>	<i>Spirits</i>	<i>Total Alcohol</i>	<i>Peer Pressure</i>	<i>Change in Pressure</i>
Beer	-.14**								
LA	-.03	-.13*							
Wine	.19**	-.30**	-.16**						
Port	-.03	-.04	-.05	.04					
Spirits	.07	-.15**	-.09*	-.11*	.04				
Total Alcohol	-.07	.88**	.02	-.07	.12*	.16**			
Peer Pressure	.25**	-.38**	-.04	.10*	.00	-.01	-.39**		
Change in Pressure	-.10*	.13*	.02	-.06	-.02	.07	.15**	-.16**	
Sex	.24**	-.40**	-.21**	.40*	.00	.05	-.33**	.25**	-.05
Education	.04	-.17**	.03	.15**	.14**	.02	-.10*	.08	-.08

Table 5.1 (continued)

	<i>Drinking Behaviour</i>								
	<i>Frequency of Drinking</i>	<i>Beer</i>	<i>LA Beer</i>	<i>Wine</i>	<i>Port</i>	<i>Spirits</i>	<i>Total Alcohol</i>	<i>Peer Pressure</i>	<i>Change in Pressure</i>
Age	-.21*	-.14**	.00	-.05	-.02	-.12*	-.22**	.13*	.08
Ever Drink-drive	.14*	-.24**	-.05	.05	.01	.02	-.24**	.24**	-.02
Drink-drive Convictions	.11*	-.33**	.04	.09*	.05	.04	-.29**	.21**	-.03
Drink-drive Since RBT	-.11*	.28**	.08	-.03	.04	.01	.32**	-.24**	.05
Travel Modifications	-.13*	.24**	-.02	-.01	-.03	.04	.26**	-.25**	-.08
Drinking Modifications	-.17*	.04	.02	.03	.08	.05	.09*	-.21**	-.06
Total Modifications	-.19**	.18**	-.01	.02	.03	.06	.22**	-.29**	-.09*
Caught/No Penalty	-.02	.09*	.00	.03	.04	-.02	.10*	-.07	.01
Perception of Penalties	-.02	-.01	.01	.05	-.01	-.03	-.01	-.04	.01
Arrest Certainty	-.09*	.03	.03	.04	-.02	-.03	.04	-.03	.14**

	<i>Personal Characteristics/Past Drink-drive Behaviour</i>					
	<i>Sex</i>	<i>Education</i>	<i>Age</i>	<i>Ever Drink-drive</i>	<i>Drink-drive Convictions</i>	<i>Drink-drive Since RBT</i>
Education	.10*					
Age	-.08	-.18**				
Ever drink-drive	.32**	.01	.12*			
Drink-drive Convictions	.21**	.07	.01	.20**		
Drink-drive Since RBT	-.19**	.09*	-.22**	-.38**	-.12*	
Travel Modifications	-.15**	.00	-.18**	-.18**	-.16**	.20**
Drinking Modifications	-.10*	.05	-.13*	-.24**	-.05	.09*
Total Modifications	-.15**	.03	-.19**	-.25**	-.13*	.18**
Caught/No Penalty	-.13*	.03	-.13*	-.10*	-.10*	.09*
Perception of Penalties	-.02	.02	-.06	.01	.00	-.01
Arrest Certainty	-.04	-.08	-.02	-.01	.02	.03

	<i>Modifications to Behaviour Due to RBT/Perceptions of Sanctions</i>				
	<i>Travel Modifications</i>	<i>Drinking Modifications</i>	<i>Total Modifications</i>	<i>Caught No Penalty</i>	<i>Perception of Penalties</i>
Drinking Modifications	.32**				
Total Modifications	.84**	.78**			
Caught/No Penalty	.08	.12*	.11*		
Perception of Penalty	.10*	.07	.10*	.12*	
Arrest Certainty	.13*	.11*	.14**	.24**	.20**

**p* < .05. ** *p* < .001

As would be expected, TV reached the widest audience at slightly more than two out of three (68.3%), followed by newspapers with a penetration of 44.4% and radio with 19.9%. When asked what they recalled, respondents mostly mentioned either features of the television advertisements, such as the police road block, the jingle and the man being arrested, or they answered in terms of a generalised message about the risks involved in drinking and driving (e.g.: "don't take the risk", "drink and drive and you are gone"). Stiff penalties and the role of alcohol in causing accidents were mentioned by a few (7.2% and 8.5% respectively). The power of television in communicating a message is illustrated by the contrast between the mean numbers of items recalled by those exposed and those not exposed to TV advertising: 1.4 compared with 0.4 ($r = .57$). There were, as expected, variations between regions, but perhaps surprisingly Sydney recorded the lowest rates of exposure for all three media. The "working class" cities of Newcastle and Wollongong recorded quite high levels, suggesting that the low rate of awareness in Wollongong was more a matter of relative police inactivity over Easter than a deficiency in publicity.

It can be seen from Table 5.1 that exposure to publicity (particularly on the radio) was correlated with knowing people who had been tested. In addition, listening to the radio was associated with alcohol consumption (particularly the consumption of beer), with being a young man and with having high perceptions of the chances of arrest. It seems that through radio more than through the other media the message may have effectively reached a group of young but heavy drinkers. However, with the possible exception of TV, the correlations between exposure to publicity and changes to travel and drinking arrangements were quite modest.

Turning from awareness of publicity to personal exposure, 13.9% of the population claimed to have been either randomly tested or a passenger in the car when the driver was tested. In the first survey the figure was 9.5% for Sydney, which as we saw in Chapter 4 is consistent with the official police figures for the period. Surprisingly, the figures for Sydney in April were no higher than in February. For the repeat sample of 185 drinking licence holders the figure was exactly the same, at 11.4%, while for the new Sydney sample the figure actually declined from 9.5% to 9.0%. As we saw in Chapter 4, to some extent these anomalies can be explained by the unreliability of the item. If in the repeat sample those who gave an affirmative answer in February but a negative answer in April are counted as having been tested, then the exposure rate for April increases from 11.4% to 17.3%. In any case, there seems no doubt that a higher percentage of the population in areas outside Sydney had had direct exposure to RBT, with Bathurst heading the list at 40.0%.

Nearly half the April sample had driven past police carrying out random testing, and of these 12.0% had driven past only a few days ago (Table 5.2). Conversely, a substantial proportion had not seen an RBT operation for a month or more. An even higher proportion knew someone who had been tested, at 58.5%, and nearly one in six (15.9%) claimed to know four or more people who had been tested. One in five (20.3%) knew one person who had been tested.

Not surprisingly, the several measures of exposure were moderately correlated with each other. The strongest correlation was between recency and frequency of driving past ($r = -.42$), with those who had most recently driven past also being those who had driven past most frequently. Young people tended to be exposed to RBT more, probably because they generally drive more, particularly at high risk times (Homel, 1983c). Exposure was weakly correlated with awareness of publicity, but rather more strongly with perceptions of sanctions. In particular, the more people the respondent knew who had been randomly tested, the higher the perceived certainty of arrest for drinking and driving ($r = .21$). Consistent with this, those exposed to RBT were more likely to modify their travel and drinking behaviours, although they were also more likely to report drinking and driving since the introduction of RBT. This is partly because certain groups, such as young men, are at greater risk of drink-driving because of their lifestyle and the amount of driving they do, and therefore have more scope for modifying their usual practices. This issue is probed in more detail in subsequent sections.

Drinking, Driving and Drink-driving

Some fairly clear drinking patterns emerged from the data. Of respondents classified as drinking licence holders, about one in five (20.5%) drank once a day, and slightly more than a third (34.6%) drank once or twice a week. Only 2.3% admitted to drinking more often than once a day, while more than a quarter (26.9%) claimed to drink no more often than two or three times a month.

Table 5.2. Driving Past Police Carrying out RBT: Recency and Frequency

<i>Recency-frequency</i>	<i>Number</i>	<i>Percentage of Total</i>	<i>Percentage of Those Driven Past</i>
Not driven past at all	402	51.2	
1-3 times, the last time a few days ago	22	2.8	5.7
4 or more times, the last time a few days ago	24	3.1	6.3
Once only, a week or fortnight ago	26	3.3	6.8
2-3 times, a week or fortnight ago	49	6.2	12.8
4 or more times, a week or fortnight ago	43	5.5	11.2
Once only, a month or two ago	73	9.3	19.1
2-3 times, a month or two ago	64	8.2	16.7
4 or more times, a month ago or longer	24	3.1	6.3
1-3 times, but 3 months or more ago	58	7.4	15.1
Total interviewed in April	785	100.0	100.0

By far the most frequently consumed beverage was beer, with a mean of 2.36 standard drinks on a drinking day (Table 5.3). Total standard drinks consumed on a drinking day averaged out at just on four, which given the literature on self-reported alcohol consumption reviewed in Chapter 3 we can safely assume is an under-estimate. As with the frequency of drinking, amounts consumed had a skewed distribution. For example, although one respondent claimed to drink 36 middies on a drinking day, more than half of all respondents stated that they drank no beer at all. The skewed nature of the distribution of stated consumption is clearly reflected in the quantity-frequency index (Table 5.3), in terms of which only 9.5% of the sample are heavy drinkers, but 54.2% are occasional, frequent-light or infrequent-light.

Table 5.3. Quantities and Frequencies of Alcohol Consumption

<i>Quantity-frequency</i>		<i>Amounts Consumed on a Drinking Day</i>				
<i>Category</i>	<i>% (N=517)</i>	<i>Beverage</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>Median</i>	<i>Maximum</i>
Occasional	6.8	Beer	2.36	3.96	0.00	36
Frequent-light	39.4	LA Beer	0.25	0.95	0.00	12
Infrequent-light	18.0	Wine	0.82	1.22	0.00	6
Medium	26.3	Port	0.09	0.51	0.00	6
Heavy	9.5	Spirits	0.48	1.39	0.00	15
ALL drinking licence holders	100.0	ALL Beverages	4.01	3.68	3.00	36

From Table 5.1 marked differences in drinking patterns according to age, sex and type of beverage are evident. Wine drinkers tend to imbibe occasionally, beer drinkers heavily and

frequently. Heavy but less frequent drinking (especially beer drinking) is characteristic of young men; older men drink more often, but in smaller quantities. Women drink less frequently than men, and consume smaller quantities of beer but more wine and (to some extent) more spirits. The more highly educated drink more wine and port, but less beer and less alcohol overall. Among occupational groups, the heaviest consumption levels were reported by semi-skilled and unskilled blue collar workers (7.16 standard drinks - mainly beer - on a drinking day) and by the unemployed (8.36). Housewives and pensioners reported the lowest levels of consumption (3.13 and 3.62 respectively).

Quantities and frequencies of beer consumption, but not of wine consumption, were associated with group pressure to drink (Table 5.1). Nearly a quarter (22.5%) of those classified as heavy drinkers on the quantity-frequency index said they find it "extremely hard" to drink less than their friends in a group situation, compared with only 2.8% of lighter drinkers. Overall, more than one drinking licence holder in four (26.3%) claimed to find it at least "quite hard" to resist the blandishments of alcohol when in a group situation (AQ21), and a substantial minority of these people said that RBT had made it even *harder*, not easier (perhaps this involves a fear of being called "chicken"?). Those who felt subject to the most pressure tended to be young, male, and less well educated, and to be unemployed, blue collar workers or students. The correlation between group pressure and perceptions of change in pressure since the introduction of RBT was -.16, but when analysed as nominal variables rather than as numerical scores the correlation was .29 (Cramer's V). The marginal and bivariate distributions of responses to these two questions are set out in Table 5.4.

Table 5.4. The Relationship Between Group Pressure to Drink and Perceived Changes in Such Pressure Since RBT

Change in Pressure (AQ22)	Group Pressure (AQ21)							N	%
	Extremely Hard	Very Hard	Quite Hard	Quite Easy	Very Easy	Extremely Easy			
	%	%	%	%	%	%			
Easier	29.2	26.5	38.1	47.2	43.2	33.7	207	40.0	
No difference	37.5	44.9	39.7	50.3	55.7	64.3	266	51.5	
Harder	33.3	28.6	22.2	2.6	1.1	2.0	44	8.5	
ALL	N	24	49	63	195	88	98	517	
	%	4.6	9.5	12.2	37.7	17.0	19.0		100.0

Both perceived pressure to drink and personal levels of consumption were correlated with drinking-driving behaviour, as indicated by having ever driven with too much to drink, by having driven with too much to drink since RBT, and by drink-drive convictions. Nearly half (49.9%) of all drinking licence holders reported drink-driving at some time in the past, and 7.4% reported a conviction for drink-driving. The frequency of drink-driving since RBT is set out in Table 5.5.

It is clear from Table 5.5 that drink-driving is far from rare behaviour. In fact the preamble to AQ19, which mentioned the figure of a quarter of a million convictions for drink-driving in New South Wales, is pretty accurate in view of the recorded conviction rate of 7.4%, and the likely underreporting rate of about 35% (Locander, Sudman and Bradburn, 1976). Of more immediate importance, however, is the fact that *more than one person in five in the population at risk admitted to driving over the legal limit in the three months since the introduction of RBT*. Nearly one in ten did it several times. Since this drinking and driving took place at a time when perceptions of the

Table 5.5. Frequency of drink-driving Since RBT

<i>Frequency</i>	<i>%</i>
Not at all	78.9
Over .05, not over personal limit	7.7
Once over personal limit	4.3
Two or more times over personal limit	9.1
ALL drinking licence holders	517

chances of arrest were probably as high as they are ever likely to be, it seems reasonable to conclude that whatever the deterrent impact of RBT, no form of police enforcement of drink-drive law will even get close to eradicating drinking and driving, at least not in Australia. This might seem like a banal observation, but it needs to be emphasised since the apparent success of RBT which is documented in later sections might lead some to conclude that drinking and driving is no longer a problem in New South Wales.

It should come as no surprise that heavy drinkers were more at risk. Nearly half (44.9%) of the heavy drinkers (9.5% of the sample) admitted to drinking and driving since the introduction of RBT, and 22.5% claimed to have driven while impaired at least twice. The correlation between alcohol consumption on a drinking day and the frequency of drink-driving since RBT was .32, a relatively high figure. Total alcohol consumption was correlated with having a conviction for drinking and driving ($r = -.29$), and those with a previous conviction were in turn twice as likely to have driven whilst impaired as those without a previous conviction (39.5% compared with 19.6%). Similarly, those most conscious of social pressure were more likely to have driven while impaired and to have a conviction.

As indicated in Chapter 1, drinking and driving tends to be male behaviour, and this fact is clearly reflected in the survey responses ($r = .32$ for having ever driven while impaired and $-.19$ for having driven while impaired since RBT). Moreover, the survey data suggest that it is a practice more common among young people, particularly those aged 21 to 24, although as also noted in Chapter 1 this pattern is not as evident from available roadside survey data (Homel, 1983c). The rate of self-reported drinking and driving in this age group was 41.2%, twice as high as the average of 21.1%. These correlations parallel those for peer pressure and for alcohol consumption. Drinking and driving was also more commonly reported by blue collar workers and the unemployed, which once again is consistent with the drinking and social pressure correlations. Contrary to the earlier pattern there was a trend for the more highly educated to report *more* drink-driving since RBT ($r = .09$), but this probably reflects the relative youthfulness of the better educated.

Unfortunately it was not possible to explore aspects of vehicle usage in the same detail that drinking patterns could be explored. It would have been very useful, for example, to have developed a measure for each individual of amount of time spent driving. However, one question (AQ31) did ask about the respondent's need for a vehicle. Only one in forty (2.5%) of the 517 drinking licence holders said they didn't need to drive; a third (33.5%) said a vehicle was absolutely essential for their job, 8.7% claimed that the absence of alternative forms of transport made their own vehicle essential, but more than half (55.3%) implied that they could survive from day to day without a car or other motor vehicle. The great majority (80.9%) of those needing a vehicle for work were men. Blue collar workers and the young were also more likely to see a vehicle as essential for job purposes, while the elderly were more likely to see the lack of practical alternatives as a problem. Consistent with this pattern, the "essential for job" group consumed more beer than average and were twice as likely as other groups to have a conviction for drinking and driving. However there was no correlation between need for a vehicle and the incidence of drinking and driving since RBT, nor was there any correlation between need for a vehicle and peer pressure

to drink.

In summary, the various indices of drinking, peer pressure to drink and drink-drive behaviour were all quite strongly correlated, in predictable ways. Group pressure seemed to be especially critical for heavy drinkers as a factor encouraging drinking and driving, and contrary to what might have been expected the introduction of RBT made it *harder* for many of these people to reduce their alcohol consumption in a group situation (at least that's what they claimed). Young men in blue collar occupations, particularly those aged 21 to 24, appear to be high risk for drinking and driving. The respondent's need for a vehicle did not seem in itself to be a very useful predictor of such behaviour.

On the face of it, these statistics tend to implicate the young, beer drinking "ocker" male as the villain of the piece.* There is, as noted above, an element of the predictable about many of the correlations. Perhaps what is less predictable is the association between this cluster of variables and modifications to behaviour as a response to RBT. Frequency of drink-driving since RBT was in fact *positively* correlated with the number of steps being taken to avoid drinking and driving, especially through modifications to travelling arrangements ($r = .20$). Similarly, modifications to behaviour were more commonly made by the young ($r = -.19$), by men ($r = -.15$), by heavy drinkers ($r = .22$) and by those most conscious of group pressure ($r = -.29$). This suggests that although still drinking and driving more than others, these groups responded to RBT in quite a positive fashion. Clearly it would be useful, in evaluating the extent to which an individual has driven while impaired since the introduction of RBT, to take account of his or her frequency of drinking and driving *prior* to the new law. Unfortunately this information is not directly available in the present study, although it may be inferred from responses to other questions.

The interpretation of a deterrent impact of RBT is supported by the positive correlations between levels of exposure and perceptions of the chances of arrest, and the positive correlations between perceptions of sanctions and the numbers of modifications to travel and drinking habits. The evidence for such a deterrent effect is examined more rigorously in the following sections.

The Effects of Police Testing: An Area Level Analysis

Much of the deterrence literature is based on an analysis of correlations between variables at the aggregate level. One good reason for beginning the formal analysis of the present data in this manner is the central importance of the objective probability of arrest or imprisonment in the deterrence model. This variable is operationalised in the present study as the number of random tests conducted by police in the period between the introduction of RBT and the completion of the survey interviews (April 16, 1983). In Figure 2.1, the level of police enforcement of RBT is proposed as being one of the major influences on an individual's chances of being exposed to RBT, and hence of his or her perceptions of sanctions and resulting changes in behaviour. Since the only way levels of enforcement can be conceptualised and measured is as an aggregate phenomenon, an area level analysis is clearly essential, at least to the extent that police enforcement itself is the object of analysis.

One of the many advantages of using the offence of drinking and driving as a vehicle for studying deterrence is that the intensity of police enforcement in an area can be reliably quantified through the RBT statistics. Of course there is a lot more to police enforcement than the simple number of tests conducted; time of day, location, duration of testing at a site, type of unit (bus or highway patrol) and a number of other factors are all aspects of police activity which could affect the amount of deterrence achieved. However, the number of tests conducted has the great advantage that it was a statistic which was readily available for the areas sampled. Indeed as was pointed out in the last chapter, in order to ensure a spread in intensities of enforcement the eight towns and cities were selected largely on the basis of the numbers of tests conducted over Easter, and these figures (in preliminary form) were available the day after Easter. In any case, the number

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of tests is arguably the best summary measure of the level of enforcement. (An analysis of regional variations in some of the other aspects of police operations is presented by Cashmore and Vignes, 1984b).

In order for the number of police tests to be a meaningful measure of enforcement, it is necessary to relate it to the population at risk. The only practical way of estimating the size of this population in an area is to use the number of resident licence holders. There are a number of unavoidable defects in this procedure: drivers tested may not be residents of the area, not all licensed drivers drive, and some drivers are not licensed. Moreover, police divisions and districts in New South Wales do not conform to census or postcode boundaries, which means that since the statistics on licence holders are available only for postcodes, estimates of licence holders in police divisions are somewhat rough. The figures used to calculate random tests per 1000 licence holders in each area are set out in Table 5.6.

Table 5.6. Random Tests and Licence Holders in Police Divisions Sampled

Town or City	Divisional Head Station	Number of Licence Holders (Approximate)	Number of Random Tests Dec. 17-April 16	Random Tests per 1000 Licence Holders
Sydney	N/A	1,740,000	147,427	85
Newcastle	Newcastle, Belmont, Wallsend	117,700	18,486	165
Wollongong	Warilla, Wollongong	89,500	14,755	165
Bathurst	Bathurst	27,700	5,377	194
Lismore	Lismore	47,200	1,431	30
Goulburn	Goulburn	35,400	3,289	93
Wagga Wagga	Wagga Wagga	37,000	3,168	86
Tamworth	Tamworth	41,300	3,938	95
Dubbo	Dubbo	31,900	2,305	72

It is convenient to construct three measures of the extent to which a population has been exposed to RBT: the percentage tested, the percentage who have driven past an RBT operation, and the average number of people known to have been tested. Perceptions of arrest certainty can be measured by the mean score on the arrest index, and also by the mean score on AQ9, the perceived likelihood of being randomly tested in the next month (to conform with the direction of scoring of the arrest index, the codes for the five responses to this question have been reversed so that a high mean score indicates a high perceived chance of being tested). Similarly, behavioural responses to RBT can be measured by the mean numbers of changes to travel and drinking behaviours, and by the percentage admitting to driving over .05 since RBT. Given their potential importance as mediating variables, several measures of drinking behaviour are also included: the mean number of standard drinks consumed on a drinking day in the area, the percentage of abstainers, the percentage of heavy or moderate drinkers, the percentage who find it hard or very hard to resist group pressure and the percentage who have found it harder since RBT to resist such pressure. These data for all areas are set out in Table 5.7.

There is a fair degree of agreement between the official number of tests per 1000 licence holders and the percentage of respondents who reported being tested. Lismore attracted the lowest rate of enforcement and also recorded the lowest percentage tested, while Bathurst, which was heavily blitzed over the Easter period, recorded by far the highest percentage tested. In fact the correlation between the two sets of figures is .79 (see Table 5.8), a comforting confirmation that two types of data which *ought* to agree actually *can* agree, even when one source is the much maligned sample survey (or much maligned police statistics, for that matter). There are several reasons why the correlation is not higher. Firstly, the survey figures pertain to the percentage tested

to drink.

In summary, the various indices of drinking, peer pressure to drink and drink-drive behaviour were all quite strongly correlated, in predictable ways. Group pressure seemed to be especially critical for heavy drinkers as a factor encouraging drinking and driving, and contrary to what might have been expected the introduction of RBT made it *harder* for many of these people to reduce their alcohol consumption in a group situation (at least that's what they claimed). Young men in blue collar occupations, particularly those aged 21 to 24, appear to be high risk for drinking and driving. The respondent's need for a vehicle did not seem in itself to be a very useful predictor of such behaviour.

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Table 5.7. Scores for Components of the Deterrence Model Averaged for each Town or City

Town or City	Tests/1000 Licence Holders	% Tested Randomly	% Driven Past RBT	Mean Number Known	Mean Arrest Score	Mean Chances in Next Month	Mean Alcohol Consumed
Sydney	85	11.2	57.6	1.23	1.61	1.57	3.37
Newcastle	165	20.8	75.0	1.38	0.67	1.39	3.84
Wollongong	165	20.7	62.1	1.86	1.79	2.17	3.23
Bathurst	194	42.9	34.3	2.51	2.94	2.00	3.13
Lismore	30	7.1	46.4	1.68	2.11	2.18	1.73
Goulburn	93	24.1	44.8	2.28	2.00	2.90	2.72
Wagga Wagga	86	16.0	40.0	1.72	2.56	2.39	3.14
Tamworth	95	15.2	42.4	2.27	1.73	2.42	2.64
Dubbo	72	18.4	52.6	1.89	2.66	2.08	3.30

Town or City	% Abstainers	% Heavy/Moderate Drinkers	% Very or Ext. Hard to Resist	% Harder Since RBT	Mean Mods. to Travel	Mean Mods. to Drinking	% Driving Over .05
Sydney	15.9	30.2	12.7	5.1	0.63	0.68	21.0
Newcastle	22.6	29.0	29.2	20.8	0.00	0.08	33.3
Wollongong	27.5	40.0	27.6	41.4	0.55	0.86	37.9
Bathurst	22.2	24.4	17.1	11.4	1.00	0.66	20.0
Lismore	31.7	17.1	7.1	3.6	0.54	0.68	7.1
Goulburn	32.6	18.6	13.8	3.5	0.31	0.48	17.2
Wagga Wagga	32.4	18.9	12.0	4.0	0.52	0.64	16.0
Tamworth	26.7	22.2	12.1	12.1	0.48	0.51	12.1
Dubbo	17.4	39.1	10.5	5.3	0.53	0.66	26.3

or in the car when the driver was tested, and should therefore be somewhat higher than the official police rates. This is so for every area, although in the case of Bathurst the discrepancy is marked. Secondly, the official rate for an area will be a little high, since it includes people tested more than once. Thirdly, the official police rate of testing takes no account of differential rates of exposure due to different driving patterns, which are reflected in the survey figures. Finally, there is an approximate 15% error either way in the survey percentages, due to sampling error (sample sizes in areas outside Sydney were small).

Another noteworthy feature of Table 5.7 is the high rate of drinking and driving in Newcastle and Wollongong, both of which areas were characterised by high rates of alcohol consumption and heavy pressure to drink. In Newcastle no one reported making changes to their travel arrangements as a result of RBT, and very few modified their drinking behaviours. On the other hand, Lismore (on the north coast of New South Wales) recorded low levels of drinking and driving, low levels of consumption of alcohol, and little pressure to drink. The association between levels of drinking, peer pressure and the extent of driving over .05 is confirmed by the correlations in Table 5.8. In Table 5.8, correlations significant at the 5% level are marked with an asterisk. Since only nine areas were sampled statistical tests are not powerful, but they are useful for indicating associations which are particularly strong.

The strong association between the number of official tests and the proportion tested in the survey does not extend to the other measures of exposure (the correlations are .22 and .26). However, an examination of the scatterplot of the percentage driven past by official testing rate

Table 5.8. Correlations Between Components of the Deterrence Model, Computed at the Area Level

	<i>Tests/1000 Licence Holders</i>	<i>% Tested Randomly</i>	<i>% Driven Past RBT</i>	<i>Mean Number Known</i>	<i>Mean Arrest Score</i>	<i>Mean Chances in Next Month</i>	<i>Mean Alcohol Consumed</i>
% Tested Randomly	.79*						
% Driven Past RBT	.22	-.29					
Mean Number Known	.26	.66*	-.71*				
Mean Arrest Score	-.14	.37	-.81*	.57			
Chances Next Month	-.30	-.11	-.67*	.52	.60		
Mean Alcohol Consumed	.62	.34	.54	-.30	-.30	-.55	
% Abstainers	-.22	-.12	-.36	.30	.09	.53	-.59
% Heavy/Moderate	.35	.08	.58	-.23	-.12	-.23	.60
% Very Hard to Resist	.82*	.36	.69*	-.16	-.57	-.46	.65
% Harder Since RBT	.66*	.19	.53	-.03	-.38	-.05	.36
Mean Mods. to Travel	.11	.40	-.67*	.43	.78*	.39	-.22
Mean Mods. to Drinking	-.19	-.06	-.42	.18	.64	.56	-.34
% Driving Over .05	.66*	.27	.73*	-.25	-.36	-.44	.79*

	<i>% Abstainers</i>	<i>% Heavy/ Moderate Drinkers</i>	<i>% Very or Ext. Hard to Resist</i>	<i>% Harder Since RBT</i>	<i>Mean Mods to Travel</i>	<i>Mean Mods to Drinking</i>
% Heavy/Moderate	-.66*					
% Very/Ext. Hard	-.12	.48				
% Harder Since RBT	-.02	.60	.84*			
Mean Mods. to Travel	-.19	.02	-.37	-.12		
Mean Mods. to Drinking	.04	.23	-.35	.10	.75*	
% Driving Over .05	-.40	.83*	.86*	.77*	-.26	-.10

* $p < .05$.

reveals Bathurst as an outlier, with a high rate of testing but with a low percentage of motorists having driven past. Presumably the explanation for this is that testing was so intense in Bathurst that a very high proportion of passing motorists were pulled over. In any case, if Bathurst is omitted the correlation rises to .72. The low correlation with the number of people known to have been tested is probably due to the fact that this latter quantity is affected by many variables in addition to the actual level of enforcement in an area.

It is possible to carry out a more rigorous analysis of the relationships between police activity and aspects of exposure. Regressing the proportion tested against test rate using a logistic model (since the dependent variable is a proportion), the relationship is highly significant ($G^2(1) = 6.59$, $p = .010$). An increase of 100 tests per 1000 licence holders corresponds to a threefold increase in the odds of being tested.

How often people have driven past an RBT operation is a variable (not explicitly represented in Table 5.8) which may be analysed at the individual level as a numerical response, and regressed against the rate of testing in an individual's area of residence. That is, as indicated in Chapter 2, each individual is assigned the rate of testing which applies in his or her area of residence, and this is used as a predictor of how often he or she has been tested. The sample of 517 drinking licence holders was used rather than the full sample of 785, since other components of the deterrence

model apply only to drinking licence holders. Consistent with the low correlation in Table 5.8, the relationship was not significant ($p = .60$), although if Bathurst is omitted the relationship once again becomes significant ($t(480) = 2.31, p = .02, r^2 = 1.1\%$), with an increase of 100 in the rate of testing corresponding to an increase of .5 in how often people have driven past. Assigning an appropriate numerical value to the categories of AQ3(b), the same method of analysis can be used to show that (not surprisingly) there was no significant relationship between police testing and how *recently* people had driven past an RBT operation ($p = .21$). The number of people known to have been tested can also be treated as a numerical response, but in contrast to the correlation based on the mean values for each area the relationship was significant ($t(515) = 2.95, p = .004, r^2 = 1.7\%$). An increase of 100 in the testing rate corresponded in the model to an increase of .5 in the number known to have been tested.

It is fair to conclude that there is a strong association between the official intensity of enforcement in an area and the extent of exposure of the target population to RBT. This is hardly a surprising conclusion. However it is necessary to verify the existence of this relationship if exposure is to be an element in a causal chain linking official police activity with perceptions of sanctions and drink-drive behaviour. In the analyses reported in later sections, which are all based on individual responses rather than on average scores for areas, the measures of exposure act essentially as "proxies" for the intensity of police enforcement in the area, in the sense that the effects of enforcement on perceptions and behaviour are assumed to take place through an individual's personal exposure to RBT. (The possibility of a direct link between enforcement levels and perceptions of arrest certainty is explored in the next section.)

In addition to being correlated with the exposure measures, official police testing is correlated with alcohol consumption (.62), with social pressure to drink (.82 and .66) and with driving over .05 (.66). It is not directly correlated, at the area level, with perceptions of arrest likelihood or modifications to drinking or travel behaviours. On the face of it, the positive correlation with the proportion driving over .05 is paradoxical. Is police testing actually encouraging drinking and driving? A much more plausible explanation is that police are concentrating their efforts in areas with a reputation for heavy drinking, and that these areas are characterised by high rates of drinking and driving. This explanation is fully supported by the correlations. The partial correlation between police testing rate and the incidence of driving over .05, controlling for mean alcohol consumption, is only .35. Controlling for social pressure to drink (the proportion who find it extremely or very hard to resist pressure) the effect is even more pronounced, with a partial correlation of -.15.

It is possible from Table 5.8 to follow the causal chain implied by the deterrence model. The correlations associated with each link in the chain are set out in Figure 5.1. By and large, these correlations are consistent with what would be expected if deterrence were actually occurring, and this fact could be discerned from ecological correlations. For example, the rate of police testing correlates well with the proportion tested in an area. This in turn correlates moderately well with the average perceived chances of arrest, which in turn correlates strongly with the mean number of attempts being made to avoid drinking and driving. The more people report drinking and driving, the lower are the mean scores for arrest certainty, consistent with the hypothesised experiential effect.

However, the correlation between rate of police testing and the proportion of people who have driven past an RBT operation is not in the predicted direction (-.81). To reconcile this correlation with deterrence theory, we could argue that simply driving past police is actually counterproductive from a deterrence point of view, since motorists are encouraged to believe that their chances of being pulled over are small. Unfortunately for this explanation, the correlation between these two variables when calculated at the individual level is nothing like -.81. As can be seen from Table 5.1, the correlation between arrest certainty and the number of times people have driven past RBT is moderate and positive, at .11. The exact analogue of the ecological correlation involves the correlation of arrest certainty with the binary variable, "driven past RBT or not". This correlation is a little lower, at .08, but still positive, as would be predicted by commonsense.

The fact that ecological and individual level correlations can be discrepant is well known. There are thus two basic problems in deterrence research generally and in Table 5.8 in particular: correlation does not necessarily imply causation, but, more than that, ecological correlations bear no necessary relationship to correlations between the same variables calculated at the individual level. The crucial questions then become: what is the theoretically appropriate unit of analysis, and given a resolution of this problem, how do we go from correlation to causation?

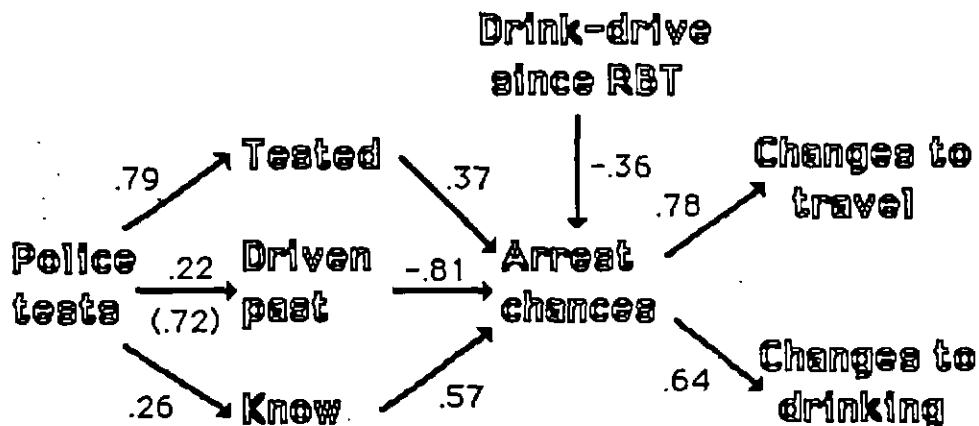


Figure 5.1. Ecological Correlations Associated With Each Link in the Simple Deterrence Model

Gibbs (1979) and a number of other deterrence theorists (e.g.: Grasmick, 1981) insist on an aggregate level analysis because only at the level of jurisdictions does it make sense to talk about the objective properties of legal sanctions. This point is conceded. It does *not* follow, however, that all the links in the deterrence model should therefore be traced at the aggregate level. Deterrence is in essence a psychological process; it is the sum of individual responses which constitutes the deterrent impact of a law in a jurisdiction (although of course individual responses take place within a sociological framework). In Figure 2.1, *individual exposure* to RBT is the crucial factor linking official rates of enforcement with perceptions and behaviours. Provided measures of exposure are included in the analysis, and provided it can be shown that exposure is related to official levels of enforcement, it seems to the present author that analysis at the aggregate level has little value.

In summary, the main use of Table 5.8 is in helping to establish the link between police testing and exposure to RBT, and in showing that the level of police activity may well be strongly influenced by the drinking patterns in an area. Readers who wish to draw stronger conclusions from Table 5.8 and Figure 5.1 are welcome to do so (although the small sample sizes in areas outside Sydney should be kept in mind). The further problem of establishing causal connections between elements of the deterrence model is dealt with, as far as is possible, in subsequent sections.

The Relationship Between Exposure to RBT and Perceptions of the Chances of Being Randomly Tested and Arrested for Drinking and Driving

Having established a link between police testing and exposure to RBT, the next question is whether exposure has any influence on perceptions of the chances of being tested, or of being arrested for drinking and driving. This is a crucial question, since deterrence is a psychological process in which calculations of arrest chances play a central role. If exposure to RBT cannot be demonstrated to have had some influence on perceptions of arrest certainty, it is difficult to see how the deterrence model could be valid, even if a link between police testing and changes in behaviour could be established. Of course there is a problem of method, as well: it may be that if perceptual measures do not play an effective mediating role that the measures are defective in some way. This is a real possibility, since as indicated in Chapters 2 and 3 a brief interview at home on a Saturday afternoon may not throw much light on perceptions and evaluations in a real life situation. Moreover, it should be remembered that the arrest index had relatively low reliability.

A further question is the role of publicity in forming perceptions of arrest certainty. Is publicity as important as personal exposure to RBT? Are the two sets of variables strongly correlated, making it difficult to determine their net effects on perceptions and evaluations of police enforcement?

The Effects of Exposure to Police Enforcement of RBT

For purposes of the present analysis, we will focus on the arrest index as well as on responses to AQ9 (the perceived chances of being randomly tested in the next month). The effects of publicity will be considered below. The perceived chance of being tested in the next month, which is one element of the more general index, is of special interest, for two reasons. Firstly, this question was asked in both surveys, and therefore it can be used to examine changes over time (this is done later in this chapter). Secondly, it is the express aim of the architects of RBT to convince all motorists that their chances of being tested at any time are high, and AQ9 was addressed specifically to this issue. In fact more people thought the chances were low rather than high: nearly one in three (32.1%) said "quite unlikely" or "extremely unlikely", but fewer than a quarter (22.4%) thought they were "extremely likely" or "quite likely" to be tested. This moderate skew in the distribution is not clearly reflected in the complete index, which was close to being symmetrically distributed about a median score of 2 (minimum -4, maximum 8, mean 1.85, and standard deviation 1.88).

All three measures of exposure were significantly correlated (using a threshold model) with the perceived chances of being tested in the next month (the threshold estimates suggest that in this case the assignment of evenly spaced numerical values would not be very wide of the mark). Being personally tested ($G^2(1) = 4.78; p = .029$) doubled the odds of an "extremely likely to be tested" response (12.7% compared with 6.1%). Recency and frequency of driving past was even more significant ($G^2(9) = 21.4; p = .011$), with those who had driven past four or more times, most recently a few days or a week or two ago, being much more likely to record high subjective probabilities (more than half the motorists in these categories gave ratings of "extremely" or "quite likely", compared with fewer than a quarter of motorists in other categories). Conversely, those who had last driven past more than a month ago, or who had not driven past at all, generally had lower estimations of the chances of being tested. However, these figures are not presented in more detail since further analysis, reported below, suggests that neither factor is the critical element in forming perceptions.

By far the strongest association was with the number of people known to have been tested ($G^2(4) = 50.9; p = .000$). There was a clear trend for subjective probabilities to increase with the number known, so that, for example, 15.5% of those who knew four or more tested (18.8% of the 517 drinking licence holders) thought it "extremely likely" that they would be tested, compared with 3.4% of those who knew no one. The number known was also the strongest predictor of the overall arrest score ($F(4, 512) = 8.60, p = .000, r^2 = 6.3\%$), with the same strong monotonic trend. In fact despite their association with the perceived chances of being tested in the next month, neither of the other exposure measures successfully predicted arrest certainty ($p = .19$ and $.42$). This suggests that these aspects of exposure are rather specific in their psychological effects, not flowing over to the more general aspects of police enforcement covered by the items from which the arrest score is formed.

The importance of the number of people known to have been tested is reinforced by linear models analysis which incorporates all exposure measures simultaneously. The recency and frequency of driving past was not significant as a predictor of either dependent variable when adjusted for the other two measures of exposure ($p = .17$ and $.65$ for AQ9 and the arrest index respectively), and neither was the personal experience of being tested ($p = .99$ and $.53$). However, the number of people known remained highly significant ($p = .000$ for both response variables). The relationship between number known and the two outcome measures (unadjusted for other exposure variables) is set out in Table 5.9.

The Effects of Exposure to Publicity

Perhaps surprisingly, only exposure to radio advertising significantly elevated the perceived probability of being breath tested or arrested for drink-driving ($p = .001$ for the chances of being tested and $p = .000$ for the arrest index), although TV and newspaper publicity came close to achieving a significant result ($p = .075$ and $.101$ for TV and $.063$ and $.074$ for newspapers). The total number of points recalled from all sources of advertising had no predictive power at all ($p = .81$ and $.83$). These results were confirmed by an analysis in which all publicity variables were

Table 5.9. The Relationship Between the Number of People Known to Have Been Tested and Perceptions of the Chances of Being Tested in the Next Month and Perceptions of Arrest Certainty

Chances in Next Month (Excludes 10 Unsure)	Number Known					ALL
	0	1	2	3	4+	
	%	%	%	%	%	
Extremely likely	3.4	2.8	8.5	10.5	15.5	7.1
Quite likely	14.2	17.0	16.9	28.1	28.9	19.5
Even chance	33.5	28.3	42.3	29.8	39.2	34.3
Quite unlikely	27.8	34.0	25.4	22.8	12.4	25.3
Extremely unlikely	21.0	17.9	7.0	8.8	4.1	13.8
TOTAL	176	106	71	57	97	507
Estimated mean perception ^a	-.63	-.61	.06	.34	.83	
Mean arrest certainty (N = 517)	1.37	1.57	2.10	2.33	2.55	

^a Estimated from threshold model; high score = high perception.

fitted simultaneously. For both outcome variables, radio maintained its predictive power ($p = .008$ and $.000$ adjusted for other publicity variables) while TV, papers and recall remained non-significant. The effect of exposure to radio was to increase scores on the arrest index by an average of .74 (.39 standard deviations) and by .65 standard deviation units on the latent scale underlying responses to AQ9.

When variables measuring both exposure to publicity and exposure to testing were fitted simultaneously, the number of people known to have been tested retained its significance (adjusted for other variables), while the significance of radio publicity became more marginal. With arrest certainty as the dependent variable, the p value for radio was .026 but .000 for the number of people known. With AQ9 as the dependent variable, the p values were .150 and .000. None of the other variables approached significance.

Influences on Arrest Certainty: Towards a Parsimonious Model

The Relationship Between Levels of Police Enforcement and the Perceived Probability of Being Tested or Arrested

According to the model of the deterrence process described in Chapter 2, police enforcement in an area should manifest itself in the exposure of individuals to RBT, which in turn should influence perceptions and behaviours. It is not clear that there should be any direct link between the intensity of police enforcement and perceptions of arrest certainty. In fact the correlation between arrest certainty and police tests was .03 calculated at the individual level, and -.14 calculated at the area level. Scoring AQ9 as a numerical variable, the correlations with police testing were -.02 and

-.30. Moreover, the rate of police testing had no predictive power over and above the publicity and exposure variables ($p = .19$ for the chances in the next month and $.75$ for the arrest index). In other words, there appears to be no direct connection between police testing and perceptions of the chances of being tested or arrested, whether or not exposure is taken into account. However as we have seen, there is an indirect link via the number of people known to have been tested, although it has to be admitted that the linking correlations are small ($r^2 = 1.7\%$ for the relationship between police testing and the number known to have been tested (calculated at the individual level), and $r^2 = 6.3\%$ for the number known as a predictor of arrest certainty).

Other Influences on Perceptions of the Chances of Arrest

Following Figure 2.1, there are several types of variables which could influence perceptions of arrest probabilities and which could also be correlated with exposure to RBT or exposure to publicity. It is necessary, therefore, to check that the significant exposure variables remain significant when adjusted for the effects of these additional variables. However, before describing the results of these tests, it will be useful to examine which factors do correlate with arrest certainty. The main focus will be on arrest certainty, rather than on the perceived chances of being tested in the next month, since the analysis of behaviour changes reported in the next section demonstrates that the index of arrest certainty is the more powerful predictor.

Of all the sociodemographic variables, only education, occupation and area of residence had significant associations with arrest certainty. The precise patterns are set out graphically in Figure 5.2. In general, lower white collar and blue collar workers, without Higher School Certificate qualifications (or the equivalent), gave higher estimates of the chances of arrest (education level: $p = .01$, $R^2 = 3.3\%$; occupation: $p = .040$, $R^2 = 3.5\%$). The area effect was most marked ($p = .000$, $R^2 = 7.4\%$), with residents of Bathurst giving the highest estimates and those in Newcastle giving the lowest. The estimates of Sydney residents were below the average for all areas, the second Sydney sample (i.e. the new sample) significantly so.

Both measures of social pressure correlated with arrest certainty (perceived change in pressure since RBT: $p = .003$, $R^2 = 2.3\%$; current pressure: $p = .009$, $R^2 = 3.0\%$). The pattern for social pressure as currently experienced was rather uneven, with a sudden dip in estimated arrest probabilities for those who find it "quite easy" to resist pressure. The effects of changes in pressure are easier to interpret: those who found it harder since RBT had arrest estimates about half a standard deviation *higher* than those who found it easier since RBT to resist pressure (see Figure 5.2).

Contrary to the experiential effects often found in deterrence research, the frequency of drinking and driving since RBT was not significantly associated with arrest certainty ($p = .61$, $R^2 = .3\%$). This surprising result might be attributable to the short time (three months) that RBT had been operating, or maybe it reflects shortcomings in the measure of arrest certainty. There was also no discernible effect of drink-driving experience on the estimated chances of being tested in the next month ($p = .10$).

The key question theoretically is whether the exposure variables remain significant as predictors of arrest certainty, adjusted for the socio-demographic, peer pressure and experiential variables. Consistent with the results reported above, only the number of people known to have been tested was clearly significant ($p = .002$), with radio again being marginal ($p = .048$). Taking the perceived chances of being tested in the next month as dependent variable and fitting a threshold model, the number known remained significant ($p = .000$) but radio had no predictive power at all ($p = .58$). Fitting radio exposure and other variables in different orders suggests that the effects of radio publicity are partly explained by regional variations. In other words, the penetration of radio publicity in different areas is to some extent correlated with other features of those areas which influence arrest estimates.

In conclusion, it seems clear that RBT has had an influence on arrest certainty (and on the perceived probability of being randomly tested) via the mechanism of people's social networks. This link does seem to reflect a real causal effect, since none of the other variables depicted in Figure 2.1 affected the significance of the relationship.

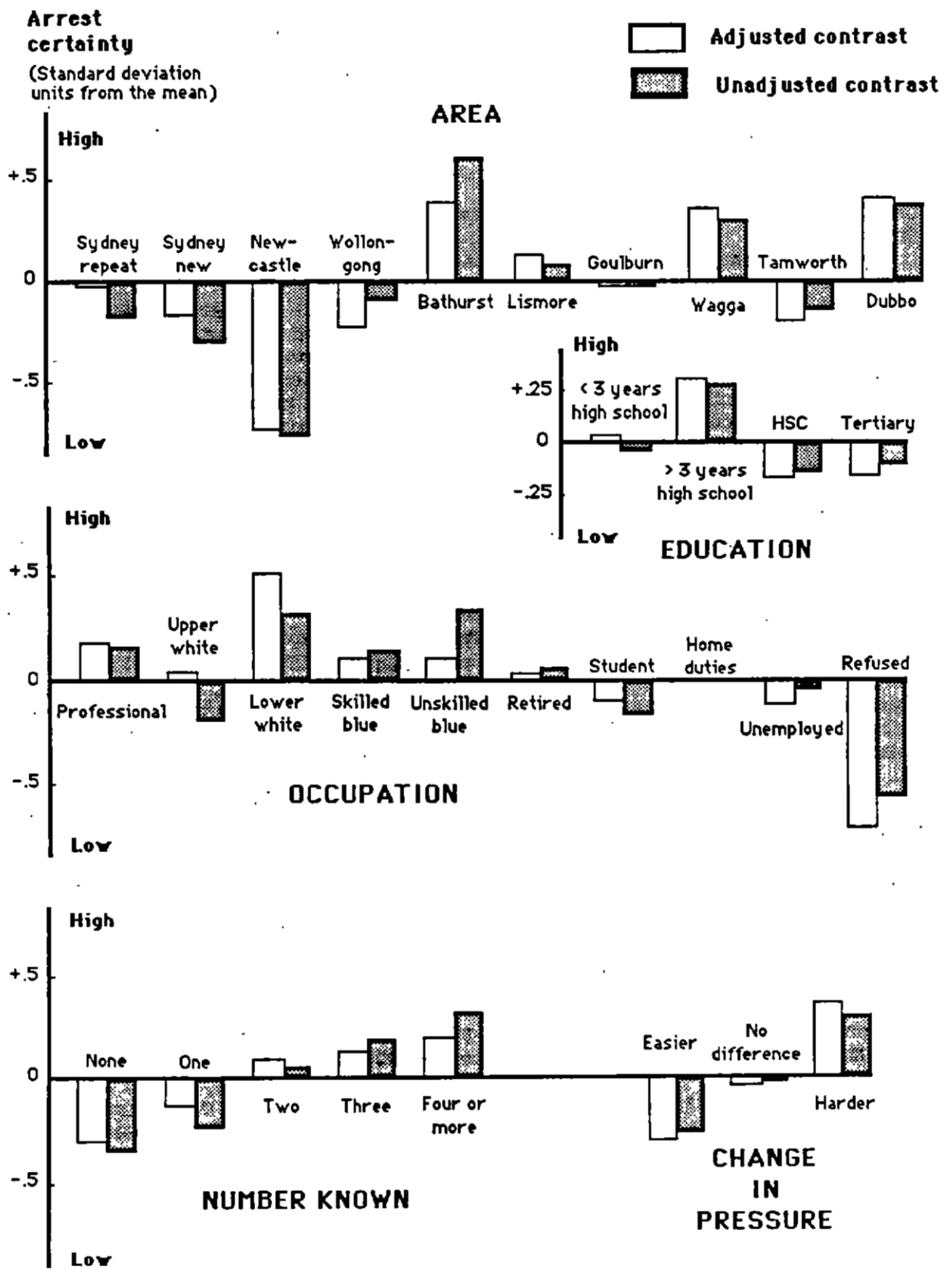


Figure 5.2. Reduced Model of Predictors for Arrest Certainty: Adjusted and Unadjusted Effects

Influences on Arrest Certainty: A Parsimonious Model

The analysis so far has been concentrated on building a model from the individual components of Figure 2.1. In order to summarise the influences on arrest certainty, it will be convenient to fit all predictors in a full model and reduce to a minimal adequate subset (Aitkin, 1974). R^2 for the full model was 26.6%, with the number known to have been tested ($p = .005$), social pressure ($p = .030$), change in social pressure ($p = .005$), education ($p = .002$) and area of residence ($p = .001$) being the most significant terms, adjusted for all others.

An adequate subset consisted of the number known to have been tested ($p = .007$; $R^2 = 3.3\%$), education ($p = .001$; $R^2 = 3.6\%$), occupation ($p = .024$; $R^2 = 3.3\%$), area of residence ($p = .006$; $R^2 = 5.2\%$), and perceived change in social pressure ($p = .006$; $R^2 = 2.6\%$). This subset was not minimal adequate since occupation could have been omitted, but because this term was significant at .025 it was decided to retain it in the model. R^2 for the reduced model was 20.2%, and the R^2 value quoted above for each term represents the contribution to the total sum of squares of that term when fitted last in the reduced model. Using these R^2 values as a measure of the relative importance of each variable, it can be seen that area has the greatest predictive power (5.2%), with all the others making approximately equal contributions at about 3%.

The patterns of association are set out in Figure 5.2. The vertical axis, representing arrest certainty contrast scores, is marked in units of standard deviation above or below the mean. The shaded bars represent the effects of each factor unadjusted for the effects of others in the reduced model, while the unshaded bars represent the adjusted effects.

It appears that lower white collar workers and those with minimum high school qualifications saw arrest for drink-driving as most likely. The effects of having a network of friends who have been tested is very clear, the credibility of the legal threat increasing steadily with the number tested. Although adjustment for other factors slightly diminished the impact of this variable, the difference between those who knew no one and those who knew four or more was still .49 standard deviation units. It is of great interest that those finding it harder since RBT to resist peer pressure to drink also had higher than average arrest scores. This suggests that for this group RBT achieved its objective of making the legal threat more credible, but simultaneously helped to create a situation where the chances of drink-driving may have been enhanced.

The persistence of area as a predictor of arrest certainty merits a comment, since we might have expected that area would disappear after adjustment for exposure. Although Bathurst residents did not have the highest arrest estimates after adjustment, probably because of the large number of friends and acquaintances of respondents who were known to have been tested in that region, their scores were nevertheless higher than average. Presumably this is because Bathurst was heavily blitzed over Easter. Thus it would seem that the impact of RBT in an area is not explained solely by the aspects of exposure measured in the present study, and that features of police enforcement unique to each region may have an influence. It is also possible that aspects of the social and demographic make-up of an area influence estimates of arrest certainty. An explanation along these lines seems necessary for Newcastle, which according to the figures presented in Table 5.7 was by no means neglected by police RBT squads.

Interaction Effects

In a longitudinal study, Minor and Harry (1982) found that for some offences the experiential effect was more pronounced for respondents with initially high perceptions of the chances of apprehension; that is, they predicted an interaction between criminal behaviour over a given time period and perceptions of arrest certainty at the beginning of that period. Although the present analysis does not include the longitudinal component, it is possible to check for a differential experiential effect by using the respondents' memories of how likely they thought it was that they would be tested when RBT was first brought in. However, the evidence for an interaction between AQ10 and the frequency of drink-driving since RBT was not overwhelming, with a p value of .99. Since Minor and Harry's (1982) argument concerning a naiveté effect seems very plausible, the null result in the present case may reflect the inadequacy of a retrospective question as a substitute for genuine longitudinal data.

It is likely that a number of variables are important only in interaction with others, but there is

little theory to guide the selection of interaction terms. Since a completely systematic investigation would greatly reduce the power of tests of main effects, the possibility of interaction effects was checked only for selected exposure variables. Interactions were fitted one at a time in an additive model containing all exposure and publicity variables. The 15 two-factor interactions investigated included the three interactions of TV, radio and newspapers, six interactions involving the three personal exposure variables and radio and TV publicity, and six interactions involving the age and sex of the respondent with the number known to have been tested and TV and radio publicity. These interactions were selected because they covered most of the potentially interesting combinations of publicity and personal exposure, and also because they allowed a test of the hypothesis that publicity and exposure had different effects for men and women and for people of different ages. This last question is of some interest in view of the discussion in Chapter 1 concerning young men as high risk drinking drivers. To protect against Type I errors each of the 15 tests should have been carried out at approximately the .003 level of significance, in which case none of them would have been significant. The results reported below should therefore be regarded as exploratory and tentative.

Two of the 15 interactions were significant at the 5% level: the recency and frequency of driving past an RBT operation with TV publicity ($p = .019$) and TV publicity with newspaper publicity ($p = .046$). However when adjusted for the first interaction the second became non-significant, while the reverse was not true, so only the first is interpreted.

The combined effect of driving past an RBT operation four or more times, most recently only a few days ago, together with having seen TV publicity, was to create the highest mean arrest score of any group in the sample. This result is intuitively appealing, and demonstrates the value of investigating the combined effects of variables. Less intuitively appealing, however, was the finding that for respondents who had last driven past an RBT operation more than a month ago, the effect of TV was to *reduce* their mean arrest scores to a level well below average. It almost seems that in these cases there was a rejection of the official message in the light of experience, which might be seen as evidence for the evanescence of deterrent effects. For respondents who had not passed an RBT operation at all, as well as for most others, TV seemed to make no difference to arrest certainty.

In summary, while there was some evidence for an interaction between two of the exposure variables, most interactions tested were not significant. In particular, there was no evidence that factors influential in the formation of perceptions of arrest certainty operated in a different manner depending on the age or sex of the respondent. Except in the negative sense of indicating a commonality of effects across subgroups, the analysis of interactions in this analysis does not greatly advance the understanding of how perceptions of arrest certainty are formed.

Modifications to Travel and Drinking Behaviours in the April Survey

Following the paths of Figure 2.1, the analysis so far has been focussed on levels of police enforcement, exposure to RBT, and perceptions of arrest certainty. It has been shown that the level of police activity in an area is a major influence on the probability that an individual will be exposed to RBT in some way, and that at least one aspect of exposure (the number of friends and acquaintances who have been randomly tested) is a major influence on the perceived probability of being arrested. It is now time to examine the determinants of changes in travel and drinking practices, particularly the role of perceptions of arrest certainty. It will be shown that arrest certainty does correlate with the number of ways respondents were modifying their normal practices, confirming the predictions of the deterrence model. However there are a number of other influences, including aspects of exposure to RBT, peer pressure, and area of residence.

We will begin the analysis with descriptive statistics of behaviour change. This will lead to a multivariate analysis, firstly with predictors considered individually, then jointly. Two reduced models will be presented, one for travel modifications and the other for changes to drinking practices. Finally, the possibility of a number of interactions involving arrest certainty and some other variables will be examined.

The Pattern of Responses to RBT

More than half the 517 drinking licence holders (58.0% to be exact) reported making some modification to their lifestyle as a direct result of RBT. These modifications were more commonly made by young beer drinking males than by other groups, but nevertheless a wide cross-section of the sample was affected. (As indicated in Table 5.7, Newcastle residents were an exception since practically none of them had made any response to RBT.) On average respondents reported 1.22 adjustments to their pre-RBT behaviours, with modifications to the amount or place of drinking being slightly more common than modifications to travel (a mean of .63 compared with .58). The distributions of these two types of responses, together with the frequencies of the specific behaviours affected, are set out in Tables 5.10 and 5.11.

Table 5.10. Modifications to Travel and Drinking Behaviours as a Result of RBT

<i>Modifications to Travel Practices</i>	<i>% (N = 517)</i>
Not using the car as much	5.2
Driving more carefully at all times	3.7
Stopped driving to places where you will be drinking	9.3
Driving more carefully after drinking	2.1
Using taxis more often after drinking	9.7
Using public transport more often after drinking	2.9
Staying overnight after drinking	7.5
Having someone else drive you home after drinking	15.3
Sleeping in car instead of driving home after drinking	0.4
Using special buses or drive home schemes organised by clubs or pubs	1.5
<hr/>	
<i>Modifications to Amount, Type or Place of Drinking</i>	<i>% (N = 517)</i>
Drinking at home more often, drinking away from home less	13.5
Carefully limiting your drinking when driving	23.4
Stopped drinking altogether when driving	8.3
Drinking more soft drinks when driving	8.1
Switching to low alcohol beer when driving	4.3
Drinking at places closer to home than before	5.8
<hr/>	
HAVE NOT CHANGED USUAL BEHAVIOUR	42.0

Carefully limiting drinking when driving was the single most popular strategy, which is not surprising since of all the options considered in AQ16 it probably involves the least inconvenience and personal effort. The second most popular response was having someone else drive you home, which for men at least is probably a more effective strategy than trying to reduce consumption. Other responses listed in Table 5.10, such as drinking at home more or staying overnight after drinking, represent more radical departures from accepted practices and suggest that RBT had, at least in the first three months, more than a superficial impact on the lives of many motorists.

Table 5.11. Frequency Distributions of Behaviour Changes

<i>Modifications to Travel</i>		<i>Modifications to Drinking</i>		<i>Total Modifications</i>	
<i>Number of Changes</i>	<i>% (N=517)</i>	<i>Number of Changes</i>	<i>% (N=517)</i>	<i>Number of Changes</i>	<i>% (N=517)</i>
0	66.0	0	56.5	0	42.0
1	20.1	1	28.6	1	28.8
2	7.7	2	10.3	2	11.2
3	3.7	3	4.3	3	9.7
4	1.5	4	0.4	4	3.9
5	1.0			5	1.9
				6	1.4
				7	1.0
				8	0.2
Mean no. of changes	.58		.63		1.22

It is evident from Table 5.11 that the majority of motorists modified their drinking and driving practices in only one or two ways. The frequency distributions are in fact very skewed, creating some difficulties for analysis. Discrete numerical distributions, or "counts", tend to be intrinsically awkward, as Nelder (1978) has noted, and may lend themselves to a generalised linear model approach with a non-constant variance function and a non-identity link function (Nelder and Wedderburn, 1972). In the present case a further complication is that modifications to drinking and travel behaviours are correlated ($r = .32$ in Table 5.1), making necessary a multivariate analysis. Since the sample size (517) is large enough to make appeal to the Central Limit Theorem reasonable, the approach adopted was to use standard multivariate least squares procedures but to check the models for linearity.

The Significances of Predictors Considered Individually

The statistical significances of each factor as a predictor of travel modifications, drinking modifications and both jointly are set out in Table 5.12, together with measures of the variances explained by each factor. (η^2 is a measure of variance explained in a multivariate model and is based directly on λ , which is the test statistics for the multivariate tests [Tabachnick and Fidell, 1983; Timm, 1975].) It can be seen from Table 5.12 that arrest certainty is highly significant ($p = .001$), although other factors, such as the quantity and frequency of drinking, explain more variance. The relationship is as predicted: an increase in the arrest score corresponds to an increase in modifications to both travel and drinking behaviours. A belief that one could be arrested but escape punishment was associated with fewer than average modifications to drinking patterns ($p = .027$), but the more general question on evaluations of penalty severity failed to reach significance. However, many other factors also are significant, and it remains to be seen whether fear of arrest or beliefs about "getting off" can be argued to *cause* these behaviour changes. The single strongest predictor was level of drinking ($\eta^2 = 12.9\%$), with heavy and moderate drinkers being more likely than others to modify their driving patterns. Of even greater significance was the fact that these groups were also more likely than others to modify their *drinking* habits. Since it is often suggested that heavy or high risk drinkers are essentially undeterrable (e.g.: Bø, 1978), this correlation is of great importance if it survives adjustment for the influence of other factors.

Consistent with the association with level of drinking, respondents who confessed to

The Pattern of Responses to RBT

More than half the 517 drinking licence holders (58.0% to be exact) reported making some modification to their lifestyle as a direct result of RBT. These modifications were more commonly made by young beer drinking males than by other groups, but nevertheless a wide cross-section of the sample was affected. (As indicated in Table 5.7, Newcastle residents were an exception since practically none of them had made any response to RBT.) On average respondents reported 1.22 adjustments to their pre-RBT behaviours, with modifications to the amount or place of drinking being slightly more common than modifications to travel (a mean of .63 compared with .58). The distributions of these two types of responses, together with the frequencies of the specific behaviours affected, are set out in Tables 5.10 and 5.11.

Table 5.10. Modifications to Travel and Drinking Behaviours as a Result of RBT

<i>Modifications to Travel Practices</i>	<i>% (N = 517)</i>
Not using the car as much	5.2
Driving more carefully at all times	3.7
Stopped driving to places where you will be drinking	9.3
Driving more carefully after drinking	2.1
Using taxis more often after drinking	9.7
Using public transport more often after drinking	2.9
Staying overnight after drinking	7.5
Having someone else drive you home after drinking	15.3
Sleeping in car instead of driving home after drinking	0.4
Using special buses or drive home schemes organised by clubs or pubs	1.5
<hr/>	
<i>Modifications to Amount, Type or Place of Drinking</i>	<i>% (N = 517)</i>
Drinking at home more often, drinking away from home less	13.5
Carefully limiting your drinking when driving	23.4
Stopped drinking altogether when driving	8.3
Drinking more soft drinks when driving	8.1
Switching to low alcohol beer when driving	4.3
Drinking at places closer to home than before	5.8
<hr/>	
HAVE NOT CHANGED USUAL BEHAVIOUR	42.0

Carefully limiting drinking when driving was the single most popular strategy, which is not surprising since of all the options considered in AQ16 it probably involves the least inconvenience and personal effort. The second most popular response was having someone else drive you home, which for men at least is probably a more effective strategy than trying to reduce consumption. Other responses listed in Table 5.10, such as drinking at home more or staying overnight after drinking, represent more radical departures from accepted practices and suggest that RBT had, at least in the first three months, more than a superficial impact on the lives of many motorists.

Table 5.11. Frequency Distributions of Behaviour Changes

<i>Modifications to Travel</i>		<i>Modifications to Drinking</i>		<i>Total Modifications</i>	
<i>Number of Changes</i>	<i>% (N=517)</i>	<i>Number of Changes</i>	<i>% (N=517)</i>	<i>Number of Changes</i>	<i>% (N=517)</i>
0	66.0	0	56.5	0	42.0
1	20.1	1	28.6	1	28.8
2	7.7	2	10.3	2	11.2
3	3.7	3	4.3	3	9.7
4	1.5	4	0.4	4	3.9
5	1.0			5	1.9
				6	1.4
				7	1.0
				8	0.2
Mean no. of changes	.58		.63		1.22

It is evident from Table 5.11 that the majority of motorists modified their drinking and driving practices in only one or two ways. The frequency distributions are in fact very skewed, creating some difficulties for analysis. Discrete numerical distributions, or "counts", tend to be intrinsically awkward, as Nelder (1978) has noted, and may lend themselves to a generalised linear model approach with a non-constant variance function and a non-identity link function (Nelder and Wedderburn, 1972). In the present case a further complication is that modifications to drinking and travel behaviours are correlated ($r = .32$ in Table 5.1), making necessary a multivariate analysis. Since the sample size (517) is large enough to make appeal to the Central Limit Theorem reasonable, the approach adopted was to use standard multivariate least squares procedures but to check the models for linearity.

The Significances of Predictors Considered Individually

The statistical significances of each factor as a predictor of travel modifications, drinking modifications and both jointly are set out in Table 5.12, together with measures of the variances explained by each factor. (η^2 is a measure of variance explained in a multivariate model and is based directly on λ , which is the test statistics for the multivariate tests [Tabachnick and Fidell, 1983; Timm, 1975].) It can be seen from Table 5.12 that arrest certainty is highly significant ($p = .001$), although other factors, such as the quantity and frequency of drinking, explain more variance. The relationship is as predicted: an increase in the arrest score corresponds to an increase in modifications to both travel and drinking behaviours. A belief that one could be arrested but escape punishment was associated with fewer than average modifications to drinking patterns ($p = .027$), but the more general question on evaluations of penalty severity failed to reach significance. However, many other factors also are significant, and it remains to be seen whether fear of arrest or beliefs about "getting off" can be argued to *cause* these behaviour changes. The single strongest predictor was level of drinking ($\eta^2 = 12.9\%$), with heavy and moderate drinkers being more likely than others to modify their driving patterns. Of even greater significance was the fact that these groups were also more likely than others to modify their *drinking* habits. Since it is often suggested that heavy or high risk drinkers are essentially undeterrable (e.g.: Bø, 1978), this correlation is of great importance if it survives adjustment for the influence of other factors.

Consistent with the association with level of drinking, respondents who confessed to

Table 5.12. Predictors of the Number of Behaviour Modifications: Statistical Significances and Variances Explained

Predictor	D.F.	Bivariate Response		Modifications to Travel		Modifications to Drinking	
		P	Eta ² (%)	P	R ² (%)	P	R ² (%)
<i>Exposure and Publicity</i>							
Tested	1	.001	1.8	.005	1.6	.995	.0
Driven past	9	.029	5.9	.016	3.9	.111	2.8
No. known	4	.001	5.0	.000	4.1	.019	2.3
TV	1	.008	1.9	.011	1.3	.407	.1
Radio	1	.437	.3	.326	.2	.268	.2
Newspapers	1	.629	.2	.496	.1	.388	.1
Recall	1	.304	.5	.144	.4	.977	.0
<i>Perceptions of Sanctions</i>							
Arrest certainty	1	.001	2.8	.001	2.2	.007	1.4
Zero penalty	5	.022	4.0	.092	1.8	.027	2.5
Penalty severity	4	.173	2.2	.059	1.8	.210	1.1
<i>Peer Pressure</i>							
Peer pressure	5	.000	9.2	.000	6.6	.000	5.0
Change in pressure	2	.001	3.4	.001	2.9	.017	1.6
<i>Experience</i>							
Drink-drive	3	.000	5.1	.000	5.1	.217	.9
<i>Sociodemographic Factors</i>							
Convictions	1	.006	2.0	.001	2.0	.341	1.8
Need for car	4	.090	2.6	.461	.7	.016	2.4
Age	6	.000	6.7	.001	4.6	.019	3.0
Sex	1	.006	2.0	.003	1.8	.044	.8
Education	3	.127	1.9	.105	1.2	.409	.6
Occupation	9	.004	7.1	.012	4.2	.009	4.4
Area	9	.031	5.8	.029	3.7	.053	3.3
Drinking	4	.000	12.9	.000	10.5	.000	4.5

drink-driving since the introduction of RBT and those conscious of heavy pressure to drink were more likely than others to be taking steps to avoid drinking and driving on future occasions, although these groups more often changed their travel than their drinking patterns. Similarly, young men were more responsive to RBT, although once again changes in driving were more popular than changes in drinking (especially among those aged 21 to 24, who scored a little below average in terms of drinking modifications). Occupation was also quite significant, but its effects were difficult to interpret. Contrary to the general effect of age, students were less likely than average to change either type of behaviour, but there was no clear trend for variations in response according to status.

Personal exposure to RBT was more strongly correlated with behaviour change than exposure to publicity. Of all the indices of exposure to publicity only TV was significant, and that only for travel modifications. Those personally tested were also more likely to make changes to their driving but not their drinking. The number of people known to have been tested appeared to have the greatest overall effect, since knowing a number of people was associated with changes to both travel and drinking behaviours.

A Parsimonious Model for Predicting the Number of Modifications to Travel and Drinking Behaviours

As with the analysis of the arrest measure, the simplest way of sorting out the relative importance of the factors set out in Table 5.12 is to fit a full model and then reduce to a model or models which are minimal adequate (or parsimonious). The model with all 21 predictors included had 75 degrees of freedom and an eta^2 of 47.0%. The R^2 for the number of modifications to travel was 34.9%, and 23.8% for modifications to drinking. In the full bivariate model the arrest index was only significant at .13, which might lead some to conclude that, adjusted for all other factors, arrest certainty is not correlated with behaviour change. However, such a conclusion would be premature, for several reasons.

First, in view of the skewed nature of the response variables, it is necessary to check that the model is at least a reasonable fit to the data. The residuals from the model, when plotted against predicted values and rankits, revealed slight non-normality and moderate departure from linearity, neither of which were sufficiently severe to invalidate the use of the model, although probably the significance of marginal factors is understated (i.e. tests are conservative). Secondly, one disadvantage of a bivariate model is that occasionally a factor is non-significant in the multivariate test but is strongly associated with one dependent variable. This is an example of an inappropriate choice of variables diluting the power of the multivariate test, a problem which is foreseen and avoided by the omniscient researcher depicted in statistics text books. In the present case, arrest certainty (adjusted for all other factors) was significant at .048 as a predictor of travel modifications, but was only significant at .594 in the drinking model. However, the most compelling reason for attaching little weight to the probability levels in the full model is that correlated factors offset each other. For example, arrest certainty is correlated with perceptions of the chances of being let off without penalty ($r = .24$ in Table 5.1), and both these factors individually are significant predictors of behaviour change (Table 5.12). The need to take account of these complex intercorrelations is the main reason for searching for a reduced model.

In the full model, "significant" factors (adjusted for all other factors) were exposure to TV publicity ($p = .009$), pressure to drink ($p = .054$), change in peer pressure ($p = .002$), area ($p = .001$) and level of drinking ($p = .000$). These factors were used as a starting point for the model reduction process, but many other combinations were also considered. Given the post hoc nature of the process, Aitkin's (1974; 1978) criterion was again employed as a guide to keeping Type I errors in check. With 21 terms in the model and using a nominal error rate of .025, the error rate for the model was $1 - .975^{21} = .41$. Two slightly different minimal adequate models were uncovered. Statistics for these models are set out in Table 5.13.

The two models are identical in the first four terms: area, awareness of TV publicity, perceived change in pressure to drink and arrest certainty. Arrest certainty is highly significant in both models, but seemed to have more influence on travel behaviour than drinking. The two models differ with respect to variables which are correlated and are therefore alternatives to each other: Model 1 contains peer pressure and the quantity and frequency of drinking, Model 2 contains

Table 5.13. Summary of Reduced Models for the Number of Modifications to Travel and Drinking Practices

Predictor	Bivariate Response			Modifications to Travel		Modifications to Drinking	
	D.F.	P	Eta ² (%)	P	R ² (%)	P	R ² (%)
<i>MODEL 1</i>							
Area	9	.001	7.9	.001	4.6	.033	3.3
TV	1	.001	2.8	.001	1.8	.585	.1
Change in pressure	2	.000	5.1	.000	3.7	.014	1.5
Arrest certainty	1	.001	2.7	.001	1.7	.020	1.0
Peer pressure	5	.006	4.9	.028	2.0	.014	2.6
Drinking	4	.000	9.2	.000	6.3	.042	1.8
FULL MODEL	22	.000	29.8	.000	23.3	.000	13.0
<i>MODEL 2</i>							
Area	9	.000	8.4	.001	5.0	.018	3.8
TV	1	.000	2.1	.003	1.5	.756	.0
Change in pressure	2	.000	4.4	.000	3.2	.025	1.4
Arrest certainty	1	.004	2.2	.005	1.3	.018	1.0
Age	6	.007	5.4	.031	2.3	.017	2.9
Sex	1	.012	1.8	.012	1.1	.030	.9
Drink-drive	3	.003	3.9	.000	3.3	.577	.4
FULL MODEL	23	.000	24.9	.000	19.5	.000	10.8

Note: The statistics for all terms represent the effects adjusted for all other terms.

instead the age and sex of the respondent and whether they had driven over the limit since RBT.

The effects of all four variables common to both models were much the same in both models. An increase of one standard deviation in arrest certainty (1.88) corresponded to an increase of about .14 in the number of modifications to travel behaviour, and about .09 in the number of modifications to drinking behaviour. These effects could not be described as massive, but they do nevertheless constitute strong evidence for deterrence, since the correlation between arrest certainty and behaviour change has been demonstrated not to be a reflection of other factors. Perceptions of the chances of arrest do seem to be an important influence on the extent of behaviour change, as predicted by the deterrence model.

However, arrest certainty is by no means the only influential variable. Those aware of TV publicity reported on average .31 more changes to their travel behaviour than those who had not seen the TV ads, an influence at least comparable with that of arrest certainty. But why did TV have this effect? The most plausible explanation, given the extremely heavy emphasis in the advertisements on arrest and imprisonment, was fear. In theory therefore, the effect of TV should have been via the sanctions pathway in Figure 2.1, suggesting that the measure of arrest certainty is

less than completely satisfactory. In any case the fact that TV publicity was significant lends further weight to the deterrence argument.

Another important feature of both models is the role played by perceived changes in peer pressure. Those who were finding it easier since RBT to resist pressure to drink were more likely than others to be modifying both their travel and drinking behaviours (see Figures 5.3 and 5.4). This is an example of how RBT affected *non-legal* sanctions operating to encourage drinking and driving. As indicated in Figures 5.3 and 5.4, the effect was of the same order of magnitude as that of TV but somewhat less than that for arrest certainty.

The most noticeable feature of area of residence was the large number of changes in travel methods (but not in drinking practices) in Bathurst, and the virtual absence of change in Newcastle. As discussed previously, these effects are probably attributable to features of police enforcement not captured by the exposure measures. Since these patterns conform very closely to the variations in arrest certainty depicted in Figure 5.2, the area effect further supports claims that RBT has had a deterrent impact.

The effects of the remaining variables in Table 5.13 and Figures 5.3 and 5.4 are much as described previously: adjustment for other factors in most cases makes little difference. The most important point is that RBT appears to have had its greatest impact among the most conspicuous target group, namely young men who drink lots of beer. Even the heaviest drinkers responded, although they tinkered with their driving more than their drinking.

Generally speaking, the contrast scores for drinking parallel those for transport, but are smaller in magnitude. Although overall slightly more people were modifying their drinking than their driving, changes in travel behaviours seemed a more sensitive index of the effects of RBT inasmuch as these models had greater explanatory power. In this respect it should be recalled that the most popular response to RBT was to "carefully limit your drinking when driving", which quite possibly was a convenient answer to a question which may have put some people under pressure to report that they were doing something.

Interaction Effects

In Chapter 4, a number of hypotheses concerning interaction effects were put forward. For the analysis of behaviour change, perhaps the most interesting interactions are those involving arrest certainty. However, from a statistical point of view the main problem with these hypotheses is that they generate too many interactions to be handled conveniently in a single model. In the analysis, 17 interaction terms were considered, with a total of 90 degrees of freedom (Table 5.14). Therefore a thoroughly ad hoc procedure was adopted: interactions were tested one at a time in a model with travel and drinking modifications as dependent variables, with significant interactions

Table 5.14. Modifications to Travel and Drinking Behaviours: Interaction Terms Investigated Together with their Levels of Significance

<i>Interaction Term</i>	<i>p</i>	<i>Interaction Term</i>	<i>p</i>
Arrest . no penalty (AQ25)	.951	TV . recency-frequency	
Arrest . perc. of penalty (AQ26)	.892	of driving past RBT	.794
Arrest . conviction	.023	TV . personally tested	.018
Arrest . age	.800	TV . number known to have	
Arrest . sex	.432	been tested	.093
Arrest . level of drinking	.496	Age . sex	.131
Arrest . occupation	.603	Age . level of drinking	.860
Arrest . education	.951	Sex . level of drinking	.207
Arrest . pressure to drink	.085	Conviction . no penalty	.041
Arrest . change in pressure	.744		

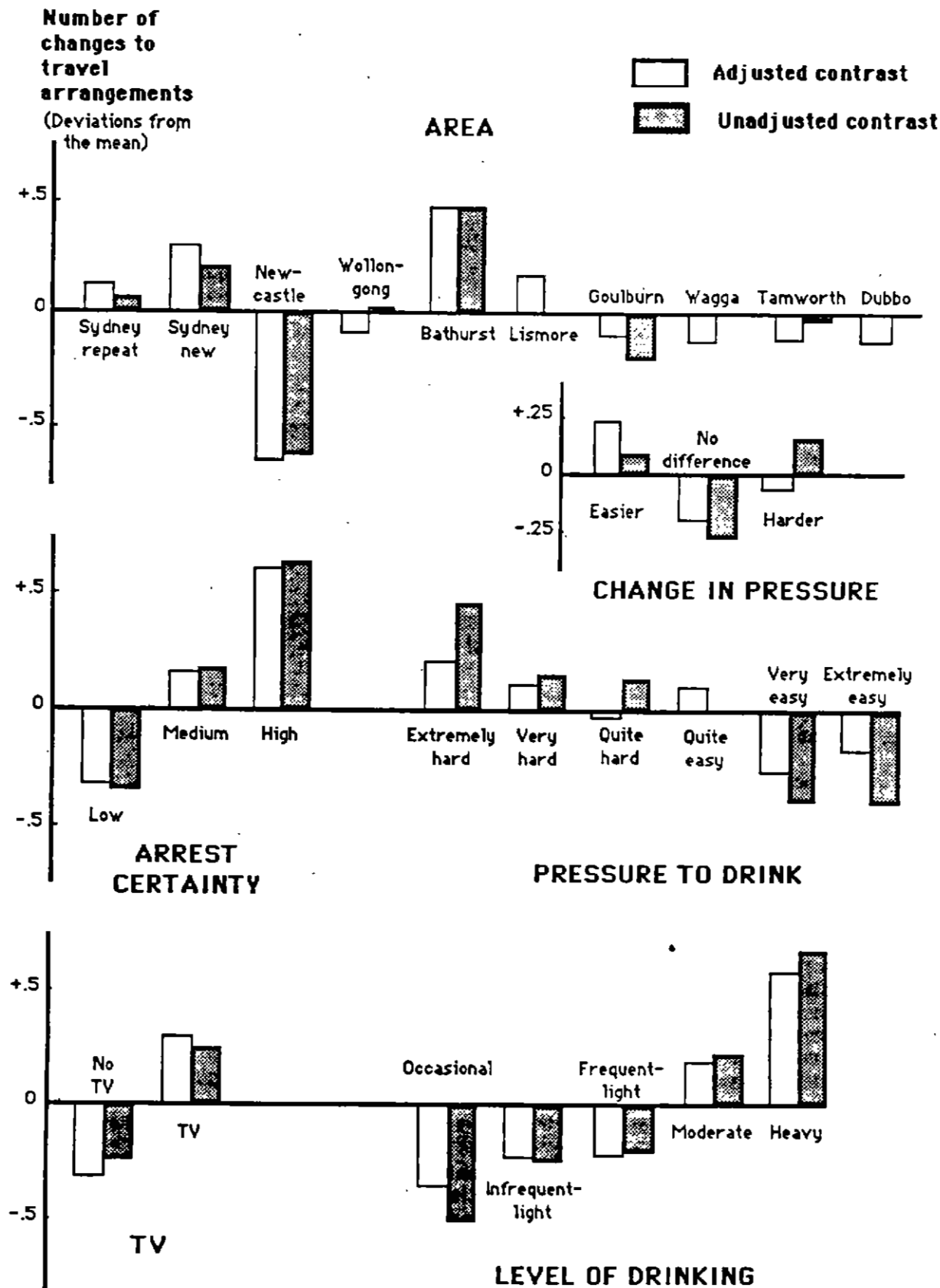


Figure 5.3(a). Model 1 Predictors for the Number of Changes to Travel Arrangements: Adjusted and Unadjusted Effects

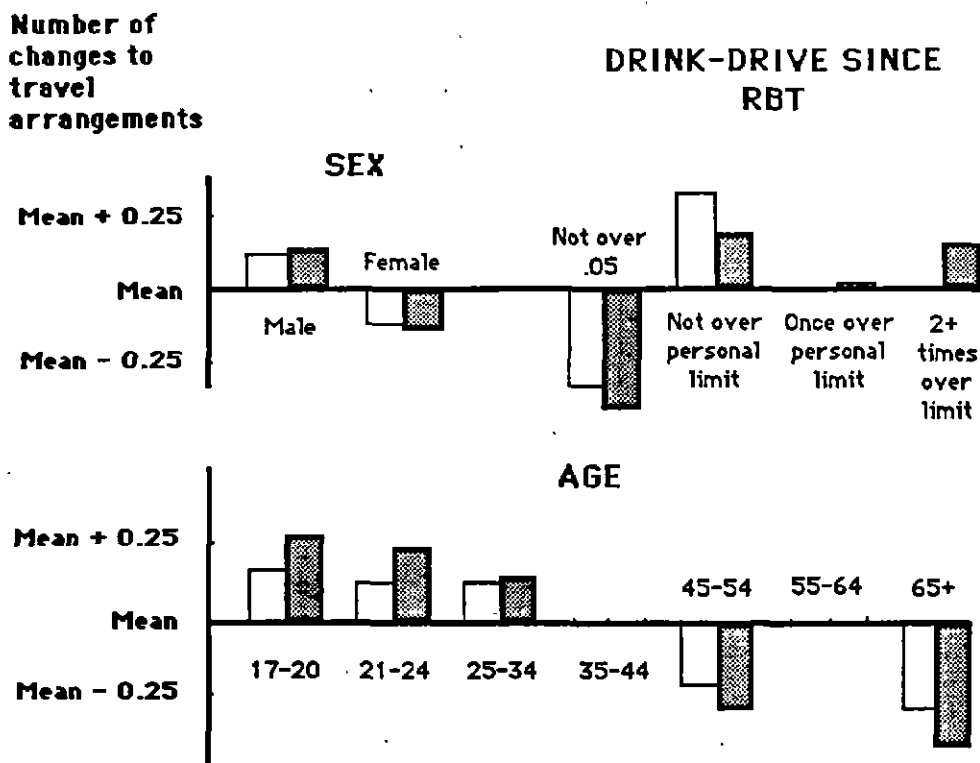


Figure 5.3 (b). Additional Model 2 Predictors for the Number of Changes to Travel Arrangements: Adjusted and Unadjusted Effects

being tested further in the two reduced models described in the previous section. The interactions, together with their levels of significance (multivariate) unadjusted for other factors, are set out in Table 5.14.

The interactions of arrest certainty with perceptions and evaluations of penalties are of fundamental theoretical importance. In the present study, however, there is no evidence at all for such interactions, at least using the number of attempts to avoid drinking and driving as dependent variables. Nor is there any evidence for interactions between arrest certainty and the two measures of informal sanctions (pressure to drink and change in pressure), although one approached significance ($p = .085$ for arrest . pressure, but only .270 for travel and .077 for drinking modifications). The interactions of arrest certainty with age, sex and socioeconomic status have been investigated in the literature and are of obvious interest in the present study, but once again the p values do not approach significance. Given the finding that heavy drinkers were over-represented among those taking steps to avoid drinking and driving, the interaction of arrest certainty with level of drinking, had it been significant, also would have been of considerable interest.

The interaction of arrest certainty and drink-drive convictions. Among all the interactions involving arrest certainty, the most promising was that with the possession of a conviction for drinking and driving. The multivariate p value was .023, which would not have been significant if the tests had been protected against Type I errors, but the p value for travel modifications was .009, sufficiently low to warrant further investigation. Adjusted for all terms in the first reduced model, the significance dropped to .048, with .032 for travel and .69 for drinking. Although not quite significant when added to the second reduced model (multivariate $p = .107$, .066 for travel and .62 for drinking), the significant result in the first model justifies interpretation, particularly since the tests are probably conservative. The unadjusted interaction pattern is set out in Figure 5.5 (the adjusted pattern is very similar and is therefore not shown).

The figure shows the regression line of the relationship between travel behaviour and arrest score for those with a conviction and those without a conviction. Both the number of changes to

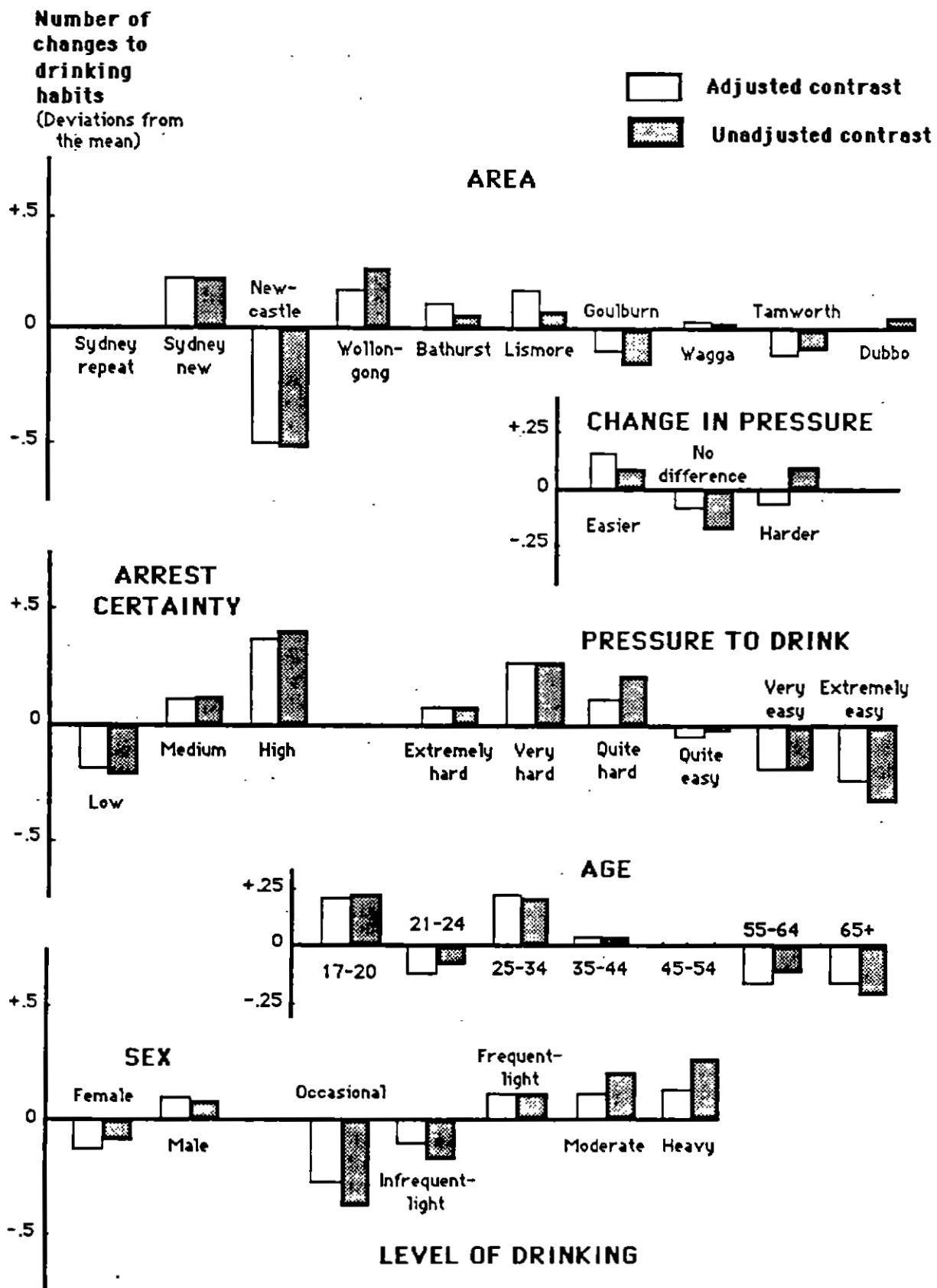


Figure 5.4. Model 1 and Model 2 Predictors for the Number of Changes in Drinking Habits: Adjusted and Unadjusted Effects

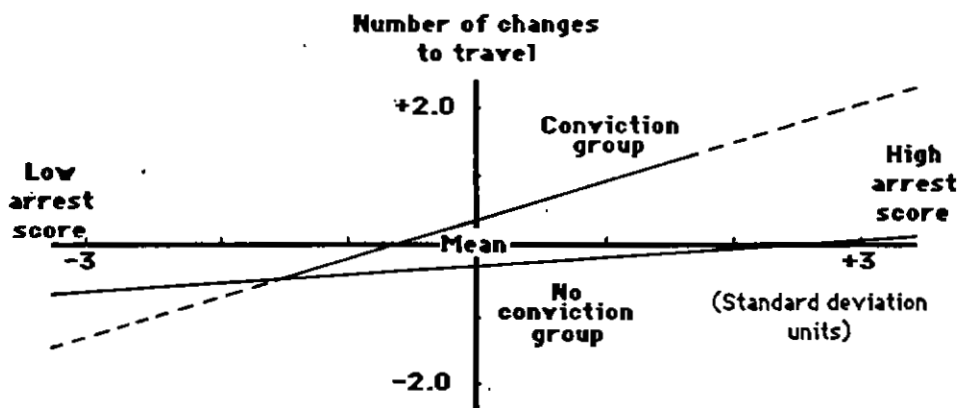


Figure 5.5. Number of Modifications to Travel Arrangements: Interaction Between Arrest Certainty and a Conviction for Drinking and Driving (Unadjusted for Other Factors)

travel and the arrest score are represented as deviations above or below the mean. Only 39 respondents (7.4%) had a conviction, and none had very high or low perceptions of arrest certainty, so the equation for this group is represented by a dashed line outside the observed range of arrest scores.

The correlation between arrest score and the number of modifications to travel arrangements was .42 for those with a conviction, and only .12 for those without a conviction. Clearly the effect of arrest perceptions on travel behaviour was much less marked for those without a conviction, although the relationship was still highly significant among those without a conviction ($p = .008$). For the non-convicted group, over the whole range of arrest scores the difference in number of changes to travel was .75. By contrast, over a much shorter range the variation in travel modifications for those with a conviction was 1.8. The difference between the groups was most marked for the higher arrest scores, suggesting that the experience of a previous conviction has its greatest effect on behaviour when the chances of arrest are seen as high. However there was no evidence that having a conviction of itself affected perceptions of the chances of arrest.

There was also a significant interaction between having a conviction and perceptions of the chances of being let off without penalty ($p = .041$). However, when adjusted for the interaction involving arrest certainty this interaction ceased to be significant ($p = .116$), while arrest by conviction remained significant ($p = .029$). This interaction is therefore not investigated further. The only other significant interaction was between exposure to TV and being personally tested ($p = .018$, with .010 for travel and .052 for drinking). The interaction was in the expected direction, with the effect of being tested heightened by TV publicity. However, when added to the reduced models (including the arrest by conviction interaction) this interaction became rather marginal ($p = .075$ in Model 1 and .169 in Model 2), while the arrest by conviction interaction remained (just) significant in Model 1 ($p = .052$). The evidence is therefore a little unclear with respect to the combined effects of TV publicity and direct exposure to RBT.

The evidence for absolute specific deterrence. The interaction between arrest certainty and a conviction for drink-driving suggests that punishment may have an absolute specific deterrent effect. However, in order to establish this beyond reasonable doubt, it is necessary to compare behaviour change among offenders who have been punished with behaviour change among offenders who have never been punished. The analysis reported above does not directly address this question, since the non-convicted group consisted of those who had never driven after drinking too much, as well as those who had but who had never been caught.

Slightly more than half of all drinking licence holders (52.0%) reported driving when they had had too much to drink (this included five respondents with a conviction who claimed that although they may have been over the limit, they were not impaired). Restricting analysis to this subsample of 269 respondents, the conviction by arrest interaction for the number of travel

modifications was not quite significant ($t(265) = 1.73; p = .086$), although the pattern was very similar to that of Figure 5.5. When adjusted for all other variables except exposure to RBT publicity and enforcement the significance reduced to .17, and it dropped further to .27 if exposure variables were included. There was no evidence of any interaction for drinking modifications.

These results suggest that the experience of punishment is not sufficient to cause the convicted group to react to RBT in a way which is clearly distinguishable from the responses of never convicted drink-drivers. However, in order to conduct a completely adequate test of the absolute specific deterrence hypothesis, a larger number of convicted offenders are required, preferable all convicted at the same time in the past and matched on at least recency and frequency of drink-driving with a control group of non-convicted offenders. The fact that the interaction is close to significant, even when adjusted for a range of other factors, suggests that punishment may have a measurable, although by no means massive impact on responses of drink-drivers to legal innovations like RBT.

Individual Measures of Perceptions of Police Activity as Predictors of Behaviour Change

The significance of arrest certainty as a predictor of behaviour change raises the question of the relative importance of different stages of the enforcement process. Maybe the perceived likelihood of being randomly tested is the critical component, or perhaps later stages in the process, such as the perceived chances of being able to talk one's way out of a positive reading, are the crucial psychological elements. A further question relates to the significance of interaction terms involving individual arrest measures and perceptions of penalties. Although there was no evidence of such interaction effects using the index of arrest certainty, it is possible that when individual questions are examined some important interactions will emerge.

Taken individually, very few of the arrest questions predicted behaviour change. The perceived chance of being randomly tested in the next month (AQ9) was not a significant predictor of modifications to transport ($p = .536$), but did predict changes to drinking ($p = .014$). The most marked effects were at the extremes, with those rating the chances of being tested as "extremely unlikely" being least likely to take steps to modify their drinking. However, when adjusted for the effects of the other factors in the first reduced model, the item became non-significant ($p = .169$).

Those not very worried about being tested (AQ28) didn't modify their drinking ($p = .004$), and neither did those who thought it unlikely that the police would pull them over if they drove past an RBT operation ($p = .049$). These effects are consistent with the results for the full index, but the predictive power of individual items is clearly fairly weak. Taken as a family of eight terms and adjusted for the factors in the first reduced model the p value is about .10, which is sufficiently low to suggest that at least some of these variables are important. This should be compared, however, with the p value of .001 for the arrest index in the same model. More importantly, this analysis does little to highlight any one stage of the enforcement process as the critical predictor of behaviour change.

The low predictive power of the individual arrest questions extended to interaction terms involving these questions and the two questions on perceptions of penalties (AQ25 and AQ26). None of these interactions was significant, confirming the null result obtained when the full index of arrest certainty was used.

Reasons for Not Drinking and Driving: Fear Versus Conscience

So far in the analysis of the data collected in the April survey, the emphasis has been on establishing the plausibility of the causal chain implicit in the theoretical model described in Chapter 2. Thus it has been demonstrated that the intensity of police random testing in an area was a major determinant of rates of exposure of the target population, and that features of such exposure predicted arrest certainty. Arrest certainty in turn predicted the extent of behaviour change. Some subsidiary analyses have focussed on interaction effects, with a view to exploring the nature and extent of deterrent effects in selected subgroups of the population (such as those with a conviction for drink-driving). With the exception of the measures of behaviour change, which are based on

assessments by respondents of alterations in practices *caused* by RBT, the analysis has been conducted within the traditional positivist mould discussed in Chapter 2. However, in the discussion of deterrence in that chapter, it was emphasised that the admission of evidence on which the respondent is the most privileged observer - namely, reasons for not drinking and driving - is essential for the determination of a verdict on whether or not deterrence has been operating.

The importance of asking about people's reasons for drinking and driving or for not drinking and driving was recognised from the beginning of the present project. In the February survey, interviewees were asked (FQ10): "Since random breath testing was brought in just before Christmas, have you driven when you felt you had had *too much* to drink?" (Yes, no, unsure.) "Why do you say that? Any other reasons?" The analysis of responses to these questions, together with an analysis of responses to a more structured question asked in the April survey, is presented in this section. The primary objective is to throw more light on the deterrence process through a direct examination of the stated reasons for respondents' behaviours.

Of the 254 drinking licence holders in the February survey, nearly one in ten (9.8%) admitted to driving with too much to drink since the advent of RBT. Responses to the follow-up question fell into three main categories: "I like to go to the pub" (28.0%), "I've only done it once" (32.0%) and "The limit's too low" (12.0%). Detailed comments indicated that convenience was frequently a major factor in the decision to drink and drive, an outcome predictable from theory.

The reasons given for their behaviour by the 227 respondents who claimed not to have driven whilst impaired fell into four main categories. The most frequent single answer was that the respondent simply didn't drink and drive (27.3%). This of course is strictly an answer to the question, but *immediately* raises another: why do these respondents make a practice of not drinking and driving? A second category of response was similar in nature: 27.7% claimed to avoid the problem by not getting into situations where driving whilst impaired would be a possibility. Some of these (20.7% overall but 28.4% of women) said they always drank very moderately so would never (by implication) be impaired, a few (4.4%, but 9.9% of women) said they didn't drive much, and a small number (2.6%) said they only drank at home. These responses seem to raise the same sort of questions about lifestyle as the previous category. A third type of reason proffered by 5.3% of the sample was that drinking and driving is unsafe (e.g.: "I have two kids and don't want to see them hurt").

Actually, it is surprising that such a small minority mentioned the chances of injury, since this is presumably why drink-driving laws exist, but it is very likely that if respondents in the first two categories had been questioned further, fear of accidents would have been mentioned more frequently. What the respondents who gave the above three types of answers seem to be saying is that drinking and driving is not part of their lifestyle, either because they are not much exposed to the opportunity to do it or because they consider it is wrong since it might cause crashes. Although this last point is an inference, since few respondents actually *said* that drinking and driving is wrong or causes accidents, it does seem to be at the basis of many responses.

These answers are in marked contrast to those in the fourth category, which related to *fear of apprehension and penalties*. Half of those who had not driven whilst impaired (50.2% to be precise) gave as one of the reasons for their behaviour fear of apprehension and/or fear of punishment. One in six (16.7%) mentioned fear of being caught (e.g.: "I don't want to get arrested"), a similar proportion (16.3%) mentioned loss of licence (e.g.: "I need my licence for my job"), while some (8.4%) mentioned higher fines (e.g.: "I can't afford a \$1000 fine") and some (8.8%) simply referred to RBT (e.g.: "The publicity associated with RBT makes one more aware"). Some of the comments made by people indicated the mechanisms of deterrence: some mentioned that they had been caught for drink-driving before RBT (a significant comment in view of the interaction depicted in Figure 5.5), some mentioned RBT publicity and some mentioned the operations of the police. Compared with other socio-demographic variables, the respondent's gender was by far the strongest predictor of whether fear was offered as an explanation: nearly two thirds of men (65.1%) referred to fear of arrest or penalties, but fewer than a quarter (23.4%) of the women. There was also a tendency for younger drivers, higher status drivers and heavy drinkers to be more concerned about apprehension and punishment. These patterns are interesting, since they were not clearly revealed in the analysis of perceptions of arrest certainty, but are consistent with the behavioural responses to RBT. This suggests that the open response data may have captured aspects of the subjective appraisal of RBT which escaped the more conventional measure of arrest certainty.

Building on these answers, questions were devised for the April survey which attempted to pin respondents down to a specific reason for not drinking and driving since RBT. Since in the February interview some respondents gave more than one answer, the April questions (AQ14[c] and 14[d]) asked non-drinking drivers to rank order their reasons: "From this card, could you choose the statement that *best describes* your reasons for not drinking and driving? What would be the *second* most important reason for your not drinking and driving?" Response categories were: drinking and driving is wrong, drinking and driving leads to accidents and drinking drivers stand a good chance of being caught and punished. These categories were deliberately selected to force a choice between morality and/or safety on the one hand, and fear of punishment on the other. Although the earlier open-ended question had revealed that for some respondents (particularly women) drinking whilst impaired wasn't very likely because they drank or drove very little, it was felt nevertheless that since all licence holders who drink are potential drink-drivers the choice should be put in this form.

In the present analysis, only the main reason for not driving whilst impaired is considered in detail. Of the 444 drinking licence holders who claimed not to have driven whilst impaired since RBT, only 15 were unsure of their reasons or declined to select one of the choices offered. However, in contrast to the open-ended question fewer than a quarter (24.5%) nominated fear of punishment as their primary motive, although 24% rated it as the second most important factor. Most nominated the risk of accidents (45.5%) or morality (26.6%) as their main reason for avoiding drinking and driving. This suggests that the form of the question may have had some effect on the answers, with fear of punishment being seen as the less socially desirable response. If this is correct, then the proportion admitting to fear as their primary motive is a conservative estimate.

In considering the correlates of people's main motive for avoiding drinking and driving, we have a choice between two approaches: we could follow Meier (1979) and exclude those who did in fact drive whilst impaired, or we could include these malefactors in the analysis. Given that "the deterred" can be regarded as those who have refrained from drinking and driving because they said they feared punishment (Meier), the question is whether the *percentage* who have been deterred should be calculated from the total of those who said they did not drink and drive or from the total of all potential offenders. In the present writer's judgement the second approach seems most logical; that is, all potential offenders should be included, and the proportion of these who have been deterred, using the term in the sense described above, should be regarded as the quantity of interest. However, excluding self-confessed drink-drivers has the advantage that the odds that the remaining respondents will nominate punishment over safety/morality as their primary motivation can be more easily analysed. The results of this conditional analysis are summarised later in this section.

If it is possible to identify (in the manner described) those who have been deterred, it is logical to ask whether being deterred is affected by exposure to RBT, either through publicity or through personal experience. We already know that some respondents mentioned these factors in their answers, but can their importance be documented through correlational analysis? In addition, it is of interest to ascertain whether having a conviction for drink-driving makes one more responsive than other motorists to the threat of punishment, a proposition supported by the analysis summarised in Figure 5.5 and also supported by comments made by some respondents. Finally, if the proposed method of identifying deterred motorists is valid, they should have higher arrest scores and may perceive sanctions as being more severe. (Alternatively, it is possible to regard this method of identifying deterred motorists as a way of validating the arrest measure.)

Investigation of the correlations with exposure to RBT and to RBT publicity revealed limited evidence for the hypothesised influence of these variables on the odds that a motorist would nominate fear as the main reason for not drinking and driving. The experience of being tested personally appeared to have no effect ($G^2(1) = .04$), but the recency and frequency of driving past an RBT operation did seem to have some bearing: only 17.5% of those who had not driven past an RBT operation gave fear as their main reason, while twice as many (35.7%) of those who had driven past four or more times, the last time a few days ago, gave this response. However, the relationship with the recency and frequency of driving past failed to reach statistical significance ($G^2(9) = 13.2$, $p = .15$). The only exposure variable which clearly predicted the "fear of punishment" response was newspaper publicity, with 27.5% versus 17.7% ($G^2(1) = 6.6$, $p = .01$). This variable survived adjustment for other variables in a logistic model ($G^2(1) = 5.6$, $p =$

.018), suggesting that newspaper publicity had a real impact and that the observed correlation did not simply reflect respondent characteristics.

As suggested by respondents' comments, those with a conviction for drinking and driving were much more likely to nominate fear as their primary motivation than those without a conviction (36.8% versus 19.8%, Yule's $Q = .40$, $G^2(1) = 5.39$, $p = .02$). However, unlike exposure to newspaper publicity, having a conviction did not survive adjustment for other variables, weakening the evidence for the deterrent impact of an earlier contact with the law.

As predicted, those nominating fear of punishment had higher arrest scores than those nominating safety or morality (means of 2.09 and 1.75 respectively), but their scores were not much higher than those of the people who *did* drink and drive (mean of 1.92). The overall relationship was not significant ($F(2,154) = 1.42$, $p = .25$). However, there was a significant relationship in the expected direction between giving fear as a reason for not drinking and driving and one's rating of the likelihood of being randomly tested in the next month ($X^2(5) = 13.42$, $p < .025$). Around a third of those who rated their chances of being tested as extremely or very high nominated fear as their main motive, about twice the proportion as in the lower probability categories. Similar, although weaker, relationships were observed for most of the other indices of arrest certainty, but not for perceptions of the severity of sanctions. Fear of punishment seems to be based largely on fear of apprehension.

The conditional analysis. As noted earlier, by excluding those who admitted to driving whilst impaired since RBT, it is possible to obtain a clearer idea of what factors were correlated with a concern for safety or for morality as opposed to being motivated by fear. The justification for this analysis is that by examining the motivations of those who were law abiding, we can come to a better understanding of how RBT may have influenced perceptions and behaviours (Meier, 1979). It is convenient for purposes of this analysis to group the 15 people who gave "other" or "unsure" responses with the 320 who nominated safety or moral factors.

Of the 444 law abiding motorists, three quarters (75.5%) mentioned safety/morality. Cross-tabulations confirmed the importance of newspapers in inducing fear as a motivation, and also more clearly revealed the role of observation of RBT operations. More than half of those who had driven past an RBT operation four or more times were motivated by fear of being caught and punished, compared with only 19% of those who had not driven past any RBT operations or who had done so only once or twice some time ago ($X^2(9) = 24.6$, $p < .005$). Again, having convictions for drinking and driving was significant ($X^2(1) = 9.4$, $p < .001$). However, by far the most important factor was respondent gender, with men being nearly three times as likely as women to nominate fear (35.2% versus 12.2%, $X^2(1) = 31.4$, $p = .000$, $\phi = .26$). Age was *not* significant, suggesting that young motorists are just as likely as older ones to operate on the basis of internalised norms or beliefs about road safety.

Safety/morality was least likely to be mentioned by moderate and heavy drinkers ($p < .001$) and by those subject to the greatest peer pressure to drink ($p < .001$). Interestingly, of the 35 respondents who claimed that since RBT it was harder to resist pressures to drink, 57.1% - more than twice the average - offered fear of getting caught as their main reason for not driving whilst impaired ($p < .001$). This reinforces the impression gained from the analysis of the arrest certainty scores (Figure 5.2) that for these people RBT simultaneously affected informal and formal sanctions, but in a mutually contradictory fashion. The implications for behaviour of the implied psychological conflict are explored further in the analysis of the longitudinal data.

Finally, it is worth noting that the minority motivated by fear reported more attempts to avoid drinking and driving, both through modifications to travel behaviours (means of .74 versus .44; $p < .005$) and through modifications to drinking (means of .93 versus .50; $p = .000$). These correlations provide a check on the validity of the behavioural measures, and suggest that fear of arrest was one factor influencing behaviour change.

Summary. The analysis of the data on the stated reasons for not drinking and driving yielded results broadly consistent with predictions of the deterrence model. In particular, there appeared to be an association between aspects of exposure to RBT and the odds of nominating fear of arrest as a reason for one's behaviour, and an association between being fearful and the extent of reported behaviour change. Moreover, those with a conviction were more likely to nominate fear as a reason for not drinking and driving. In these respects the results of the reason analysis paralleled the formal quantitative analysis incorporating the arrest score, and might be regarded as providing some support for the validity of the arrest measure.

The reason analysis highlighted the importance of concerns about road safety and the immorality of drinking and driving as motivations for avoiding the offence. Although one might argue that such an exploration of motives simply invites the socially desirable response (since high-minded statements about safety present the respondent in a better light than a self-interested desire to avoid arrest), it is significant that heavy drinkers were much less likely than others to project an image of moral rectitude. In any case, it is clear that measures of moral beliefs must be incorporated in future quantitative research (Norström, 1981).

A further valuable feature of the results of the reason analysis was the pronounced tendency for men to cite RBT and the fear of arrest rather than safety/morality as a motivation. This correlation did not emerge so clearly in the earlier analysis of the arrest measure, but is consistent with behaviour change reported in the interviews. The apparent influence of newspaper publicity is another example of a possible effect of RBT not revealed in the earlier analysis.

In conclusion, the reason analysis provided some valuable insights into the deterrence process, and extended the understanding of the impact of RBT beyond that provided by the analysis based on the measure of arrest certainty. It seems clear that when a change in the social environment is as well known and is as potentially influential as RBT, people are capable of providing useful information on its role as a factor actually influencing their behaviours. Such information is not simply descriptive or illustrative, but is an integral part of the total body of evidence against which the deterrence model should be tested.

The Longitudinal Study: February and April Compared

The emphasis of the analyses reported so far in this chapter has been on the interpretation of correlations arising from the second (April) survey. The analysis has, on the whole, supported the theoretical model set out in Chapter 2, and operationalised in Figure 2.1. In particular, support has been found for the hypothesised causal chain linking police activity with behaviour change, via the exposure of the target population to police enforcement leading to higher perceptions of the probability of arrest for drinking and driving. However, using a longitudinal design it is possible to address a number of questions which are not easily answered from the analysis of responses from a single survey.

In summary, the chief virtue of repeated interviews is that *changes* in perceptions and behaviours can be studied. It is possible to assess whether Ross' (1982) hypothesis of a decline in subjective arrest probabilities is supported, changes in reported behaviour can be investigated, and correlations between changes in arrest certainty and changes in behaviour can be computed. The longitudinal design has the further advantage that perceptions of arrest chances at time one can be correlated with reported drink-driving between time one and time two, thus avoiding the debates about causal order which have so plagued the perceptual research into deterrence.

It will be recalled that 185 of the 255 drinking licence holders interviewed in Sydney in the February survey were reinterviewed six weeks later. Of these, 10 were not included in the analysis since they claimed at the second interview (contrary to their first report) to drink less often than once a year. The 175 who were reinterviewed appeared to be a random subsample of the original 255, with the possibility that young heavy drinking men were slightly underrepresented.

The six weeks time period was deliberately selected so that the effects of the publicity campaign over Easter 1983 could be included in the study. It was expected that by February, 10 weeks after the introduction of RBT, the initial impact would be wearing off, and that the Easter publicity would give the whole campaign a boost. Moreover, in view of the international literature on legal innovations like RBT, it was expected that the overall impact would be rather short lived. When these considerations were added to the well known practical difficulties entailed in locating the same people over an extended time period, a six weeks interval between surveys seemed most appropriate. The selection of such a relatively short period did, however, create some problems for the analysis. The major problem was that in six weeks relatively few people were exposed to RBT, and only a small minority (6.9%) admitted to driving whilst impaired in that period. Thus there is a rather slender data base for some of the analyses which flow from the research questions, particularly the analysis of the effects of perceptions of sanctions on the extent of drink-driving.

In analysing the repeated interviews, the same strategy is followed as for the April data. After an analysis of the descriptive statistics and correlations, changes in perceptions of the chance of

being randomly tested are investigated. This leads to an analysis of behaviour change in the six weeks, including the testing of possible interaction effects. The analysis concludes with an investigation of the predictors of driving while intoxicated.

Summary Statistics and Correlations

A number of questions were repeated in the second survey. Other variables may be regarded as measuring constant quantities (e.g.: age and sex), so that the fact that they were derived from questions asked only once is no problem. The variables available for the analysis of the repeat interviews fall into six sets: the standard sociodemographic variables employed previously; exposure to RBT, both before the February interview and between the two interviews; drink-drive behaviour, both before the February interview (but since RBT) and between the interviews; perceptions of the severity of penalties; perceptions of the chances of being randomly tested at both interviews; and (at both interviews) modifications to drinking and travel behaviours occasioned by RBT. Of all these variables only the exposure, drink-drive and one of the penalty variables have been newly constructed. The distributions of these variables are set out in Table 5.15.

Table 5.15. Distributions of Measures of Exposure to RBT, Drink-drive Behavior and Perception of the Severity of Penalties (February Interview) for the 175 Respondents Interviewed Twice

<i>Exposure to RBT</i>	
<i>Variable</i>	<i>% of 175</i>
Tested between RBT and February interview	12.0
Driven past between RBT and February interview	52.0
Know someone tested between RBT and February interview	59.4
Tested between February and April interviews	5.7
Driven past between February and April interviews	16.0
Know someone tested between February and April	12.0
<i>Drink-driving</i>	
Drive impaired between RBT and February interview	11.4
Drive impaired between February and April interviews	6.9
<i>Perceptions of Penalties at the February Interview</i>	
Penalties increased	64.0
No change in penalties	14.3
Unsure/responses off the point	21.7

The question on impaired driving (AQ14[a]) dealt with driving when the respondent felt he or she had had *too much* to drink, not with whether they had driven over the .05 limit. The question on penalties (FQ13) dealt with changes believed to have occurred at the same time as

RBT. Of the 132 respondents (out of the 185 reinterviewed) who said changes had taken place, 118 (89.4%) believed (correctly) that penalties had increased. (This figure reduced to 112 when the 10 who became non-drinkers were excluded.) In the analysis, the two questions about penalties which were asked only in the April survey were also included, on the grounds that perceptions of the severity of penalties should not vary much due to RBT publicity or enforcement. Finally, it should be noted that the exposure variables all deal with police enforcement rather than with publicity, and that each exposure item is dichotomous (yes/no). The variables are constructed in this way because that is how they appeared on the February interview schedule. Moreover in response to the one question (FQ2[d]) asked in February about publicity, 97.2% of drinking licence holders (in Sydney) said they were aware of RBT publicity, so this question was not included in the analysis.

The correlations between most of the variables included in the analysis are set out in Table 5.16. As with Table 5.1, all binary and ordinal variables have been assigned arbitrary numerical codes in order to compute the Pearson correlations (occupation and need for a car, which are nominal scale variables, have been omitted). Although the Pearson correlations are in many cases not the most appropriate measures of association, they should allow a rough overview of the main relationships. (Correlations of .14 and higher are significant at .05 and are marked with one asterisk, and those .24 and higher are significant at .001, marked with two asterisks.)

With one exception the method of scoring follows exactly the category descriptions in Chapter 2 and the Appendix. The exception is the perceived likelihood of being randomly tested in the next month (FQ5 and AQ9), for which the order of categories has been reversed, making a high score of 5 correspond to a high subjective probability. (Note that the arrest index used in earlier analyses applies only to perceptions of the April interview. However, the question on perceptions of being tested was asked on both occasions.) All binary variables (e.g.: convictions for drink-driving or driven past an RBT operation between RBT and February) are ordered 1: yes and 2: no. The categories of the index of quantity and frequency of drinking have been reordered to make the variable approximately ordinal (occasional to heavy coded 1 to 5), as have the categories of perceived change in social pressure to drink (1 - easier, 2 - no difference and 3 - harder). The variable measuring perceptions of penalties in February was reduced to two categories: 1 - perceived increase in severity, and 2 - other responses.

Those admitting to impaired driving prior to the February interview tended to be young ($r = .27$), male ($r = .18$), heavy drinkers ($r = .23$) and subject to peer pressure to drink ($r = .17$). This pattern did not appear so marked for those driving whilst impaired *between* the interviews, since the highest correlation was .11. Drink-drivers were more likely than non-drink-drivers to have friends who had been randomly tested prior to the February interview ($r = .15$ for drink-driving between RBT and February, and .22 for drink-driving between interviews). On the face of it this is contrary to the predictions of the deterrence model, and somewhat puzzling in view of the association in the April data between perceptions of arrest chances and the number of friends tested. Also contrary to what might be predicted, but consistent with previous analyses, the drink-drivers were making more attempts than others to avoid further drink-driving through modifications to their travel arrangements ($r = .18$ for behaviour changes in February correlated with drink-driving prior to February, and .22 for behaviour changes in April correlated with drink-driving between interviews).

A new finding of great interest is that respondents who believed in February that penalties had increased were less likely subsequently to drive whilst impaired ($r = -.17$). The two measures of penalty severity from the April interview did not predict drink-drive behaviour in the same fashion ($r = .10$, maximum). In fact the correlations of these variables with the February item were .06 and .00, suggesting that for some reason they may not be tapping the same dimension as the February question. Surprisingly, there was no correlation between the subjective risk of being tested in February and subsequent drink-drive behaviour ($r = -.01$).

An increase in the number of attempts to avoid drink-driving through modifications to travel arrangements was characteristic of light drinkers ($r = .22$ for February and .37 for April) and those who felt little pressure to drink ($r = .15$ for February and .23 for April). Curiously, an increase in this avoidance behaviour corresponded to a *decline* in subjective probabilities of being tested ($r = -.15$), a phenomenon which requires further exploration. Equally strange, the negative correlation with perceived penalty severity in February ($r = -.19$) indicates that those who believed in February that penalties had increased *reduced* their number of travel modifications between February and

Table 5.16. Correlations in the Longitudinal Study (N = 175) Between Personal Characteristics, Exposure to RBT, Drinking and Driving Behaviours and Perceptual Variables

<i>Personal Characteristics/Drink-drive Behaviour</i>									
	<i>Drink-drive Convictions</i>	<i>Peer Pressure</i>	<i>Change in Pressure</i>	<i>Age</i>	<i>Sex</i>	<i>Education</i>	<i>Quantity/Frequency of Drinking</i>	<i>Drink-drive RBT-February</i>	<i>Drink-drive February-April</i>
Peer Pressure	.24**								
Change in Pressure	-.03	-.04							
Age	-.08	.23*	.09						
Sex	.17*	.33**	.06	-.03					
Education	.13	.11	-.17*	-.12	.10				
Quantity-Frequency Drinking	-.22*	-.27**	-.04	-.03	-.39**	-.01			
Drink-drive,RBT-February	.08	.17*	.08	.27**	.18*	-.06	-.23*		
Drink-drive,February-April	.04	-.03	.04	.11	.00	-.01	.09	-.10	
Tested,RBT-February	.23*	.10	.00	.06	.01	.10	-.06	-.02	.11
Driven Past,RBT-February	.12	-.03	.06	.18*	.03	.02	-.02	-.01	.03
No. Known,RBT-February	.14	.16	.09	.19*	.11	-.09	-.16	.15*	.22*
Tested,February-April	-.06	-.06	-.05	.05	.02	-.03	.04	-.01	.13
Driven Past,February-April	-.10	.08	.11	.01	.09	-.05	-.07	.09	-.06
No. Known,February-April	-.09	-.03	.10	-.15*	.04	.02	.11	-.08	-.10
Knowledge of Penalty Increase	.01	-.07	-.01	.00	-.04	.14*	.02	-.03	-.17*
Caught/No Penalty	-.03	-.03	-.02	-.03	-.23*	-.01	.10	-.07	.08
Perception of Penalties	-.05	.04	.02	.06	-.05	.02	.07	.03	-.10
Travel Modifications:Feb.	-.07	-.15*	.02	-.26**	-.16*	.00	.22*	-.18*	-.13
Travel Modifications: April	-.19*	-.23*	-.12	-.25**	-.25**	.00	.37**	-.07	-.22*
Travel Changes:Feb.-April	.13	.08	.16*	-.02	.10	-.01	-.16*	-.12	.08
Drinking Modifications:Feb.	-.12	-.14*	-.11	-.13	-.14*	.07	.29**	.04	-.08
Drinking Modifications:April	-.11	-.24**	.00	.00	-.22*	.06	.35**	.07	-.07
Drinking Changes:Feb-April	-.02	.10	-.12	-.14*	.08	.01	-.06	-.03	-.01
Chance of RBT: February	-.11	-.20*	.04	-.01	-.16*	-.15*	.10	-.08	-.01
Chance of RBT: April	-.10	-.18*	.05	-.05	-.12	-.22*	.05	-.08	-.03
Chance of RBT: Feb-April	-.02	-.03	.00	.04	-.04	.05	.06	.00	.02

Exposure to RBT/Perceptions of Penalties

	<i>Tested: RBT-February</i>	<i>Driven Past RBT-Feb</i>	<i>No. Known RBT-February</i>	<i>Tested February-April</i>	<i>Driven Past: Feb-Apr</i>	<i>No. Known February-April</i>	<i>Knowledge of Penalty Increase</i>	<i>Caught/No Pen. April</i>	<i>Percep. of Pen. in April</i>
Driven Past,RBT-Feb.	.25**								
No. Known,RBT-Feb.	.27**	.13							
Tested,February-April	-.10	-.06	-.05						
Driven Past,Feb-April	-.11	-.45**	.01	.09					
No. Known,Feb-April	-.13	-.03	-.45**	-.02	.03				
Know Penalty Increase	.09	.07	-.13	-.12	-.12	.06			
Caught/No Penalty	.02	-.02	-.01	-.07	-.06	-.05	.00		
Perception of Penalties	-.09	-.14*	.00	-.07	-.08	-.11	.06	.22*	
Travel Mods: February	-.26**	-.16*	-.18*	.10	.14*	.06	-.13	.10	-.10
Travel Mods: April	-.24**	-.05	-.27**	-.04	-.07	.12	.04	.02	.00

Table 5.16 (continued)

<i>Exposure to RBT/Perceptions of Penalties</i>									
	<i>Tested: RBT- February</i>	<i>Driven Past RBT-Feb</i>	<i>No. Known RBT- February</i>	<i>Tested February -April</i>	<i>Driven Past: Feb-Apr</i>	<i>No. Known February- April</i>	<i>Knowledge of Penalty Increase</i>	<i>Caught/ No Pen. April</i>	<i>Percep. of Pen. in April</i>
Travel Changes:Feb-Apr	-.02	-.12	.09	.15*	.23*	-.06	-.19*	.10	-.10
Drinking Mods: Feb.	-.13	-.13	-.14*	.13	.04	.02	-.03	.12	.08
Drinking Mods:April	-.02	-.07	-.13	.12	.09	-.02	.04	.12	.14*
Drinking Mods:Feb-Apr	-.11	-.07	-.02	.01	-.05	.04	-.07	.00	-.07
Chance of RBT:Feb.	-.12	-.05	-.08	-.13	-.12	-.02	-.07	.07	.15*
Chance of RBT:April	-.13	-.06	-.11	.01	-.10	-.07	-.15*	.00	.05
Chance of RBT:Feb-Apr	.02	.01	.02	-.15*	-.03	.05	.08	.08	.10

Drinking and Travel Behaviours/Perceived Chance of Being Randomly Tested

	<i>Travel Mods: February</i>	<i>Travel Mods: April</i>	<i>Travel Changes: Feb-April</i>	<i>Drinking Mods: February</i>	<i>Drinking Mods: April</i>	<i>Drinking Changes: Feb-April</i>	<i>Chance of RBT: February</i>	<i>Chance of RBT: April</i>
Travel Mods: April	.58**							
Travel Changes: Feb-April	.47**	-.44**						
Drinking Mods: February	.36**	.32**	.05					
Drinking Mods: April	.11	.30**	-.19*	.58**				
Drinking Changes:Feb-April	.27**	.03	.26**	.48**	-.44**			
Chance of RBT: February	.11	.22*	-.11	.14*	.13	.02		
Chance of RBT: April	.19*	.16*	.03	.20**	.15*	.06	.50**	
Chance of RBT: Feb-April	-.07	.07	-.15*	-.04	-.01	-.03	.54**	-.46**

Note: The variables Travel Changes: February-April, Drinking Changes: February-April and Chance of RBT: February-April represent *difference scores* for modifications to travel, drinking and perceived chances of being randomly tested (February score minus April score).

* $p < .05$. ** $p < .001$

April. More reassuringly, those tested or driving past an RBT operation between the two interviews increased their attempts to avoid drinking and driving through modifications to their travel arrangements ($r = .15$ for tested and $.23$ for driven past).

Changes in drinking modifications were positively correlated with changes in modifications to travel ($r = .26$), but were otherwise predicted only by age (older respondents were more likely to step up modifications to their drinking habits: $r = .14$). The change in the perceived chances of being tested was also correlated with only one variable, whether the respondent had been tested between interviews ($r = -.15$). Again, however, the correlation was opposite in direction to that which would have been predicted (those tested were more likely to see the chances of being tested as *lower* in April than in February).

In summary, the most interesting correlation is that indicating that those aware of penalty increases in February were less likely to drive whilst impaired in the period February to April. The most puzzling correlations are those involving changes in the perceived chances of being tested and that between changes in travel behaviours and perceptions of penalties in February, all of which go in what seems to be the wrong direction.

Changes in Perceptions of the Chance of Being Randomly Tested Between February and April

The major hypothesis that we wish to test is that subjective arrest probabilities declined between February and April. A significant decline would be a strong result, since it would indicate a diminution in the deterrent effectiveness of RBT *despite* the Easter campaign. Strictly speaking, it is not possible to test this hypothesis from the longitudinal data, since only the question on the chances of being randomly tested was repeated. However, perceptions of random testing must constitute a major part of the calculation of the probability of arrest, so the restriction is not very serious. The responses were scored on a five point scale, but to maintain comparability with the preceding analysis the categories were reversed in order, so that a high score indicates a high subjective probability of being randomly tested in the next month. Six people were unsure of their chances either in February or in April, so the analysis is based on 169 cases. The distribution of change scores is set out in Table 5.17.

Table 5.17. Changes in the Perceptions of the Chances of Being Randomly Tested (February Minus April: $N = 169$)

	Change score	Frequency	Occasion	M	SD
Increase in chances of being tested	-3	1	February	2.70	1.11
	-2	12	April	2.56	1.05
	-1	23			
Decline in chances of being tested	0	74	February minus April	.14	1.07
	1	48			
	2	8			
	3	2			
	4	1			

A paired t test applied to the difference scores yielded a value of $t(168) = 1.73$, with a two tailed p value of .085, which is not quite significant. However, an examination of the difference scores reveals that of the 95 people who changed their ratings, 59 believed their chances had declined and only 36 that they had increased. Applying the sign test, we obtain a p value of .015. There is thus strong evidence for a decline in the perceived chances of being tested over the six weeks separating the two surveys. This decline occurred despite the Easter publicity campaign, but might have been greater in magnitude, of course, if the campaign had not taken place.

The discrepancy between the results of the paired t test and the sign test suggests that the t test lacks statistical power, despite the large sample size. This is possibly because of the discrete nature of the scores or their skewed distribution. Whatever the reason, it is likely that the results of parametric tests applied to these data will be conservative. Even allowing for this, however, there was no evidence at all using ANOVA and regression that any subgroup of the population, apart from those tested between February and April, differed from any other in the rate of decline in subjective probability of being tested. As revealed by the simple correlations, for those tested in the interval between surveys the decline in subjective probability was *greater* than for other groups ($r = -.15$, $p = .044$ from the ANOVA). However, a causal relationship between these two variables is unlikely, since controls for peer pressure to drink and the quantity and frequency of drinking are sufficient to render the test non-significant ($p = .075$).

In summary, there is evidence for a decline in the estimated probabilities of being randomly tested in the six weeks between interviews. However, there is no evidence that this decline was more pronounced among particular subgroups of the population of drinking licence holders in Sydney.

Analysis of the Retrospective Question on the Chances of Being Randomly Tested

In addition to being asked about their perceptions of the chances of being tested in the next month, respondents in February and in April were asked to indicate, on the same five point scale, how they would have answered that question if they had been asked the day RBT was brought in. The purpose of this retrospective question was to develop a measure of the extent to which respondents believed they had shifted in perceptions of RBT in the weeks since its introduction. While it is unlikely that answers to this question are a valid substitute for responses which would have been obtained on the actual day, the question nevertheless affords an opportunity to examine the psychological impact of RBT from a slightly different perspective. Thus there are four items which can be analysed: the subjective chances of being tested in February and April, and memories of initial reactions to RBT for both February and April. Since 18 people were unsure of their answers to one or more of these four questions, the sample size is reduced to 157.

Interestingly, while people declined in subjective probabilities of being tested in the next month, they revised their memories of their initial reactions to RBT in an upward direction. That is, the mean retrospective probability of being tested was higher in April, at 3.35 ($SD = 1.78$), than in February, when the mean was 3.13 ($SD = 1.21$). If we regard the gap between current and retrospective assessments as indicating a feeling of reduced risk, then it seems that the legal threat was viewed as less serious in April than in February. This is consistent with the conclusion from the analysis of current ratings of arrest probabilities.

These data may be analysed formally as a 2×2 fully repeated factorial design (retrospective/actual \times April/February). Multivariate procedures are required since all four measures were correlated (the correlation between the retrospective items on both occasions was .41, and the retrospective and current ratings were also highly correlated at both interviews). The usual method of analysis (Morrison, 1976) involves the construction of three orthogonal contrasts: *interaction* ([February current - February retrospective] - [April current - April retrospective]), *current - retrospective main effect* (February current + April current - February retrospective - April retrospective) and *February - April main effect* (February current + February retrospective - April current - April retrospective). These transformed variables are not independent ($p = .015$), hence the null hypothesis of sphericity is rejected and each contrast must be adjusted for the effects of others.

The interaction was marginally significant ($p = .057$) adjusted for the main effects. Since the interaction contrast is simply the difference in the gap between current and retrospective scores in February and April, the statistical analysis confirms (although at a marginal level of significance) the interpretation noted above. Thus the incorporation of the retrospective item in the analysis slightly strengthens the interpretation of a decline in deterrent effectiveness of RBT between February and April.

The repeated measures analysis can be extended by investigating whether the changes in scores over time are predicted by other variables. It is possible, for example, that the decline in subjective probabilities was more marked for men than for women. In fact, consistent with the analysis of changes in current ratings, very few predictors were significant. Even allowing for the conservative nature of the tests, only one variable had any predictive power: respondents who had been randomly tested prior to the February interview were more likely to rate their current chance of being tested (averaged over both interviews) as higher than they would have rated it when RBT was brought in ($p = .029$). This was contrary to the general trend for retrospective ratings to be higher than current ratings, but is consistent with the operation of deterrence. The effect was quite marked: .56 units on the 5-point scale, or half a standard deviation.

Changes Between February and April in the Number of Modifications to Travel and Drinking Behaviours due to RBT

Given the evidence for a decline in the perceived chances of being tested between February and April it might be expected that the number of people taking steps to avoid drinking and driving, or the number of avoidance tactics employed by a given person, would also have declined. Summary statistics for drinking and travel behaviours affected by RBT are set out in Table 5.18, for February and April.

Table 5.18. The Number of Tactics Employed to Avoid Drinking and Driving in February and April ($N = 175$ Drinking Licence Holders)

		February		April	
		Current	Retrospective	Current	Retrospective
Travel Behaviour	<i>M</i>	.50	.51	.55	.58
	<i>SD</i>	.99	1.00	.97	.97
	% not affected	70.9	70.3	66.3	65.1
Drinking Patterns	<i>M</i>	.66	.67	.61	.66
	<i>SD</i>	.87	.87	.86	.86
	% not affected	56.6	55.4	58.9	54.9
Total Behaviour Change	<i>M</i>	1.16	1.20	1.17	1.26
	<i>SD</i>	1.53	1.50	1.47	1.46
	% not affected	45.1	41.1	44.6	40.0

At the first interview more people had changed their drinking behaviours than their travel arrangements, but by April the proportion whose travel was affected had increased slightly, while the proportion modifying their drinking patterns had slightly decreased. The majority of drinking licence holders had modified their behaviour in at least one way, as indicated by the bottom line of Table 5.18, and there was almost no change in total avoidance behaviour between surveys. Correlations between February and April scores were moderate, ranging from .4 to .6. Correlations between current and retrospective behaviour scores were of the order of .8 or .9. Once again the null hypothesis of sphericity was rejected ($p = .000$ for both drinking and travel behaviours), necessitating a multivariate analysis. The data were analysed as a 2×2 fully repeated factorial, as above, and also as simple changes scores from current behaviours in February and April.

Without taking into account the influence of any predictors, there was no evidence of any statistically significant changes in behaviour, using both the sign test and the t test, and focussing both on current behaviours alone and on current and retrospective behaviours together (as a 2×2 design). Thus, overall, the pattern of behavioural responses to RBT appeared to be stable between February and April, and moreover respondents did not perceive themselves as having shifted appreciably from their reactions the day RBT was brought in. However, analysis of predictors revealed a more complex pattern. Although on average there were no changes in behaviour, in specific subgroups there were changes, some positive and some negative.

Travel behaviours. A number of factors influenced travel behaviour. It is convenient to focus on actual changes in behaviour (that is, the number of ways people were modifying their travel or driving arrangements in February minus the same number in April) and refer to the results of the analyses which incorporated the retrospective questions only when they shed light on the analysis of simple changes.

The inspection of correlations revealed that increases in travel modifications were positively correlated with being tested or driving past an RBT station between interviews and with being a light drinker not subject to peer pressure. In addition, increases in modifications to travel were negatively correlated with increases in the perceived chance of being tested and with perceptions of more severe penalties in February. These same factors emerged in ANOVA, the results of which are therefore not reproduced. Following the procedures used in previous analyses, a model with all

predictors was fitted and reduced to an adequate subset.

There were 22 predictors in all: the three measures of exposure to RBT between interviews and the same three measures for the period up till the February interview; two measures of change in perceptions of the chances of being tested (one's chances personally of being tested in the next month plus the question about the drink-driver who was not obviously drunk); the three measures of penalty severity discussed above; drink-drive behaviour between RBT and February and between February and April; and the nine sociodemographic variables. R^2 for the model was high, at 45.7% ($p = .018$), with nearly the same set of variables which were significant in the zero order correlations emerging as significant at or near the .05 level, adjusting for all other factors. Missing from the set was the quantity and frequency of drinking ($p = .56$). Additions to the set were having a drink-drive conviction ($p = .007$) and perceptions of the chance of being let off in court without penalty ($p = .027$). Those with a conviction were more likely than those without to increase the number of modifications to their mode of travel, but those perceiving no chance at all of being let off without penalty (once caught) *reduced* their attempts to avoid drink-driving. This last effect is consistent with the effects of perceptions of a penalty increase in the February interview.

Many subsets were fitted with a view to arriving at one which was minimal adequate using a level of significance of .025. One adequate subset had an R^2 of 23.6% and consisted of six variables: driving past an RBT station between interviews (contribution to $R^2 = 7.9\%$; $p = .000$); being tested between interviews ($R^2 = 2.0\%$; $p = .041$); drink-driving between RBT and February ($R^2 = 2.9\%$; $p = .007$); peer pressure to drink ($R^2 = 7.2\%$; $p = .015$); change in pressure since RBT ($R^2 = 2.9\%$; $p = .054$); and convictions for drink-driving ($R^2 = 3.3\%$; $p = .010$). To make this set minimal adequate, being tested between interviews ($p = .041$) and change in pressure to drink ($p = .054$) should be omitted. However, since the tests of significance are almost certainly conservative, given the skewed nature of the dependent variable, it was decided to retain these two variables in the model. The effects of all six variables are set out in Figure 5.6.

The remarkable thing about the effects depicted in Figure 5.6 is that they are so intuitively reasonable, and so consistent with the hypothesis of deterrence. Those tested between interviews and, even more strongly, those who had driven past an RBT operation were more likely than other respondents to increase their attempts to avoid drink-driving through modifications to methods of travel. Moreover, those with a conviction for drink-driving were markedly more likely than those without a conviction to increase these avoidance behaviours, a result consistent with previous analyses of travel behaviours. Consistent with the hypothesis of an experiential effect, those who had driven whilst impaired since RBT but before the February interview subsequently reduced their attempts to avoid drink-driving.

In an alternative reduced model, perceptions of a penalty increase in February ($R^2 = 3.7\%$; $p = .017$) replaced being tested between interviews as a predictor. As noted previously, the direction of the correlation with change in behaviour was counterintuitive. The effects of all other predictors were as shown in Figure 5.6.

Interaction Effects Predicting Changes in Travel Behaviours Between Surveys

Although significant as a zero order correlation, after adjustment for the factors in the reduced model there was no evidence of a relationship between change in perceptions of the chance of being randomly tested and change in travel modifications. The failure to find a positive correlation between these quantities is an important outcome, since deterrence theory would predict such a relationship. However, according to deterrence theory a number of interactions involving arrest perceptions should be significant, so it is possible that the predicted effect can be found in certain subgroups.

In all, four interaction terms were tested: change in the perceived chance of being tested by perceptions in February of a penalty increase; change in test probability by peer pressure; change in test probability by drink-drive convictions; and drink-drive convictions by perceptions of a penalty increase. All these interactions can easily be justified on theoretical grounds. Only two interactions were close to significant at the .05 level: conviction by penalty increase ($p = .047$) and peer pressure by change in test probability ($p = .056$). Although these interactions are only marginally significant, their interpretation helps to clarify some of the puzzling correlations noted above.

Only nine respondents, or 5.3% of the sample of 169, had a conviction for drink-driving, so

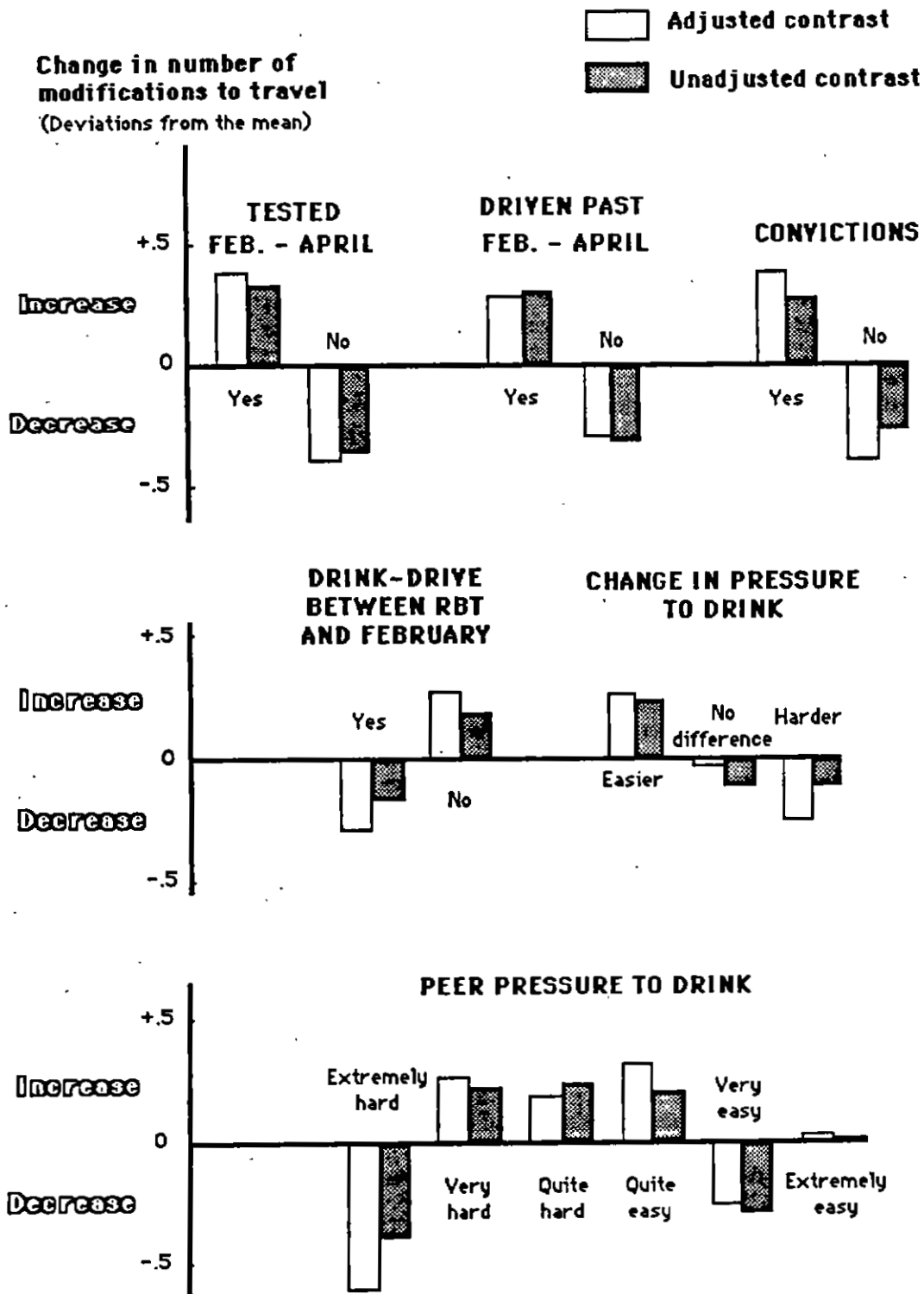


Figure 5.6. Reduced Model of Predictors for Changes in the Number of Modifications to Travel Arrangements Between February and April: Adjusted and Unadjusted Effects

the conviction by penalty interaction should be interpreted carefully. Nevertheless, the six with a conviction who believed penalties had increased were much more likely than other groups to increase their attempts to avoid drink-driving. The mean increase in this group was .83, compared with an overall average of .05. Once again, it seems that the convicted group responded more strongly to legal sanctions, but in the present case the operative dimension is penalty severity, not arrest certainty.

The peer pressure by change in test probability interaction indicated that the paradoxical correlation between change in subjective test probability and change in travel behaviours was primarily due to the responses of those who felt subject to the greatest peer pressure to drink. Among this group the counterintuitive negative correlation was very strong, but among respondents not subject to such heavy pressure there was no significant relationship between changes in subjective probability and changes in behaviour. It is not clear why the relationship between these variables should be the opposite of what one would predict only among those subject to the greatest peer pressure, but an explanation in terms of the opposing forces of formal and informal sanctions seems called for. In any case, it is important to note that for no subgroup could a well behaved positive correlation between the two sets of change scores be found.

Analysis of the Retrospective Question for Travel Behaviours

The repeated measures analysis, incorporating the 2 x 2 design structure, yielded results similar to those set out above, with one additional interesting finding. If the respondent reported drinking and driving between February and April, the number of modifications to their travel arrangements which they were actually making at both dates was greater than their recollection of the initial impact of RBT on their driving ($p = .029$). This suggests that because they knew they had driven when they had had too much to drink, they may have become more aware of the need to avoid it in future. However, such drivers had not actually increased their attempts to avoid drinking and driving between the two interviews so probably their responses can be dismissed as pious intentions (although it can perhaps be added that they were at least aware of the value of piety).

Changes in Drinking Behaviours Between February and April

Changes in drinking behaviours were not strongly associated with any predictor. The full model with all predictors included was highly non-significant ($p = .983$). The only predictor to approach significance was the February rating of the likelihood of being randomly tested ($p = .099$). Respondents who saw their chances of being tested as likely or quite likely (22.9% of the sample) increased the number of modifications to their drinking patterns by .15, while those who considered they only had an even chance reduced the number of modifications by .19. The difference between these two groups was just statistically significant ($p = .041$). The result is consistent with deterrence theory, but the relationship was weak.

The analysis incorporating the retrospective question yielded one other item of information: those randomly tested prior to February claimed to be modifying their drinking behaviours more than when RBT was brought in ($p = .014$). This result is also consistent with a deterrent effect. However, these people recorded no real behavioural change between interviews.

Drink-driving Between February and April

The final question to be addressed in this chapter is the one which, in the literature, has consumed most energy. All the analyses of behaviour reported so far in this study have focussed on reported attempts to *avoid* drinking and driving. The question to be considered now is whether all the information we have about respondents from the February interview can be used to predict reports of actual drink-driving behaviour in the following six weeks. Such a methodology avoids the problems involved in inferring causal relationships in a cross-sectional study, since only variables prior in time to the drink-driving behaviour are included. Unfortunately, the exigencies of sampling precluded the kind of thorough analysis of drink-driving made possible in principle by the

longitudinal design, since as previously noted, only 12 respondents could be identified unambiguously as having driven whilst impaired in the six weeks between interviews. Given this small number, only limited analyses of the drinking-driving item are possible.

The item was treated as a binary (yes/no) response, and a series of logistic analyses carried out using the February variables one at a time as predictors. Only three were significant (one marginally): perceptions of penalty increases in February ($G^2(1) = 5.15; p = .023$), perceptions of the chances of being let off without penalty (dichotomising the variable as zero chance/other, $G^2(1) = 3.07; p = .080$, but $X^2(1) = 3.98; p = .046$), and whether the respondent knew someone before the February interview who had been randomly tested ($G^2(1) = 12.49; p = .000$).

Respondents who believed in February that the severity of penalties had increased at the time RBT was introduced were 3.5 times less likely than the rest to report drinking and driving between February and April (3.4% of the 118 who believed penalties had increased drove while intoxicated, compared with 11.9% of the 67 who were not aware of increases). Similarly, only one of the 64 who believed they had a zero chance of being let off without penalty drove whilst impaired (1.6%), compared with 10 of the 108 who considered they had some chance (9.3%). All 12 who reported drinking and driving knew someone who had been randomly tested. When the two most significant variables (penalty increase and knowing) were fitted together, the penalty variable became marginally significant ($p = .059$) but knowing someone who had been tested retained its power ($p = .001$). In fact this variable retained its power when adjusted for a wide range of other variables, including age, sex and level of drinking.

Perceptions of the likelihood of being tested did not show up at all, either as a main effect ($X^2(2) = .13$) or (as deterrence theory might predict) as an interaction with perceptions of penalties ($X^2(2) = 2.70; p = .26$). Moreover, there was no evidence of an interaction between drink-drive convictions and subjective probability of being tested, nor between drink-drive convictions and perceptions of a penalty increase. The failure to find significant interactions, particularly with drink-drive convictions, is probably mainly a function of the small number of cases of drink-driving available for analysis.

The Relationship Between Actions Taken to Avoid Drink-driving and Actual Drink-driving Behaviour

In Figure 2.1 and in the formulations of the deterrence model in Chapter 2, a link is assumed between attempts to avoid drinking and driving and the actual rate at which a respondent commits the offence. That is, it is assumed, other things being equal, that the more someone modifies their drinking and travel behaviours the less likely they are to drive whilst impaired. The longitudinal component of the study affords an opportunity to test this assumption.

The prediction is that people making more changes to their travel and drinking behaviours in February will be less likely to drink and drive between February and April. However, the data do not support this prediction. The correlations were all in the wrong direction, although below the .05 level of significance: -.13 for travel modifications, -.08 for drinking modifications, and -.13 for all types of modifications to behaviour. Tabular analysis did not alter the picture. Moreover, contrary to predictions of an experiential effect, the correlations between drink-driving between interviews and modifications to behaviour in April were also in the wrong direction. This is consistent with what was observed in the analysis of the 517 April interviews.

What are we to make of these correlations? Three comments seem called for. Firstly, with only 12 cases of drink-driving it is difficult to draw firm inferences. Secondly, it is clear from previous analyses that while many of those most at risk of drink-driving were making strenuous attempts to avoid it in future, they were still committing the offence at a higher rate than low risk groups. This suggests that the correlations between behaviour modifications and drink-driving should be controlled for the effects of variables like age, sex and level of drinking. Thirdly, and most fundamentally, there is a need to control the correlations for baseline levels of modifications to behaviour. To do this, however, three waves of interviews are required. With three interviews (say A, B and C) it would be possible to correlate changes in the number of attempts to avoid drink-driving between A and B with drink-driving in the period B to C. Using this type of methodology it has already been established (from the reduced model for changes to travel modifications) that there is an experiential effect, since those who drove whilst impaired since RBT

(A) but before the February interview (B) were more likely than other groups to have reduced the number of modifications to their travel behaviours by April (C). It seems, however, that empirical verification of the reverse phenomenon will have to await future research.

Perceptions and Evaluations of Penalty Severity

A feature of the analysis of the 175 repeat interviews is the greater than usual prominence of a measure of perceptions of penalty severity (whether or not respondents believed in February that penalties had increased with the introduction of RBT). Neither of the two questions about penalty severity in the April interview played much part in any of the analyses, but the February question seemed to tap an aspect of the December legal innovations which had some real psychological impact, independent of the effects of the fear of being tested and arrested. Given the central theoretical importance of perceptions and evaluations of penalty severity, as well as the almost complete absence in the literature of empirical evidence for their effects, it will be useful to conclude this analysis of the survey data by reporting the results of an analysis of responses to a question in which *evaluations* of penalty severity (as opposed to *perceptions*) were explicitly probed, and also by summarising the pattern of significant correlations involving perceptions of penalty severity.

Evaluations of penalty severity among convicted offenders. Buikhuisen (1969) asked 107 Dutch drink-drive offenders (that is, a sample of those convicted for drink-driving) whether they would find two weeks in prison or six months disqualification the harsher penalty. The purpose of Buikhuisen's survey was to demonstrate the need to qualify the frequent assertion that disqualification is regarded as the most severe penalty. An advantage of questioning convicted offenders is that all have experienced arrest and a court appearance and nearly all would have experienced licence disqualification (in Holland many would also have experienced a short period of imprisonment). This means that responses to the question should accurately reflect evaluations of the severity of the two types of penalties, holding the experience of apprehension and conviction constant. About half of Buikhuisen's sample (49%) regarded prison as the harsher penalty, with offenders of higher social status and those who least needed a car preferring disqualification.

Buikhuisen's question was repeated in the present study to see whether similar results would be found in an Australian sample. Of the 38 respondents with a conviction in the April survey, 35 could state a preference and 3 regarded the penalties as being of equal severity. Of the 35 who stated a preference, 18, or 51.4%, regarded prison as the more severe penalty. This figure is almost identical with that reported by Buikhuisen. In addition, the same two variables reported by Buikhuisen, and only those two, correlated significantly with stated preferences. Out of 9 professional and white collar workers, 8 regarded prison as the more severe penalty, compared with only 7 of the 21 blue collar and unemployed respondents ($X^2(1) = 7.8; p = .000$). Of the 19 respondents who claimed a car was essential for their work, more than two-thirds (68.4%) stated that disqualification for them would be more severe. This compared with a proportion of only 28.6% among the 14 for whom a car was not essential ($X^2(1) = 4.1; p < .05$).

The identical results obtained in the two studies suggests that social factors common to all industrialised countries are operating to influence evaluations of penalty severity among convicted offenders. In the general population, the relationship between perceptions of the severity of penalties (a factor varied systematically in the Buikhuisen study) and the evaluations of such perceptions may not be purely idiosyncratic, but may vary in a systematic fashion according to an individual's social circumstances.

The role of perceptions of penalty severity in the deterrence process. It has been shown in the analysis of the longitudinal data that those who believed in February that penalties had increased were less likely to drink and drive in the following six weeks. In addition, those perceiving a penalty increase were more likely to be modifying their travel behaviours at the first interview ($r = -.13, p = .055$). Both these correlations are consistent with an initial deterrent effect. However, with the exception of the small minority with a conviction for drink-driving, those perceiving a penalty increase were more likely than average to reduce the number of types of modifications to their travel methods (so that by April there was no significant difference between those who believed there had been a penalty increase and those who did not). A possible explanation is that (with the notable exception of the convicted group) the deterrent impact of penalty severity was beginning to wane by the time of the April interview. Alternatively, it is

possible that by April some people had settled on a smaller number of methods of avoiding drink-driving, but were still as likely to take some action when there was a risk of driving after drinking.

If a real decline in avoidance tactics is indicated by the data, then it must have been bound up with the documented decline in subjective test probabilities. Unfortunately, the data on subjective test probabilities seem to reflect the operation of both formal and informal sanctions, and cannot be used to shed further light on this argument without extensive controls which are not presently possible. Nevertheless it does seem that the penalty severity analysis may provide, indirectly, another piece of evidence for an initial deterrent effect which was not completely maintained.

Summary of Main Results

The community context. RBT was introduced into a community in which the great majority of motorists drink. Nearly one drinking motorist in ten can be classified as a heavy drinker, and many of those who consume lesser quantities frequently engage in "binge" drinking leading to drunkenness. This latter pattern of drinking is characteristic of young men, particularly those in their early twenties, for whom beer is the preferred beverage. Men of this age often feel great pressure to continue drinking when in a group situation, although such pressure can be felt by all sectors of the community.

Driving after drinking is common behaviour in New South Wales. Nearly half of all drinking licence holders admitted to driving while intoxicated at some time in the past, and nearly one in ten had driven while intoxicated at least twice in the four months since the introduction of RBT. More than one in five of the heavy drinkers had driven while intoxicated at least twice, partly because they felt peer pressure very keenly. High alcohol consumption, perceived pressure to drink and driving while intoxicated comprise a cluster of correlated attributes. However, as a response to RBT, drivers with these characteristics were adopting a wider than normal range of strategies to avoid drink-driving.

Support for the deterrence model. Through police enforcement and media publicity, a very high proportion of motorists were aware of RBT, and more than one in ten had been tested personally within three months of the enactment of the law. As expected, the intensity of police random testing in an area was a major determinant of an individual's chances of being randomly tested, and was therefore a determinant of other aspects of exposure, such as the number of friends and acquaintances tested. The number of one's friends tested, rather than other aspects of exposure, was in turn a strong predictor of the perceived chances of being tested and arrested. Thus objective levels of enforcement were linked with perceptions of sanctions through this particular aspect of exposure. Finally, following the causal chain hypothesised in Figure 2.1, perceptions of the chances of arrest predicted the number of ways in which respondents were modifying both their drinking and their driving practices. The major predictions of the deterrence model might therefore be said to have been verified.

A number of other results provided support for the assertion that RBT achieved a deterrent effect in New South Wales, including the reasons offered for either drink-driving or not drink-driving and the outcome of the analysis of the longitudinal data. In the longitudinal analysis, direct exposure to RBT in the period between interviews corresponded to increased modifications to travel arrangements, and conversely experience with drink-driving corresponded to a decline in the number of such modifications. In addition, perceptions of an increase in penalty severity correlated with reduced drink-driving in the period between interviews, a surprising result in view of the literature but nevertheless in accordance with the deterrence model. The replication of Buikhuisen's (1969) study encourages the view that there is a relationship between perceptions and evaluations of penalty severity which varies systematically with social factors.

The relative importance of publicity and exposure to police enforcement of RBT. Despite the intense publicity accorded RBT over Easter 1983, in the longitudinal analysis exposure to police enforcement, rather than exposure to publicity, correlated with changes to travel practices. However, at this time about 95% of the target population were aware of RBT because of the initial publicity campaign, so it is not valid to conclude that publicity did not influence perceptions or behaviour. In the analysis of data from the April survey, those exposed to TV publicity (68.3% of the sample) had altered their travel arrangements to a greater extent than those

not exposed to TV publicity. Nevertheless it is likely that in order to *maintain* a deterrent effect created initially by massive publicity visible police enforcement is more important than further publicity campaigns, at least in the first few months.

The effects of RBT on peer pressure to drink. A substantial minority (40%) of drinking motorists found it easier since RBT to resist pressure to drink, and this in turn appeared to be an influence on behaviour independent of the effects of fear of punishment. On the other hand, one drinking motorist in twelve claimed to find it more difficult since RBT to cope with group pressure to drink. However, these people also had higher perceptions of the chances of arrest. In addition, among those who felt the greatest pressure to drink, an increase between interviews in the perceived chance of being tested coincided with a decline in the number of modifications to travel arrangements. These results are consistent with the theory of Chapter 2, since they suggest that when there is a conflict between the effects of formal and informal sanctions, informal sanctions will probably emerge as the stronger force.

The effects of alcohol consumption. One of the clearest findings of the study was that the greater a respondent's consumption of alcohol, and the greater the perceived pressure on him to drink, the more ways he reported modifying both his drinking habits and his travel arrangements. However there was evidence that among heavy drinkers the contradictory pressures of peer pressure and fear of arrest produced a psychologically unstable situation, making the deterrent impact of RBT in many cases rather short-lived.

The effects of a conviction. One of the most interesting results was the interaction between arrest certainty and a conviction for drink-driving. Among those with a conviction, arrest certainty explained nearly 20% of the variance in the number of changes to travel practices, compared with little more than 1% among those without a conviction. However the evidence fell short of establishing an absolute specific deterrent effect of punishment, since the interaction became non-significant when analysis was restricted to those who reported having driven whilst impaired sometime in the past. Nevertheless, those with a conviction were more likely to cite fear of arrest as a reason for avoiding drinking and driving. These results are consistent with the argument that legal threats have greater deterrent impact for those with a conviction because the threatened punishments are not merely theoretical. It is also of interest that the convicted group made more changes to their travel behaviours between interviews, an effect which was amplified if penalties were believed to have increased when RBT was introduced. This last interaction strengthens the argument that motorists with a conviction are more responsive than average to the threat of legal punishments.

The role of the perceived severity of penalty. Only one measure of perceived penalty severity - whether respondents believed penalties had increased when RBT was introduced - had any predictive power. The analyses based on this variable suggest that when the perceived chances of arrest are high, perceived penalty severity can have a deterrent impact additional to that of arrest certainty, particularly among those who have already suffered legal punishments for drinking and driving.

The effects of age and sex. Neither age nor sex predicted arrest certainty on its own or after adjustment for other variables, and neither variable played any significant role in the longitudinal analysis. These results suggest that RBT had much the same impact for men and women of all ages. However, the results of the analyses of changes in behaviour indicated that young men were more influenced by RBT than other groups. Moreover, men were more likely to cite fear of arrest as an explanation for their actions in avoiding drinking and driving, suggesting that the measure of arrest certainty may not be completely satisfactory. Thus men (young men in particular), were if anything more deterred by RBT than women (and older men). The only exception to this conclusion relates to men aged 21-24, who were slightly less likely than average to modify their drinking habits. No interactions with age and sex were significant, reinforcing the general conclusion that men and women of all ages were, on the whole, about equally responsive to RBT.

The effects of socioeconomic status. The shape of the relationship between socioeconomic status (measured by occupation and education) and arrest certainty was roughly an inverted-U, with those in the middle range (lower white collar and skilled blue collar) being most fearful of arrest. Occupation was significant as a predictor of changes in travel and drinking behaviours, but dropped out of the model when adjusted for age and other variables. It seems that RBT had roughly the same behavioural impact at all status levels.

Problems for the deterrence model. In a number of respects the analysis yielded findings which are not consistent with the predictions of the deterrence model. Many of the problems centre on the failure of the perceptual variables to behave as predicted. The analysis of reasons for not drink-driving suggests that the measure of arrest certainty may have missed important aspects of the perceptual process. This impression is supported by the results of many of the statistical analyses. Thus the effects of exposure to RBT on behaviour change should theoretically have been mediated through perceptions of the chances of arrest, but frequently exposure had a direct correlation with behaviour. In addition, drink-driving between interviews should have been predicted by perceptions in February of the chances of being randomly tested. Most serious was the failure to find a positive correlation between changes in the perceived probability of being tested between interviews and changes in the number of modifications to behaviour.

Additional problems relate to the negative correlation between drink-driving and the number of friends known to have been randomly tested, the failure to find evidence for an interaction between perceptions of arrest certainty and perceptions of penalty severity, and the apparent lack of relationship between the number of modifications to behaviour and the probability of drink-driving.

The reasons for these apparent failures in the deterrence model are explored further in Chapter 6.

6. IMPLICATIONS OF THE RESEARCH

In this chapter the validity of the deterrence model developed in Chapter 2 is evaluated in the light of the data analyses carried out in Chapter 5, and the implications of the research for the operation of the criminal justice system in New South Wales are briefly considered.

The main results of the study are reviewed, and considered in relation to the drink-drive and deterrence literatures. Propositions in the deterrence model which may need to be modified are identified, as are aspects which require further research. Improvements in research design and methods of analysis are also suggested. The conclusion of the review of the evidence is that the predictions of the deterrence model are, on the whole, correct as a description of how RBT affects behaviour, at least in the short term.

Following the evaluation of the deterrence model, the implications of the study for social policy are considered briefly. The emphasis is on ways of improving the deterrent effectiveness, and the fairness, of the enforcement process.

The chapter concludes with a discussion of the behavioural impact of the criminal justice system on drink-drive behaviour.

Review of the Study

It was emphasised in the description of RBT in Chapter 1 that the legislation was implemented and enforced in New South Wales with a thoroughness and rigor unprecedented in Australia and possibly anywhere else. Having made the decision to introduce RBT, the politicians committed the police to an extensive program of enforcement, and also committed millions of dollars for publicity of the police activity. In addition, RBT was not introduced gradually, but all at once on a particular date. Thus in many ways conditions were ideal for a general deterrent effect to be realised, and for the effect to be measurable. Putting this proposition more forcefully, if in the first few months of its operation a close link between RBT enforcement and drink-drive behaviour could not be demonstrated using the kind of model set out in Chapter 2, it would probably be necessary to conclude that, as a goal, general deterrence of the drinking driver is a pure chimera.

The fatal crash data presented in Figures 1.3 and 1.4, as well as the reduced proportion of dead drivers with positive blood alcohol concentrations (documented by Kearns and Goldsmith, 1984), are consistent with the argument that RBT was the cause of a sudden decline in road deaths in New South Wales. If no decline in traffic crash rates had been discernable, it would have been hard to believe that RBT had had much impact. Note, however, that in the present report no great weight is being placed on the crash statistics, which, given the emphasis on the *process* of deterrence, essentially constitute a way of "setting the scene". The thrust of the present argument is that in order to demonstrate beyond reasonable doubt that RBT was indeed the cause of the apparent drop in casualties, and that the mechanism was deterrence, it is necessary to measure the key variables of exposure to RBT and perceptions of arrest probability, and to demonstrate that these are linked with drink-driving behaviour in the manner depicted in Figure 2.1. The validity of the causal chain reflecting simple deterrence is therefore the central issue.

The major results of the study were summarised at the end of Chapter 5. In the summary, it was concluded that the model of simple deterrence was supported, despite the partial failure of some measures, particularly perceived arrest certainty, to behave in all respects in the predicted manner. It is argued in this section that most of the puzzling aspects of the RBT analyses noted in the summary and in Chapter 5 can be explained in terms of inadequate measures or in terms of unanticipated aspects of the operation of deterrence, rather than in terms of fundamental faults in the deterrence model. In particular, the weak (although statistically significant) nature of the relationships between many of the paths in Figure 2.1 is a result of limitations inherent in the survey method rather than a reflection of major theoretical deficiencies.

The Causal Chain Reflecting Simple Deterrence

Lp -> Ex. The high correlation (.79) between the intensity of police testing and the proportion tested in an area implies that both variables are reasonably reliable indicators of police RBT activity at the aggregate level. However, given the high proportion of inconsistent responses by motorists in the longitudinal analysis (discussed in Chapter 4), it appears that at the individual level the single question on the experience of being randomly tested (AQ2(a)) may have confused some respondents. Alternatively, the experience of being tested may not have made a strong enough impression to have been remembered six weeks later. In future research it will be necessary to clarify the question by separating the experience of the driver from that of the passenger. It may also be necessary to ask for details of the experience, perhaps by asking the respondent to "think aloud" (Loftus, Fienberg and Tanur, 1985), in order to check that the driver was really tested by police conducting RBT.

The number of random tests conducted in an area correlated well with the proportion of motorists personally tested, but correlated less well with the number of people known to the respondent to have been tested. The number of acquaintances randomly tested was the one exposure variable which, after adjustment for other variables, correlated with arrest certainty, and it therefore constitutes a critical link between police testing and perceptions of arrest certainty. It is possible that the relatively low reliability of the personal exposure measure is the reason why it does not play this mediating role. In any case, the low positive correlation between intensity of testing and the number known to have been tested is not contrary to the predictions of the model, since many factors may influence the size of a motorist's network of friends and the speed with which information is communicated. Moreover, it is obvious that a motorist must be tested personally before he can tell his friends of his experience.

Ex -> Pp. Apart from the possibility that the low reliability of the personal exposure measure is the problem, it is not clear why the experience of friends and acquaintances, rather than personal experience, should have been such an important factor in the formation of subjective arrest probabilities. In fact there was some evidence for the role of personal experience, both from the longitudinal study and from the analysis of reasons for not drinking and driving. People tested prior to the February interview *believed* that their subjectively rated chances of being tested were higher than when RBT was first introduced, even though there was no correlation between such exposure and *actual* changes between interviews in subjective probabilities. Moreover, those who had repeatedly or recently driven past an RBT operation were much more likely to nominate fear of arrest rather than fear of an accident as a reason for not drinking and driving. Nevertheless, the experiences of one's friends was the factor which most strongly correlated with the formal measure of arrest certainty.

From their simulation study of the deterrence of drink-driving, Summers and Harris (1979) concluded that word-of-mouth communication was not as important as media publicity and personal exposure to police activity. On the other hand, Zimring and Hawkins (1973) cite research (not on drinking and driving) which suggests that peer group contact is important insofar as it increases the salience of the legal threat. In the present case, it could be argued that especially in the early months of RBT, respondents may have tended to dismiss personal experience with RBT as a matter of bad luck, but may not have been able to dismiss the experience of several friends with the same degree of ease. However this explanation runs contrary to the results of the longitudinal analysis, in which it was shown that being tested, or driving past an RBT operation, resulted in an increase in modifications to travel behaviours between the two interviews (Figure 5.6). Moreover, in the longitudinal analysis driving while intoxicated appeared to be *more* likely if the respondent had friends who had been tested, although the small number of cases prevented adequate controls for factors like alcohol consumption which were correlated with having friends who had been tested. A priority for future research must be to explore in more depth the influence of the peer group on perceptions of sanctions, particularly since perceived pressure to drink in a group situation was such a strong influence on both perceptions of arrest certainty and behaviour change.

Although the experience of friends influenced arrest certainty, exposure to media publicity did not survive as a predictor. Radio publicity correlated with arrest certainty, but when adjustments were made for area and for the number of friends tested, it *dropped out of the model*. The fact that area remained as a predictor in the model suggests that regional variations in the type or quantity of radio broadcasts concerning RBT may have influenced arrest scores. It should also

be recalled that the arrest index had rather low reliability, and that some variables (such as radio publicity) may have been lost in the error variance. In addition, there was some evidence from the analysis of reasons for not drinking and driving that newspaper publicity may have caused people to be fearful of arrest. Nevertheless, the overall impression from all the analyses is that media publicity was less important as an influence on perceptions and behaviour than direct exposure to RBT in some form.

A surprising result of the analysis of arrest certainty was that drink-driving since RBT did not result in lower perceptions of the likelihood of being tested or arrested. Such experiential effects have been commonly found in previous research, and have even been advanced as the explanation for "deterrence relationships" in non-longitudinal studies (Paternoster et al., 1982). It is possible that the short time (four months) since the introduction of RBT is the reason for this result, or that the arrest index is faulty. A more interesting possibility is that those who drove over the limit since RBT did reduce their estimates of the likelihood of arrest, as predicted, but were also more exposed to RBT than other groups and therefore had their subjective arrest probabilities increased at some point. Evidence for this hypothesis may be found from the correlations in Table 5.1: the correlation between drink-driving and the number of friends randomly tested was .20. This suggests that the continuing enforcement of RBT may have countered the downward drift in arrest certainty due to experience. (This idea of deterrence as a dynamic process is pursued in more detail below.)

Pp -> De. Arrest certainty correlated with the number of modifications to both drinking and travel behaviours, even after adjustment for other variables. (The effects of perceived penalty severity on behaviour are discussed below.) The effect of arrest certainty was as marked as that of any other variable in the models, indicating that the fear created by RBT was a major influence on behaviour. This inference is supported by the reasons which people gave for not drinking and driving, with those citing fear of arrest making more changes to their behaviour.

In addition, both area of residence and TV publicity predicted changes in travel arrangements (Figure 5.3), while area predicted changes in drinking habits (Figure 5.4). The regression coefficients for area indicated that behaviour changes were least common in Newcastle, and most common (at least for travel) in Bathurst. The significance of these patterns is that they correspond exactly with that for arrest certainty: residents of Newcastle had the lowest perceptions of the chances of arrest, and Bathurst residents the highest. This suggests that in the behaviour change models the arrest index did not pick up all the variance associated with arrest certainty. The persistence of TV publicity as a predictor of changes in travel arrangements indicates the same problem, since theoretically TV should have affected behaviour via arrest certainty. The problem also appeared in the longitudinal analysis of travel changes, where two exposure variables predicted change but the subjective probability of being tested had no predictive power. Moreover, many of the correlations involving arrest certainty, although statistically significant, were small in magnitude and apparently subject to the effects of random error.

Measurement errors and weak correlations. In the light of the discussion above, it is reasonable to conclude that the deterrence model is accurate, but that the arrest index and the measure of the perceived probability of being tested in the next month were less than completely reliable. It is also possible, of course, that the measures of behaviour change were subject to error, or to bias. However, while conceding the possibility that there was some pressure on respondents to overstate the extent to which they were complying with the new law (due to the social desirability of appearing responsible), the data for Newcastle, where practically nobody reported any changes in behaviour, suggest that such effects were not of general importance. On the whole, the evidence points to inadequacies in the measures of subjective probabilities (and in the measures of exposure) rather than to major weaknesses in the behavioural measures as the cause of most of the anomalies in the results. (This is not to deny that a measure of behaviour change which reflected the number of attempts to avoid drink-driving, rather than the number of *strategies* being employed, would have been more valid if it could have been constructed.)

The low correlations between, say, exposure to RBT and arrest certainty should be seen partly as a consequence of measurement errors and partly as a consequence of using measures which are too simple for the phenomenon under investigation. To illustrate this last point, there are many aspects of exposure which could influence an individual's perceptions and evaluations of the likelihood of arrest - the particular location of the RBT operation (are there obvious escape routes?), the time of day or night, the presence of particular police officers (some respondents believed that they had some chance of talking their way out of a positive breath analysis), the percentage of

vehicles which were perceived to be being pulled over, and so on. The link between the experiences of friends and an individual's perceptions of arrest certainty may also depend on which particular friends have been tested, how often, and how recently. Given the multitude of variables which could be critical in the deterrence process, and the limited number of variables which can be derived from a short interview, it is not surprising that the overall predictive powers of the linear models were less than 50%, and that the variances explained by individual variables were much less.

The point which should be emphasised is that despite variables with a less than optimum level of reliability, and despite the survey researcher's inability to measure all the aspects of an individual's experiences, perceptions and evaluations which might be argued *a priori* to be of importance, the statistically significant correlations between theoretically critical variables (such as the number of friends randomly tested and arrest certainty) point to the existence of underlying relationships which are consistent with the deterrence model. This is particularly the case when the correlations persist after the inclusion of statistical controls for "extraneous variables" such as age and sex.

The relative importance of publicity and personal exposure to RBT. The importance of personal exposure to RBT in the longitudinal analysis strengthens the conclusion that publicity is less important than police activity in creating a deterrent effect. Since the study was conducted at a time when media publicity was quite intense it might be argued that there was too little variance in the publicity measures for them to emerge as significant predictors. However, even TV, which reached the widest audience, had only achieved a penetration rate of 68.3%, so this argument cannot be accepted uncritically. Despite the correlation of TV publicity with changes in travel methods, it must be concluded that publicity was less important than police activity as an influence on perceptions and behaviour. This conclusion is contrary to that of Mercer (1984), who evaluated the impact of a drink-driving blitz in British Columbia. However, in Mercer's study the majority of people questioned did not know a blitz was on, so the situation is not comparable with that in New South Wales, where over 95% of the population claimed to have seen, heard or read something about RBT. It is probable that a certain level of publicity is essential so that police activity can create widespread fear, but beyond this point personal experience and that of one's friends is the important factor. If the critical expenditure on publicity (after the initial campaign) can be determined, campaigns like RBT may be able to be run successfully at a fraction of the cost of the New South Wales experiment.

Drink-driving behaviour and the role of perceived severity of penalties. The final link in the causal chain is De -> Dr. This link was not confirmed empirically in the longitudinal analysis, partly because there were too few cases of drink-driving for reliable analysis, but mostly because a third wave of interviews would be required to correlate changes in the number of attempts to avoid drink-driving with subsequent drink-driving behaviour.

The most interesting result of the drink-drive analysis was the finding that those who believed in February that penalties for drink-driving had increased were less likely than others to drive while intoxicated between interviews. A possible reason why this correlation was significant in the present study, when it has generally not been found in other research, is that the perceived severity of penalties only has predictive power when the perceived chances of arrest are high. It is likely that in previous research perceived arrest certainty has varied within a range which is below the threshold required for penalty severity to have any influence on behaviour, although the research by Grasmick and Bryjak (1980) is an apparent exception.

In the present study, it could be argued that perceived arrest certainty was as high as it is ever likely to be in New South Wales in February 1983, and that therefore the conditions required for perceived penalty severity to have a deterrent impact were fulfilled. Against this view, however, is the failure of perceived penalty severity to emerge as a significant predictor in the analyses of behaviour change, and the failure of the penalty severity/arrest certainty interaction to be significant. However, these results also need to be interpreted cautiously. The main question on penalty severity (AQ26) did not correlate with many other variables, and may have had low reliability. This is a pity, since the wording of the question is an intelligent attempt to get at evaluations of penalty severity, rather than at perceptions of what the penalties actually are (Tittle, 1980a; Grasmick and Green, 1980). It is likely that several such questions should be asked in order to improve reliability.

In the longitudinal study of changes in travel modifications there was an interesting

interaction which formed a further exception to the main drift of the results concerning penalty severity. This interaction showed that, contrary to the pattern for the majority of respondents, motorists with a conviction who believed in February that penalties had become more severe increased between interviews the number of ways in which they were modifying their pre-RBT travel arrangements. Although not highly significant, the interaction is important since convicted drivers could be expected to be particularly responsive to the threat of further punishment. This result again highlights the predictive power of the question on penalties asked in the February survey, and suggests that measurement problems may be one reason for the failure of perceived penalty severity to have predictive power in the April data (and possibly in data from other research studies). A balanced conclusion on the importance of penalty severity would be that when the perceived chances of arrest are high, perceived penalty severity can have a deterrent impact additional to that of arrest certainty, particularly among those who have already suffered legal punishments for drinking and driving. This conclusion is completely consistent with the propositions of the deterrence model.

Informal Sanctions

More than a quarter of drinking licence holders reported difficulty in a group situation in resisting pressure to drink. Moreover, these people were more likely than others to report that RBT had made the problem harder, not easier (Table 5.4). The questionnaire provides few clues on why, overall, one drinking licence holder in twelve blamed RBT for their increased difficulties. In some cases the reasons may relate to the dynamics of the group situations heavy drinkers find themselves in, with drinking and risk taking being seen as badges of manhood. However the correlations in Table 5.1 do not indicate that the problem was particularly restricted to men, or to young people, so care should be taken not to rely too heavily for an explanation on the culture of the pub. As Sargent (1979) notes, in the middle classes the unspoken rules of "shouting" (i.e. standing one's drinking companions a round of drinks) probably still apply, but research is badly needed to clarify the ways in which social pressure is conveyed when rules are relaxed or modified. Indeed, some of the top priorities for future research must be to repeat, and adapt to the Australian situation, Gusfield's (1981a) ethnographic research on the culture of bars, and to examine the processes by which societal sub-groups influence their individual members (Clark and Powell, 1984).

From the point of view of deterrence theory, it is noteworthy that the effects on behaviour of perceived change in pressure to drink were no greater than the effects of arrest certainty. Indeed, at the extremes, arrest certainty had a considerably greater impact. In terms of variance explained (taking into account the difference in degrees of freedom in Table 5.13), change in pressure and arrest score were of about equal importance. This result is important, since it is contrary to the common assumption that deterrence effects are small relative to the effects of informal sanctions like social stigma (Grasmick and Green, 1980).

A further noteworthy feature of the behaviour change analysis was that arrest certainty and pressure to drink appeared to act in an additive, rather than interactive fashion. In other words, the influence of arrest certainty on the number of modifications to travel and drinking behaviours did not depend on the extent to which the respondent felt subject to group pressures to drink. In this respect the results are consistent with most other studies of the perceptual elements in the deterrence process (e.g.: Grasmick and Green, 1980).

There was one exception to the overall finding of no interactions between arrest certainty and peer pressure. In the longitudinal analysis, among those who reported finding it hard to resist pressure to drink, an increase in the perceived likelihood of being randomly tested corresponded to a decline in the number of modifications to travel methods. One explanation for this result is that among these heavy drinkers, fear of ostracism by peers (a certain loss) outweighed the fear of legal punishments (a possible loss).

There is evidence that because RBT simultaneously affected perceptions of formal and informal sanctions, it had contradictory effects on some people. For example, those who reported finding it harder since RBT to resist group pressure made fewer than average changes to their travel and drinking behaviours, yet these people scored more highly than average on the arrest index, even after adjustment for other variables (Figure 5.2), and also were much more likely to cite fear

of arrest as their main reason for not drinking and driving. Thus depending on the relative strengths of the two types of fears, RBT may actually have had an effect on some heavy drinkers opposite to that intended.

These results illustrate the appropriateness of the parallelogram of forces analogy employed in the description of the deterrence process. What is needed now is research which throws light on how individuals resolve the psychological tensions created by these contradictory pressures. Such research should be focussed on the decision making process, and should be directed at those individuals who feel most sensitive to the threat of being exposed as an incompetent drinker.

Who Was Most Deterred by RBT?

Four groups of variables are of particular theoretical interest: age and sex; socioeconomic status (occupation and education); alcohol consumption and peer pressure to drink; and having a drink-drive conviction.

Age and sex. In Chapter 1, it was argued that young men are the object of more intensive police surveillance and harsher punishments for drink-driving than other groups of road users (Homel, 1983c). Presumably one of the reasons for this bias is the belief that young men are a high risk group who can be deterred by harsh measures. It is therefore important to investigate whether age or sex affected the extent to which an individual was influenced by RBT.

It would appear that although RBT was not particularly directed at men or at young motorists, it had an impact among young men which was at least as great as that among women or older men. Indeed, the evidence is that as a result of RBT young men changed their lifestyle in more ways than average. This conclusion is consistent with the statistical analyses of crash data (Kearns and Goldsmith, 1984). More generally, the evidence from the analysis of the data on motivations pointed to the role of fear of arrest as a factor influencing the responses of men. It does seem that, based upon the respondents' own reasons for their behaviour, men were more deterred by RBT than women, an outcome which is highly desirable given that probably about 85% of drinking drivers in Australia are men.

One implication of these results is that enforcement policies aimed specifically at high risk groups may not be necessary, and indeed may not be as effective as more broadly based policies like RBT.

Socioeconomic status. Socioeconomic status is of interest for much the same reasons as age and sex. In particular, Andenaes (1978) has argued that high status motorists are underrepresented in the conviction statistics for drinking and driving because they are more deterred by the threat of legal and informal punishments than low status motorists. He rejects the view that discrimination by those in power has anything to do with differential conviction rates for drinking and driving. His argument about the deterrability of high status motorists is contrary to the conclusions of Grasmick, Jacobs and McCollum (1983), and his position on discrimination is contrary to data presented by Hollinger (1984).

Both education and occupation remained in the reduced model for arrest certainty (Figure 5.2), with lower white collar respondents and those with three to five years high school education recording the highest arrest scores. In other words, the shape of the relationship between arrest certainty and socioeconomic status was roughly an inverted-U. Occupation was significant as a predictor of changes in travel and drinking behaviours, but dropped out of the model when adjusted for age and other variables. In addition, the interactions between arrest score and education and occupation failed to reach significance.

It is hard not to conclude that RBT had roughly the same behavioural impact at all status levels. If this result can be generalised to the effects of the regular enforcement of drink-drive law, the predominantly low status of convicted offenders must be ascribed to police bias or exposure to risk (e.g.: amount and place of driving), rather than to differential deterrability, as Andenaes (1978) suggests.

Alcohol consumption. Alcohol consumption and perceived pressure to drink are of obvious theoretical importance. Much of the debate about who the drinking driver is centres around the question of alcohol use and alcoholism (see Chapter 1), and it is frequently proposed that the heavier an individual's alcohol consumption, the less deterrable he or she will be (T. Cameron, 1979).

One of the most clearcut findings of the study was that the greater a respondent's consumption of alcohol, and the greater the perceived pressure on him to drink, the more ways he was modifying both his drinking habits and his travel arrangements (Figures 5.3 and 5.4). With the exception of the small group of drinkers who reported that resisting pressure was "extremely hard", the longitudinal analysis of changes in travel modifications revealed a similar pattern (Figure 5.6). This leads to the important conclusion that a campaign like RBT can have a greater impact on the lifestyles of heavy drinkers than moderate or light drinkers. Of course heavy drinkers have more opportunities to drink and drive than light or moderate drinkers, and would therefore have more scope for changes in their habits, but this does not invalidate the conclusion that RBT had a greater than average impact on their lives.

This overall result is truly remarkable. Not only did more respondents change their drinking habits than changed their travel methods, itself a result which one would not have predicted, the moderate and heavy drinkers changed *both* their drinking and their travel habits more than light drinkers. The enthusiasm with which heavy drinkers modified their travel methods might have been predicted, but hardly their willingness to reduce or alter the pattern of their alcohol consumption. It would be hard to find clearer evidence that at least some individuals who might have been considered undeterrable were in fact most responsive to the threat of legal punishments.

This result needs to be viewed in a slightly broader context. It should be recalled that heavy alcohol consumption was in a number of cases associated with feelings that RBT had made it harder, not easier, to resist pressure to drink. As we have seen, the effects of such feelings were to create contradictory psychological pressures for at least some respondents. Consequently, although in general the social climate among moderate and heavy drinkers seemed to favour making a definite positive response to RBT, these effects could have been negated to some extent by increased drinking caused by fear of losing status as a competent drinker.

This interpretation is supported by the results set out in Figure 5.4 and 5.6. Figure 5.4 shows that those who felt that it was "extremely hard" to resist peer pressure made slightly fewer changes to their drinking habits than those finding it "very hard" or "quite hard" to resist pressure. Figure 5.6 shows that the "extremely hard" group were most likely to go backwards between interviews in terms of modifications to their travel arrangements. It seems that the effects of RBT may have been rather short-lived among respondents most sensitive to group pressure, reinforcing the notion advanced in the discussion of experiential effects that the state of being deterred is an unstable one, ever in danger of giving way to other forces.

Drink-drive convictions. A central prediction of deterrence theory is that motorists with a drink-drive conviction will be more responsive to the threat of legal punishments than those without a conviction (Tittle, 1980a). Convicted motorists are not predicted to be more *sensitive* to legal punishments (that is, to have higher arrest scores), since there is no reason why a conviction should make one believe that arrest is more likely (if one is an experienced drinking driver, it might even have the opposite effect).

The interaction between arrest certainty and a conviction (Figure 5.5) is consistent with this prediction of greater responsiveness. The convicted group, although few in number, appeared to make more changes in their travel arrangements when arrest certainty was high; at low arrest levels the difference between the two groups was quite small. In addition, those with a conviction cited fear of arrest more often than those without a conviction as a factor influencing their decision not to drink and drive. The greater number of changes in travel arrangements between interviews which were made by the convicted group (Figure 5.6), especially if they believed penalties had become more severe, was also consistent with the predictions of the deterrence model. These results strongly imply that convicted drink-drivers are more responsive to legal threats than motorists without a conviction, and that both arrest certainty *and* penalty severity are important components of that threat.

Deterrence as an Unstable Process

Ross (1982) has hypothesised that the impact of legal innovations like RBT are temporary because people realise after a while that the chances of getting caught are not as high as they thought at first. This hypothesis was supported in the longitudinal analysis, since it was shown that the perceived chances of being randomly tested declined between interviews, despite the publicity

campaign and the police blitz over Easter. Nevertheless there was no change, on average, in the number of ways in which motorists were modifying their drinking habits and travel methods. Moreover, there were no significant correlations between changes in the perceived chance of being tested and changes in behaviour.

It should be recalled that the interviews were only six weeks apart, and that therefore conclusions about the long term impact of RBT are not possible. However, the six weeks period was sufficiently long to reveal considerable variations between subgroups in modifications to travel arrangements (Figure 5.6). Those who had been tested or who had driven past an RBT operation between interviews increased the modifications to their travel methods, while those who had driven while intoxicated since RBT reduced the modifications to their travel methods. These results suggest a *dynamic and unstable situation*, with a constantly changing mix of those deterred through personal exposure to RBT and those "undeterred" through a successful drink-driving episode or through non-exposure to the operation of RBT. If RBT had not been enforced at all between February and April 1983, it is almost certain that the April interview would have revealed a substantial decline overall in attempts to avoid drinking and driving. The implication of the results set out in Figure 5.6 is that police RBT activity, not publicity, was a critical element in the maintenance of a deterrent impact over the six weeks between interviews.

The data analyses, including those focussed on peer pressure and on the experiential hypothesis, suggest that RBT is always in the process of losing its effectiveness among drivers who, because they feel under pressure to drink or because they haven't seen RBT in operation for some time, take the risk of driving after drinking. However, through personal exposure to RBT new groups of motorists are constantly being added to the pool of those who are deterred. This model of the deterrence process is a little less static than the picture proposed in Chapter 2, and bears an affinity to Cook's (1980) simulation model of the criminal behaviour of a population of robbers. A feature of Cook's model is that there is considerable turnover among active robbers: "robbers are deterred and 'undeterred' according to their own experiences and those of their friends" (Cook, 1980, p. 225).

Thus whether a deterrent effect is maintained or not is essentially an outcome of a delicate balance, over time, between the forces maintaining and those tending to erode perceptions of arrest for drinking and driving as a likely event. This balancing process may be depicted in a diagrammatic fashion, as in Figure 6.1, in which is set out the "hole in the bucket" model of deterrence. According to this model, the long-term impact of RBT will depend on the relative sizes

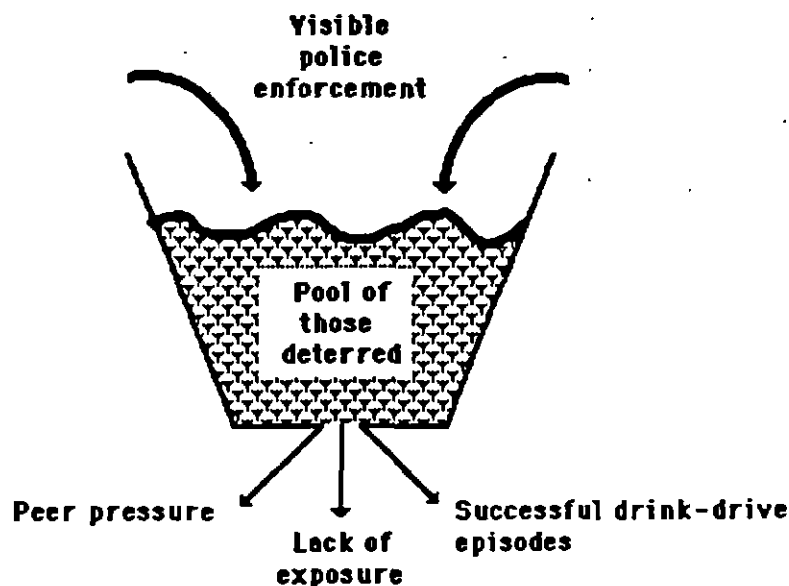


Figure 6.1. The "Hole in the Bucket Model" of the Deterrent Impact of RBT

of the input and output effects - in other words, how full the bucket can be kept through police enforcement: If RBT is to have a sustained impact on the road toll, the number of people being reminded of the operation of RBT must exceed the number lost through the three mechanisms set out in the diagram. Thus it is clear that visible police enforcement, in preference if necessary to expensive media publicity, must be maintained at a high level.

An Assessment of the Deterrence Model and Priorities for Research

The RBT analysis strongly supported the conclusion that RBT had a deterrent impact of considerable magnitude, and that the deterrence process can be described by the model set out in Chapter 2. Despite problems of measurement which must be addressed in future research, the results are consistent with the proposition that police enforcement influences behaviour via the exposure of the target population and via perceptions of arrest likelihood. Moreover, the predictive power of arrest certainty was comparable with the predictive power of informal sanctions, although informal pressures usually prevailed over fear of arrest when perceived group pressures to drink were very strong. This last result indicates the appropriateness of the framing of the drink-drive decision as a choice between losses, with the certain loss of one's status as a competent drinker carrying more weight than the merely possible losses entailed in getting caught.

The present study is in agreement with the majority of previous studies in suggesting that the behavioural effects of fear of legal punishments do not depend on the strength of informal pressures to break the law; in statistical terms, the effects of the two kinds of sanctions are additive. However, RBT had some unintended consequences, in that it made it harder for some heavy drinkers to resist pressure to drink, while simultaneously creating in them a high perception of the chances of arrest. A priority for future research must be to explore in depth the reasons for this unintended effect, and more generally to investigate the influence of informal social controls on reactions to legal innovations like RBT.

The analysis suggests that personal exposure to RBT, and the experience of one's friends and acquaintances, were of greater importance than RBT publicity in shaping perceptions of arrest certainty and in influencing behaviour. Indeed, all aspects of exposure to RBT enforcement played some role, directly or indirectly, in influencing behaviour.

A continuous process whereby motorists are deterred by exposure and undeterred by lack of exposure is indicated by a number of the analyses. In addition, experience with drink-driving and heavy pressure from one's peers can lead to a diminution in the deterrent impact of enforcement. Deterrence should be seen as a dynamic process, maintained not necessarily in a single individual but in the whole target population through constant enforcement of the law. Without such constant enforcement, it seems likely that behaviours adopted as a response to the threat of punishment will eventually disappear, unless transformed into habits. As well as being of practical importance, this finding has theoretical implications: the deterrence model of Chapter 2 needs to be stated in a more dynamic form, with an emphasis on the ways in which deterrent effects are lost as well as the ways in which they are gained.

The present study is one of the few which have produced results in support of the proposition that perceived penalty severity influences behaviour. The evidence is that such effects can occur when arrest certainty is high, and that motorists with a conviction are particularly responsive to the threat of more severe penalties. Indeed motorists with a conviction were generally more responsive to legal sanctions, consistent with the predictions of deterrence theory.

There was little evidence that any types of motorists were less deterrable than average. If anything the evidence is that high risk groups like heavy drinkers and young men were more affected by RBT than other groups. These results confirm the wisdom of not attempting to build into the deterrence model detailed predictions concerning the differential deterrability of population subgroups, apart from those with a conviction for drinking and driving. Such typologies must be developed empirically (Homel, 1980a).

Apart from the need to investigate the role of the peer group in the deterrence process (Clark and Powell, 1984), and to elaborate the social contexts of drinking and of drink-driving (Gusfield, 1984), probably the two major priorities for research are to probe in much greater depth the decision making process, and to probe the links between perceptions and evaluations of the various aspects of law enforcement. The results of the replication of Buikhuisen's (1969) study are

especially intriguing, since they suggest that the links between perceptions of penalties and evaluations of their severity may be strongly influenced by social factors like occupational status. If systematic relationships between perceptions and evaluations can be established for all aspects of law enforcement, the predictive power of the deterrence model should be greatly enhanced.

There are many further specific questions arising from the present research. Given the framing of the drink-drive decision as a choice between losses, we need to know more about the ways in which the costs and benefits of driving after drinking (and not driving after drinking) are perceived and evaluated. Why is exposure to police enforcement more of a deterrent for some motorists than for others (i.e. how is such exposure interpreted and given a meaning)? What is the effect of inebriation on the perceptions and weightings of alternative modes of action? How do the various "audiences" - one's drinking companions, one's girlfriend, perhaps even one's mother (what would she think?) - influence evaluations of the legal threat? How do these audiences impose punishments in their own right? In what kinds of social circles is driving after drinking censured rather than encouraged or regarded with indifference? How influential in Australia are beliefs about the wrongness of driving after drinking?

It is likely that answers to some of these questions will be found through ethnographic research along the lines pioneered by Gusfield and his colleagues (Gusfield, 1981a), combined with further research on the psychology of decision making (Pitz and Sachs, 1984). The psychological models of decision making have gone well beyond the simple postulates of utility theory, and it is time that some of the insights from these models were applied to the crime decision. However, as Douglas and Wildavsky (1982) argue, not only are better psychological theories of decision making in risky situations required, these theories need to be situated in the experiences of everyday life, with full attention being given to the social context within which the decisions are made.

The "Perfect" Research Design

Although many aspects of the model need further investigation, one research design is capable of dealing with many of the major questions. It would also allow an investigation of the absolute and marginal specific deterrent effects of penalties imposed on convicted offenders. This is an important topic, since numerous research studies, including one conducted by the present author (Homel, 1980a; Homel, 1981a), have suggested that marginal specific deterrent effects are generally absent. Given the evidence for the general deterrent effectiveness of RBT and other forms of police enforcement, this consistent empirical finding on the effects of penalties poses a serious problem for deterrence theory.

In essence, the design would entail selecting a sample of recently convicted offenders, as well as a general sample of motorists throughout the state, and interviewing both groups in depth at least six months before the introduction of a measure like RBT. The interviews would then be repeated on the same people at about the time RBT or its equivalent was introduced, and then at least every six months over the following two years. The general sample of motorists, which should be large, could be selected in much the same manner as in the present study, but the convicted group should be sampled so that maximum spread is obtained on indicators of the three dimensions underlying the offender typology developed by Homel (1980a). (These dimensions are the extent of *alcohol abuse*, the extent of *conflict with the police for criminal matters*, and the extent to which an individual engages in driving behaviour characterised by *aggression and recklessness*.) The sample should also be designed so that the convicted group contains those who have been dealt with lightly relative to their "entitlement" for punishment, as well as those who have been dealt with severely according to the same criteria (Homel, 1980a).

This design would have all the advantages of a multi-wave longitudinal design. It would also possess the strengths of the April RBT sample, covering areas with differing levels of police enforcement. In addition, it would provide pre-innovation baseline measures of perceptions of arrest certainty, drink-driving behaviour, and other critical variables. Most importantly, it would bring together in one design a study of general and specific deterrence, both absolute and marginal. By comparing self-reported reoffending as well as reconviction rates among the convicted offenders before and after RBT (or its equivalent), it would be possible to determine the impact of a marked increase in subjective arrest probabilities on the marginal impact of penalties.

Consequently, the hypothesis that marginal specific deterrent effects can occur only in the kind of climate created by RBT could be tested.

Absolute specific deterrence could be tested through a comparison of the convicted group with the subset of the general population sample who confessed to drinking and driving. Statistical controls could be introduced to make the comparison as valid as possible. In particular, the extent of self-reported drinking and driving should be controlled. The longitudinal nature of the design would allow regular measures of self-reported drinking and driving, with some adjustments for period of exposure to risk since conviction.

By relying on self-reports, the design would avoid many of the problems entailed in the use of reconvictions (although both these and accident involvement should be recorded as well). It is possible that the reliability of questions requiring respondents to remember specific events could be improved through the use of heuristics such as *anchoring* and through a probing of the *scripts* which are evoked in the survey interview situation (that is, through a probing of the higher order knowledge structures that govern information processing [Loftus, Fienberg and Tanur, 1985]). A well designed interview schedule would allow perceptions and evaluations of non-legal sanctions (moral attachment and peer pressure or social disapproval) to be measured adequately. Ideally, the perceived costs and inconveniences entailed in the decision not to drink and drive would be probed. The measures of arrest certainty and exposure to enforcement should be modified to improve their reliabilities, although further exploratory research is required to determine exactly how this should be done. In addition, more attention should be paid to probing respondents' evaluations of the experience of police enforcement. This would entail taking into account the fine details of the experience, such as the time, the exact location, and whether the respondent knew the police officers carrying out the testing. Most importantly, it would be necessary to ask respondents to keep a diary of their drinking episodes for (say) two weeks before and after each interview, recording the actions taken when driving after drinking was a possibility.

The interviews with convicted motorists would need to probe in detail their reactions to their penalty, focussing on its severity as well as its fairness. This aspect of the research would particularly benefit from pilot research which explored the behavioural impact of a penalty perceived as unjust (Homel, 1980a; Hurst, 1980). By sampling across all levels of the relative severity of penalties, variations in perceived severity and perceived unfairness could be maximised. The interviews with convicted offenders should also explore aspects of lifestyle and illegal activities relevant to the three dimensions underlying the offender typology (Homel, 1980a). Once again, pilot research to establish relevant indicators of these dimensions would be invaluable.

This research design, if ever implemented, would be very costly and very intrusive. In addition, it would need to be preceded by a number of intensive pilot surveys, as well as by the ethnographic research discussed earlier. However, without such a design many of the problems discussed in this report and in other studies of deterrence will probably never be solved satisfactorily. In particular, the question of whether penalties have absolute and marginal specific deterrent effects will remain unanswered, and many of the subtle but important aspects of the operation of general deterrence will remain shrouded in mystery.

Implications for Social Policy

The research set out in this report has a number of implications for social policy in New South Wales. However, the main aim of the research was to develop a general model of the deterrence process, so that the evaluation of legal innovations like RBT could be carried out within a satisfactory theoretical framework. Consequently, although the data are derived from New South Wales, the model, and the results of the analyses, have implications for the enforcement of drink-drive law in other jurisdictions, both in Australia and elsewhere. In this section policy suggestions are formulated in such a way that most should be applicable in some form in all jurisdictions. The discussion begins with an analysis of the ways in which the operation of RBT enforcement and publicity can be made most effective. This is followed by an examination of policy with respect to high risk groups, particularly young men, and then by a discussion of whether heavier penalties for drinking drivers are justified.

Fine Tuning RBT

It seems reasonable on the basis of the apparent success of RBT in New South Wales in the short term to recommend that it be introduced, on a similar basis, in other places. Of course social and political conditions vary, but it seems that in order to be successful RBT or a similar measure must be accompanied by intense publicity and extensive, visible police enforcement. The present analysis suggests that if the publicity can achieve a level of awareness of around 90% or better, then visible enforcement is more important than further publicity in maintaining the deterrent effect, at least in the short term. It follows that the efficiency of police operations needs to be maximised.

Police enforcement. One of the major problems in the enforcement of RBT is that, fundamentally, police believe their job is to catch crooks. This means that hours spent by the roadside breath testing motorists, 99% of whom are under the legal limit, holds very little appeal to most police officers. Even among those police who are most convinced of the preventive value of RBT it is inevitable that morale will eventually fall and roadside testing will be seen as a most onerous task, unless positive feedback on the continuing success of RBT can be provided on a regular basis. This feedback could possibly take the form of in-service training which emphasised the achievements of the preventive policy inherent in RBT. However, even when such feedback is made available, it is likely that left to their own devices police will revert to a "catch them" rather than a preventive mode of enforcement.

For example, it appears that a trend has developed in New South Wales for highway patrol officers to concentrate RBT operations in high drink-driving areas at times when there is a good chance of a "catch". Although it is understandable that police should wish to apprehend as many offenders as possible, the effect of such a policy, given the shortage of mobile breath analysis units, is that if a motorist is found to be over the limit early in the hour which highway patrol officers are required to devote each day to RBT, the remainder of the hour is taken up with getting the offender to a police station and doing the paper work. Consequently, although a few more offenders may be caught, the total visibility of police RBT operations is lessened.

Such well intentioned deviations from a preventive philosophy need to be dealt with by the senior echelons of the police force, and also by the government, perhaps through the provision of more mobile breath analysis units. In addition, there are other gaps in the enforcement system which require continuous monitoring. A problem inherent in any police roadblock operation is that unless care is taken, the very act of testing may cause accidents. Obviously this could happen if an RBT operation is mounted where visibility is poor or the road is rough, and police naturally take care to avoid such situations. However, testing in bad weather conditions is a more difficult problem: should police run the risk of causing accidents in order to ensure that the chances of detection for drink-driving are maintained at high levels at all times? Practical solutions to this problem need to be found within each jurisdiction; at the very least, reduced levels of testing during bad weather should not be widely publicised.

McLean (1984) has highlighted one of the most obvious weaknesses in a system of random enforcement, and has also documented empirically its effects on road crashes in South Australia. Unless steps are taken to ensure that all back roads and obvious escape routes are blocked, many motorists will continue to believe that RBT poses no threat to their drinking and driving. The extent of this problem will depend on many factors, especially the topography of the region. Blocking obvious escape routes is perhaps easier in Sydney, with its numerous hills and waterways, than in Adelaide where streets are straight and the terrain less hilly. Once again, however, the possibly negative impact of police activity on traffic crashes needs to be kept in mind.

The general principle with respect to police enforcement of RBT or a similar law is that exposure rates and the perceived likelihood of apprehension should be maintained at high levels. Optimum methods of enforcement should be evolved for each jurisdiction, and all variations in procedures, including those which "just happen", should be monitored for their effects on exposure rates, subjective arrest probabilities and accident rates. Regular experimentation by the police should be encouraged. For example, it may be valuable to try out different ways of blocking back streets in local areas of contrasting social and physical characteristics, or the value of RBT blitzes in particular regions, along the lines pioneered by the Victoria police and the Road Safety and Traffic Authority (Cameron and Strang, 1982), could be investigated through planned experimental designs. Involvement in such experimentation by both senior and junior police may help to maintain enthusiasm for RBT within the police force.

Media publicity. It has been stated on a number of occasions in this report that visible enforcement appeared to be more important than media publicity in maintaining the deterrent effects of RBT in the first few months. It should be emphasised again, however, that this was at time when more than 90% of the population were aware of RBT. Publicity clearly had a critical part to play in the initial, sudden drop in the road toll which occurred before the vast majority of the motoring public had had time to experience RBT personally. Since both common sense and other recent research (e.g.: Mercer, 1984) suggests the importance of massive media publicity, it is almost axiomatic that RBT or a similar law should be accompanied by intense publicity when introduced. It remains an open question, however, how media publicity should be organised in the medium to long term.

There are two basic questions: how often should media campaigns be conducted, and what forms should they take? A cogent argument for frequent publicity campaigns is that people forget very quickly. Among the sample of 185 Sydney motorists reinterviewed after six weeks, the rate of awareness of RBT actually *declined* from 97.3% to 91.9%, despite the \$250,000 spent in media publicity over the Easter period. However, the analyses reported in Chapter 5 suggest that this decline did not have a great impact on behaviour. In addition, it is simple political realism that governments will not spend massive amounts of money on media publicity indefinitely. It seems reasonable to argue therefore that large campaigns should be run, say, every two years, probably around Christmas, and that in the meantime less costly but continuous publicity should be funded, possibly directed at particular groups such as the young.

The major aim of the publicity should be to reinforce police activity. That is, the focus should be on the perceived probability of arrest for drink-driving. The advertisements should depict the police at work in order to remind the public that the law is still operating, and should use whatever techniques are available to heighten awareness of the legal threat. While it is clear that TV has the highest penetration rate and that people recall more of the TV message, in view of the results reported in Chapter 5 neither radio or newspapers should be neglected. It is possible that radio is a better medium for communicating with some groups of young people, and the comments of some respondents indicated that the print media may have influenced behaviour.

One important target audience for the media campaigns is the police force itself. Through constant exposure to TV advertisements depicting their activities, police are encouraged to believe that RBT is valuable, and it is possible that their style of enforcement will be influenced. In the absence of regular publicity, some police may come to believe that they are "on their own", and that the government doesn't really care about the issue.

An emphasis on publicity which supports police enforcement does not preclude other forms of drink-driving publicity. As indicated in Chapter 1, there have been many innovative campaigns directed at the drink-drive problem, and probably only half have emphasised the legal threat. Other approaches include attempts to influence the peer group ("What sort of friend are you?"), and attempts to dramatise the moral blameworthiness of drinking drivers. These sorts of campaigns have an important role to play, particularly since their aim is generally to manipulate the *non-legal* sanctions which encourage or inhibit drinking and driving. However, it is necessary that the architects of these campaigns be aware that, for example, publicity directed at making people aware of the loss and grief caused by drinking and driving is *not* the same as publicity which is directly supportive of RBT. There is room for both approaches, provided the need to maintain high subjective probabilities of arrest is not lost sight of.

Policy With Respect to High Risk Groups

As indicated in Chapter 1, current police practices in New South Wales (outside of RBT, for which relevant public data are mostly lacking) are biased against young men. The road safety value of such an informal policy is not known, but available evidence suggests that it may be limited (Homel, 1983c). An important outcome of the present study was the demonstration that drivers perceived as high risk, including young men, were more responsive than average to the threat of arrest and punishment. What this means, in effect, is that a method of enforcement which is broadly based and not directed at any particular group of road users has been successful in deterring groups who have frequently been the target of special attention.

Applying this principle more broadly, it could be argued that police enforcement of

drink-drive law (apart from RBT) should be "selective" only in that high risk *times and places*, not high risk drivers, should be the centre of attention. Kirkham and Landauer (1985), basing their comments on data from Western Australia, have put the essential point well:

If the main purpose of traffic law enforcement is to reduce the accident rate, then one might expect that the amount of law enforcement given to a particular group in the community should be roughly in proportion to their accident involvement, or at least to the amount of miles they drive. When a particular group, for instance young men under 25 years of age, are grossly over-represented in the enforcement statistics there must be some cause for disquiet as to whether traffic law enforcement is being applied efficiently (p. 214).

A policy of selective enforcement of the type proposed above would probably reduce somewhat the bias against young (unskilled) men, and would increase the road safety benefits of non-RBT enforcement. However, this leaves open the question of whether the effects of RBT among high risk groups could be enhanced through specially designed publicity. It was suggested above that there may be a case for radio publicity directed at young people. Moreover, a need highlighted by the present study is to find ways to reduce the pressure on some heavy heavy drinkers who found that RBT made it harder, not easier, to refuse a drink. One possibility would be to apply some of the insights from the anti-smoking programme, perhaps by devising a campaign emphasising that it's alright to say "no". This is a subject which requires much more intensive research.

Young people *as they come of age for a licence* are a further obvious target for special publicity. Although in the general population of motorists in New South Wales awareness of RBT remains high, it is by no means clear that young people newly licensed are as sensitive to the legal threat. It is possible that the message could be got across to this group through the schools, focussing on Year 10, using radio and even compulsory commercials on home videos as supporting methods of outreach.

The Severity of Penalties

Penalties were increased at the time RBT was introduced in New South Wales, and the analysis of the longitudinal data demonstrated that a knowledge of the increased penalties was correlated with a reduction in drink-driving. In addition, several analyses demonstrated that those with a conviction for drink-driving (i.e.: those who had previously suffered a punishment) were more responsive to the threat of further punishment than those without a conviction. This suggests that the experience of punishment, when it is combined with a realistic threat, operates as a deterrent. In view of these results, should penalties be increased even further to enhance their deterrent effectiveness?

There are several reasons why this step should *not* be taken. Firstly, the evidence from the longitudinal analysis is that the deterrent impact of the more severe penalties may have been short lived. (It is interesting to note that for those with a conviction, the effect may have lasted longer.) Secondly, despite the significance of perceived penalty severity in one analysis, the major predictors of behaviour change were fear of arrest and exposure to police enforcement. Without an increase in the perceived probability of arrest, penalty increases are not likely to have much deterrent impact. Thirdly, all the research on the marginal impact of heavy versus light penalties (Homel, 1980a; Brody, 1976) suggests that the recidivism rate would not be reduced by tougher penalties. Finally, penalties which are too high and too inflexible simply result in law enforcement officials (police, solicitors, magistrates) making more efforts to subvert the spirit of the law. If discretion is eliminated or reduced in open court, it will be exercised somewhere else, behind closed doors (Robertson, Rich and Ross, 1973; Shover, Bankston and Gurley, 1977; Little, 1975).

In summary, there is plenty of scope within existing legislation, both in New South Wales and elsewhere, for penalties which can act as a real deterrent, *provided* the subjective probability of arrest is sufficiently high. A further increase in penalties, either in the legislation or in practice, could create more problems than it would solve.

Summary of Policy Recommendations

1. In New South Wales *RBT should be continued indefinitely in much the same form as at present*. In other jurisdictions, RBT or a similar law should be introduced, and should be enforced in a highly visible manner and supported by extensive media publicity.
2. When a high level of awareness of RBT is achieved through publicity (the situation in New South Wales), the *efficiency of the visible police enforcement of RBT should be maximised*. Publicity should not be neglected, but could operate at a less intense and less frequent level than during the initial months of the law.
3. *Gaps in police procedures* which may lessen the deterrent impact of their operations should be plugged. Problems of police visibility in bad weather need to be addressed, and steps need to be taken to ensure that police time devoted to RBT is not consumed by paperwork. Sufficient mobile breath analysis units to allow motorists who are found to be over the limit to be processed quickly should be available to the police. Attempts by motorists to avoid RBT through the careful calculation of back road routes should be countered.
4. Police should be encouraged to *experiment with different methods of enforcement of RBT*, for example through intense blitzes in local areas or through variations in methods to counter avoidance tactics by motorists. Such experiments should be planned and evaluated scientifically.
5. *The inevitable trend toward an apprehension based policy should be recognised*, and countered through in-service training of police, involvement by police in experiments to improve the operation of RBT, and through general RBT publicity.
6. *An extensive media campaign* (probably at Christmas) should be undertaken every two or three years to reinforce the operation of RBT. In the intervening periods, continuous but not intense publicity should be carried out, with the objective of reminding the public that police are still active. The publicity should reinforce police activity rather than be of a general "anti-drink-driving" type, although the latter type of campaign could be conducted at any time to influence the social milieu of drinkers. TV, radio and the print media should all be utilised.
7. Outside of RBT, *police enforcement of drink-drive law should be concentrated in high risk times and places*, rather than on high risk motorists such as young, beer drinking men.
8. *Specialised media and education campaigns* should be developed to influence newly licensed drivers and men who feel particularly sensitive to group pressure to drink. A program of education about RBT could operate among Year 10 students at school. For both groups, publicity along the lines that it is alright to say "no" may be helpful. Radio may be a more effective way of reaching young people than TV or newspapers, but other forms of outreach, such as commercials on home videos, may need to be developed.
9. *Penalties* for drinking and driving should not be increased, either in the legislation or in practice.

Conclusion

The legal threat was neglected for many years as a factor in crime control. One reason for this neglect was the dominance of the positivist school, with its emphasis on finding the root causes of crime in human biology, social organisation or "emotional disturbances" (Cressey, 1978, p. 182). Social scientists of this persuasion believed that the behavioural impact of the criminal justice system must be negligible in comparison with the influence of these fundamental forces in moulding an individual's disposition to behave in a consistently criminal or law-abiding manner. There has been a resurgence of interest in the classical doctrine of deterrence in recent years, with many scholars advocating a return to deterrence principles as a major basis for penal policy (e.g.: Andenaes, 1974; van den Haag, 1980). The deterrence movement is distinguished from other recent reform movements, such as diversion or just deserts, in that the emphasis is on extending

and strengthening the criminal justice system, rather than on limiting its scope (Austin and Krisberg, 1981).

However, penal reformers have not always recognised that the empirical evidence for a system based on deterrence is rather weak, since the plethora of research on deterrence in the last 15 years has yielded few firm conclusions (Tittle, 1980b). The quasi-experimental research designed to evaluate the impact of drink-drive laws and their enforcement has provided some of the best evidence that deterrent effects can occur in some circumstances, but on the whole this research has failed to analyse the social and psychological processes which link objective legal activities with drink-driving behaviour. In particular, perceived certainty of arrest has seldom been measured and related to the intensity of enforcement and behaviour change. Moreover even if drink-drive research provides the clearest evidence that law and its enforcement can achieve deterrent effects, it also provides the clearest evidence that such effects are transitory (Ross, 1982). Tougher laws or enforcement policies may even be sabotaged in the very act of implementation, so that the road safety benefits of the legal innovations are nugatory or negative (Robertson, Rich and Ross, 1973; Shover, Bankston and Gurley, 1977).

If the research on the general deterrence of drink-driving has failed to provide a completely firm foundation for a penal philosophy based on deterrence, the research on specific deterrence is even more doubtful as a justification for deterrence-based policies. However, it is possible that the research is deficient, rather than that specific deterrent effects do not occur. Most of the research fails to deal, either at the theoretical or the empirical level, with an offender's interpretation of his experience, especially with respect to the justice of his treatment (Homel, 1980a). Moreover, within the conventional paradigm, researchers have seldom paid more than lip service to the possibility that penalties will have different effects on different sorts of people (Brody, 1976).

A failure of the criminal justice system to have any appreciable road safety benefits is not surprising if the cultural perspective of Gusfield (1981b) is accepted as a valid framework for analysis. For Gusfield the activities of legislatures and courts are dramas for the consumption of an audience rather than mechanisms through which control can be achieved. The various parts of the legal process are designed as much for "the love of noise" as for "a desire to reach a target" (p. 145). While Gusfield emphasises the role of the immediate social context and recognises the possibility of some form of risk assessment in the drink-drive decision, he leads the analysis back to many of the issues traditionally considered by positivist criminologists: the multiple causes of drink-drive behaviour and traffic crashes, the institutional settings of drinking and driving, and the nature of the informal controls which prevail within the motorist's network of friends and drinking partners (Gusfield, 1984).

The research presented in this report has been addressed to one of the major weak points in the literature on the deterrence of the drinking driver - the failure to study the process of deterrence. The results have been mixed, but have generally been more in agreement with the predictions of deterrence theory than Gusfield's (1981b) analysis might have led one to expect. Of course the study was conducted only a few months after the introduction of an unusually well publicised and energetically enforced campaign. Given the experience with similar legal innovations internationally (Ross, 1982), it is perhaps not surprising that the deterrence model fitted the data so well. However, the finding by Homel (1980a), Hagen (1978) and Sadler and Perrine (1984) that licence disqualification possesses deterrent properties for some offenders under conditions of routine enforcement raises important questions for further research, and encourages the belief that achieving marginal specific deterrence may not be a totally unrealistic goal.

The significance of these results is that they imply that the criminal justice system can, under certain circumstances, have a deterrent impact of considerable magnitude. For Gusfield, these effects are tangential rather than central to the operation of the system. Deterrence occurs almost as an unintended byproduct of a system devoted to the moral dramatisation of cultural ideals, and deterrent effects which do occur are invariably evanescent (Ross, 1982).

A critical issue for future research is the long term impact of RBT in New South Wales. The fact that fatal crashes have remained at low levels for more than two years, after a sudden decline in December 1982, suggests that RBT has had at least some long term influence. Moreover, the analysis of the survey data strongly suggests that deterrent effects can be maintained through continued enforcement (in preference, if necessary, to continued publicity). Indeed, it is possible that the increase in road crashes observed in other jurisdictions following an initial decline is due as much to a failure to maintain enforcement levels as it is to some inevitable tendency for the deterrent

effect to dissipate. In addition, it is critically important to understand the processes whereby changes in behaviour brought about initially through fear of arrest may become transformed into habits. If RBT does achieve a permanent reduction in road deaths in New South Wales, it is likely that the formation of new habits will have occurred on a large scale (Zimring and Hawkins, 1973).

Whatever its long term impact, the effects of RBT set out in this report suggest that, in terms of Gusfield's metaphor, the cannonball can - sometimes - hit the target. The point is that although the colourful uniforms and the noise and the smoke may provide a spectacle for public consumption, the cannon need not be loaded with blanks.

Of course the financial and human costs of achieving a reduction in road accidents through the criminal law may mean that deterrence is an inefficient, outmoded and dangerous weapon. Although the Council for Civil Liberties in New South Wales appears to have accepted RBT as a necessary evil, the costs in a democratic society of a system of enforcement and a style of publicity which rely increasingly on the creation of feelings of terror in the motoring public should not be under-emphasised. To continue Gusfield's metaphor, much more efficient and socially acceptable forms of artillery than the old blunderbusses of the police and the courts may be available to combat the drinking driver. It is sometimes argued, for example, that any approach which avoids trying to change individual behaviour but concentrates instead on the social or physical environment is likely to have more success, and be less politically conservative (T. Cameron, 1979; Mosher, 1985; Quinney, 1976).

In North America, controls on the availability and advertising of liquor have a long and chequered history (Gusfield, 1963; Vingilis and De Genova, 1984). Recent moves in that part of the world to deal with the effects of drinking and driving have included raising the legal drinking age and developing programmes of bartender intervention (Chafetz, 1985). Although these policies have been implemented partly as a response to the perceived failure of deterrence and education-based policies to have much impact on the extent of alcohol impaired driving (Mosher, 1985), what is interesting is that many of these innovations - particularly the bartender intervention programme - are just variations on the deterrence model. Their novelty, and possible value, lies in the shift in the target from individual drivers to the purveyors of alcohol. However, Ross (1982), in proposing that vehicle manufacturers build crash-proof vehicles, has genuinely gone beyond an enforcement-based policy. Improvements in road engineering may similarly be classified as technological, rather than as deterrence-based, approaches to the problem. There is a clear need in general to extend the research agenda beyond a concern with changing individual behaviours, so that the knowledge required for the successful implementation of environmental countermeasures can be built up (Thomson, 1985).

Despite its emphasis on deterrence, nothing in the present report should be taken as support for the view that it is sufficient to change individual behaviour, ignoring either the social environment in which drink-driving practices are shaped and rewarded, or those aspects of the physical environment which increase the likelihood that drinking and driving will lead to death or injury. In fact the criticism that the individual has been treated as if he existed in some kind of social vacuum is more appropriately directed at rehabilitation and some education programmes than at general deterrent measures like RBT. It should be clear from the present study that RBT had an impact in New South Wales not only through the fear of legal punishments, but through a reduction in the social pressures encouraging drinkers to consume more than a safe quantity of alcohol. In addition, any long term impact of RBT or a similar measure must entail changes in beliefs and social practices in directions which will produce quite significant alterations in the social environment, thereby posing a threat to the interests of powerful groups. It is not true therefore that policies aimed at creating general deterrent effects are necessarily individualistic and politically conservative, or that they "... pose the least burden on influential groups and involve the fewest risks for elected officials and bureaucrats" (Beauchamp, quoted in Mosher, 1985, p. 248). Consider as an example the description in Chapter 1 of the political environment in which RBT was introduced in New South Wales. Nevertheless, the social costs of a reliance on fear as a motivation for change cannot be discounted.

The potential of RBT and of similar measures as tools for bringing about social change, at least in the short-term, demonstrates that the impact of the criminal justice system need not be purely symbolic. However, Gusfield (1981b) is surely correct in asserting that the utilitarian value of these kinds of legal innovations is not the main reason why they are so popular. On the contrary, it is because the *killer drunk* - that antisocial, hedonistic, uncontrolled menace - is believed to tear

(or reel) around our roads, that criminal law enforcement directed at individual offenders is, and will remain, the major method for dealing with drinking and driving. Unlike the United States, Australia is unlikely to invest much in better vehicles or in better engineered roads (whatever their cost effectiveness), and tighter controls on liquor sales are not at present politically feasible. Drinking and driving will continue to be construed in terms of individual moral dereliction, with vigorous police activity and severe punishments being seen as an appropriate societal response.

In this situation, the need to develop a better understanding of the conditions under which deterrent effects occur, and of the processes linking legal punishments with behaviour (both in the short-term and in the long-term), emerges as a top priority. Not only can such an understanding contribute to improvements in the effectiveness and in the fairness of drink-drive law enforcement, it can provide the basis for improvements in a theory of the behavioural impact of criminal law. The model of the deterrence process set out in this report is offered as a contribution to the development of such a theory.

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APPENDIX
QUESTIONNAIRES FOR THE STUDY

S.P. No.
ANOP/1802

162
DRINKING AND DRIVING STUDY, FEBRUARY 1983

Card
(1)
1

Q. No.
(2-4)

INTRODUCTION: Good morning/afternoon/evening, I'm ... from AROF the research organisation. I'd now like to ask you some questions about drinking and driving ...

ASK ALL
Q. 1(a) Over the last three months or so, have you seen, heard or read anything about new methods the government is using to deal with drinking and driving in New South Wales?

YES.....1-ASK Q.1(b)
NO.....2 } GO TO Q.2
Unsure.....3 }
(5)

IF "YES" TO Q.1(a), ASK:
Q. 1(b) What new ways have you become aware of for dealing with drinking and driving? Any others? (DO NOT PROMPT)

RANDOM BREATH TESTING.....1
.05 LIMIT.....2
INCREASED PENALTIES.....3
BREATH TESTING OF DRIVERS AT ACCIDENTS....4
BLOOD TESTING OF DRIVERS ADMITTED TO HOSPITAL.....5
RANDOM LICENCE CHECKS.....6
OTHER (Specify).....
.....
.....

ASK ALL
Q. 2 As you may know, random breath testing was introduced into New South Wales on December 17 last year. This means that the police can ask any motorist to take a breath test at any time, even if he or she has not had an accident, has not committed any offence, and has not been driving in a way which would attract police attention. Since December 17 last year:

READ OUT
(a) Have you been pulled over by the police at random and asked to take a breath test - or have you been a passenger in the car when the driver has been asked to take a random breath test?

(b) Have you driven or have you been driven, past police carrying out random breath testing?

(c) Has anyone you know been randomly breath tested?

(d) Have you seen, heard or read any publicity about random breath testing?

YES.....1
NO.....2
Unsure.....3
(7)

YES.....1
NO.....2
Unsure.....3
(8)

YES.....1
NO.....2
Unsure.....3
(9)

YES.....1
NO.....2
Unsure.....3
(10)

ASK ALL
Q. 3 I'd like you to consider the following situation. A person is driving home on a weekday after drinking in a hotel for several hours. It is about 10.30 at night and his blood alcohol level is above the legal limit. His driving is not obviously affected and he is not breaking any other traffic regulations. His trip home takes about 30 minutes over suburban main roads. Are his chances of being stopped by the police lower, about the same, or higher than they were before the introduction of random breath testing?

LOWER.....1
ABOUT SAME.....2
HIGHER.....3
(11)

ASK ALL
Q. 4 Are you a current driver or rider licence holder, are you at present disqualified from driving, or are you not a licence holder and not disqualified?

CURRENT.....1 } ASK Q.5
DISQUALIFIED.....2 }
NOT LICENCED.....3-GO TO Q.13

ASK ALL
Q. 5 From this card (SHOWCARD 1), how would you rate your chances of being pulled over by the police for a random breath test some time in the next month?

0.5 0.6
(13) (14)
EXTREMELY LIKELY.....1
QUITE LIKELY.....2
EVEN CHANCE.....3
QUITE UNLIKELY.....4
EXTREMELY UNLIKELY.....5
Unsure.....6

ASK ALL
Q. 6 If you had been asked that question the day random breath testing was introduced, how do you think you would have answered? (SHOWCARD 1)

ASK ALL Q. 7 Which of the following (SHOWCARD 2) most closely describes your drinking habits?

- 3+ TIMES A DAY.....1
 - TWICE A DAY.....2
 - ONCE A DAY.....3
 - NEARLY EVERY DAY.....4
 - 3-4 TIMES A WEEK.....5
 - ONCE/TWICE A WEEK.....6
 - 2-3 TIMES A MONTH.....7
 - ONCE A MONTH.....8
 - LESS THAN ONCE A MONTH.....9
 - LESS THAN ONCE A YEAR.....0
 - NEVER DRINK.....x
- (15)
- } ASK Q.8
- } GO TO Q.13

ASK ALL DRINKERS FROM Q.7 Q. 8 On days that you do drink, how much, on average, do you have over the whole day? (PROBE EACH TYPE OF DRINK BELOW. RECORD NUMBER OF DRINKS AGAINST SIZE OF GLASS, BOTTLE, ETC.)

NORMAL BEER:	LOW ALCOHOL BEER:
Middies	Middies.....
Schooners.....	Schooners.....
Large bottles.....	Large bottles.....
Small bottles.....	Small bottles.....
Cans.....	Cans.....
TABLE WINE:	OTHER (Specify)
Glasses (4oz).....	.....
PORT/SHERRY:	.....
Glasses (2oz).....	.....
SPIRITS:	.....
Glasses (1oz).....	.....

OFFICE USE ONLY	(16)	(17)
NORMAL BEER	<input type="text"/>	<input type="text"/>
L.A. BEER	(18)	(19)
WINE	<input type="text"/>	<input type="text"/>
PORT/SHERRY	(20)	(21)
SPIRITS	<input type="text"/>	<input type="text"/>
OTHER	(22)	(23)
	<input type="text"/>	<input type="text"/>
	(24)	(25)
	<input type="text"/>	<input type="text"/>
	(26)	(27)
	<input type="text"/>	<input type="text"/>
	(28)	(29)
TOTAL	<input type="text"/>	<input type="text"/>

ASK ALL DRINKERS IN Q.7 Q. 9 Have you ever driven when you felt you had had too much to drink?

- YES.....1
 - NO.....2
 - Unsure.....3
- (30)

ASK ALL DRINKERS IN Q.7 Q.10(a) Since random breath testing was brought in just before Christmas, have you driven when you felt you had had too much to drink?

- YES.....1
 - NO.....2
 - Unsure.....3
- (31)
- } ASK Q.10(b)
- } 3-GO TO Q.11

ASK ALL EXCEPT UNSURE TO Q.10(a): Q.10(b) Why do you say that? Any other reasons? (PROBE)

(32) (33)

ASK ALL DRINKERS IN Q.7 Q.11 When they first brought in random breath testing just before Christmas, what effects did it have on you at the time. From this card (SHOWCARD 3) what if anything did you do at the time? (RECORD IN 1ST COLUMN)

Q.12 And what about now ... what effects is random breath testing having on you now. What (SHOWCARD 3) if anything are you doing now?

- | | Q.11
(34) | Q.12
(36) |
|--|----------------------|--------------|
| . Not using the car as much..... | 1 | 1 |
| . Driving more carefully at all times..... | 2 | 2 |
| . Stopped driving to places where you will be drinking..... | 3 | 3 |
| . Drinking at home more often, drinking away from home less..... | 4 | 4 |
| . Carefully limiting your drinking when driving..... | 5 | 5 |
| . Stopped drinking altogether when driving..... | 6 | 6 |
| . Drinking more soft drinks when driving..... | 7 | 7 |
| . Switched to low alcohol beer when driving..... | 8 | 8 |
| . Driving more carefully after drinking..... | 9 | 9 |
| . Using taxis more often after drinking..... | 0 | 0 |
| . Using public transport more often after drinking..... | x | x |
| . Staying overnight after drinking..... | y | y |
| | (35) | (37) |
| . Having someone else drive you home after drinking..... | 1 | 1 |
| . Sleeping in car instead of driving home after drinking..... | 2 | 2 |
| . Drinking at places closer to home than before..... | 3 | 3 |
| . Have not changed usual behaviour..... | 4 | 4 |
| OTHER (Specify) Q.11..... | <input type="text"/> | |

Q.12.....

ASK ALL
 Q.13 Did the penalties for drinking and driving change when random breath testing was brought in? (38)
 IF YES: In what ways did they change? ← YES.....1
 NO.....2
 Unsure.....3

ASK ALL
 Q.14 In general, do you agree or disagree with the introduction of random breath testing in New South Wales? (39)
 AGREE.....1
 DISAGREE.....2
 OTHER (Specify).....
 Unsure.....y

ASK ALL
 Q.15 From what you have seen, heard or read, what effects, if any, do you feel random breath testing has had in New South Wales?
 PROBE: Anything else it has done? (40) (41)

ASK ALL
 And now, to make sure we have a good sample, could you tell me your approximate age?

17-20	21-24	25-34	35-44	45-54	55-64	65+
1	2	3	4	5	6	7

 (42)
 (43)
 SEX (BY OBSERVATION) Male.....1
 Female.....2

What is the highest level of education you have reached so far? (44)
 Less than 3 yrs high school.....1
 3 or more yrs high school.....2
 Gained HSC/L.C./matric.....3
 Gained Uni degree/College diploma.....4
 What is your occupation? (45)
 WRITE IN:

NAME OF RESPONDENT: Mr/Mrs/Miss/Ms.....
 ADDRESS:.....
 TELEPHONE NO.....

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INTERVIEWER'S STATEMENT: I hereby certify that this is a true and accurate record of this interview, and that I have made a thorough check of all responses to questions so as to comply with the survey briefing and instructions.

INTERVIEWER'S NAME AND SIGNATURE

DATE OF INTERVIEW:..... LENGTH OF INTERVIEW:.....minutes

INTRODUCTION: Good morning/afternoon/evening, I'm ... from ANOP the research organisation. I'd now like to ask you some questions about drinking and driving ...

ASK ALL

Q. 1(a) Over the last four months or so, have you seen, heard or read anything about new methods the government is using to deal with drinking and driving in New South Wales?

- YES.....1-ASK Q.1(b)
- NO.....2} GO TO Q.2
- Unsure.....3}

IF "YES" TO Q.1(a), ASK:

Q. 1(b) What new ways have you become aware of for dealing with drinking and driving? Any others? (DO NOT PROMPT)

- (5)
- RANDOM BREATH TESTING.....1
- .05 LIMIT.....2
- INCREASED PENALTIES.....3
- BREATH TESTING OF DRIVERS AT ACCIDENTS....4
- BLOOD TESTING OF DRIVERS ADMITTED TO HOSPITAL.....5
- RANDOM LICENCE CHECKS.....6
- OTHER (Specify).....

ASK ALL

Q. 2 As you may know, random breath testing was introduced into New South Wales on December 17 last year. This means that the police can ask any motorist to take a breath test at any time, even if he or she has not had an accident, has not committed any offence, and has not been driving in a way which would attract police attention. Since December 17 last year:

READ OUT

(a) Have you been pulled over by the police at random and asked to take a breath test - or have you been a passenger in the car when the driver has been asked to take a random breath test?

- (7)
- YES.....1
- NO.....2
- Unsure.....3

(b) Have you driven or have you been driven, past police carrying out random breath testing?

- (8)
- YES.....1-ASK Q.3(a,b)
- NO.....2} GO TO Q.4(a)
- Unsure.....3}

IF YES TO Q.2(b), ASK:

Q. 3(a) About how often have you driven or have you been driven past police carrying out random breath testing?

- (9)
- ONCE.....1
- TWICE.....2
- THREE TIMES.....3
- FOUR OR MORE TIMES.....4
- Unsure.....5

Q. 3(b) How long is it since you last drove past or were driven past, police carrying out random breath testing?

- (10)
- A FEW DAYS AGO.....1
- ABOUT A WEEK AGO.....2
- ABOUT A FORTNIGHT AGO.....3
- ABOUT A MONTH AGO.....4
- ABOUT 2 MONTHS AGO.....5
- ABOUT 3 MONTHS AGO.....6
- OVER 3 MONTHS AGO.....7
- Unsure.....8

ASK ALL

Q. 4(a) Has anyone you know been randomly breath tested?

- (11)
- YES.....1-ASK Q.4(b)
- NO.....2} GO TO Q.5
- Unsure.....3}

IF YES TO Q.4(a), ASK:

Q. 4(b) About how many people you know have been randomly breath tested?

- (12)
- ONE.....1
- TWO.....2
- THREE.....3
- FOUR OR MORE.....4
- Unsure.....5

ASK ALL

Q. 5 Have you seen, heard or read any publicity about random breath testing?

- (13)
- YES.....1
- NO.....2
- Unsure.....3

ASK ALL

Q. 6(a) Over the past fortnight or so, have you seen or heard any advertising about random breath testing?
IF YES: Were they TV ads, radio ads or ads in newspapers?

- (14)
- YES, TV ADS.....1
 - YES, RADIO ADS.....2 } ASK Q.6(b)
 - YES, NEWSPAPER ADS.....3
 - NO, NOT SEEN ADS.....4
 - Unsure.....5

IF YES TO Q.6(a), ASK:

Q. 6(b) What do you remember from the ads ... What did they say or show you? What was the main message they were trying to get across? Anything else?

..... (15) (16)

.....

ASK ALL

Q. 7 I'd like you to consider the following situation. A person is driving home on a weekday after drinking in a hotel for several hours. It is about 10.30 at night and his blood alcohol level is above the legal limit. His driving is not obviously affected and he is not breaking any other traffic regulations. His trip home takes about 30 minutes over suburban main roads. Are his chances of being stopped by the police lower, about the same, or higher than they were before the introduction of random breath testing?

- (17)
- LOWER.....1
 - ABOUT SAME.....2
 - HIGHER.....3

ASK ALL

Q. 8 Are you a current driver or rider licence holder, are you at present disqualified from driving, or are you not a licence holder and not disqualified?

- (18)
- CURRENT.....1 } ASK Q.9
 - DISQUALIFIED.....2
 - NOT LICENSED.....3-GO TO DEMOGS

ASK ALL DRIVERS

Q. 9 From this card (SHOWCARD 1), how would you rate your chances of being pulled over by the police for a random breath test some time in the next month?

- 0.9 (19) 0.10 (20)
- EXTREMELY LIKELY.....1
 - QUITE LIKELY.....2
 - EVEN CHANCE.....3
 - QUITE UNLIKELY.....4
 - EXTREMELY UNLIKELY.....5
 - Unsure.....6

ASK ALL DRIVERS

Q.10 If you had been asked that question the day random breath testing was introduced, how do you think you would have answered? (SHOWCARD 1)

ASK ALL DRIVERS

Q.11 Which of the following (SHOWCARD 2) most closely describes your drinking habits?

- (21)
- 3+ TIMES A DAY.....1
 - TWICE A DAY.....2
 - ONCE A DAY.....3
 - NEARLY EVERY DAY.....4
 - 3-4 TIMES A WEEK.....5 } ASK Q.12
 - ONCE/TWICE A WEEK.....6
 - 2-3 TIMES A MONTH.....7
 - ONCE A MONTH.....8
 - LESS THAN ONCE A MONTH.....9
 - LESS THAN ONCE A YEAR.....0 } GO TO DEMOGS
 - NEVER DRINK.....x

ASK ALL DRINKERS FROM Q.11

Q.12 On days that you do drink, how much, on average, do you have over the whole day? (PROBE EACH TYPE OF DRINK BELOW. RECORD NUMBER OF DRINKS AGAINST SIZE OF GLASS, BOTTLE, ETC.)

NORMAL BEER:	LOW ALCOHOL BEER:
Middies.....	Middies.....
Schooners.....	Schooners.....
Large bottles.....	Large bottles.....
Small bottles.....	Small bottles.....
Cans.....	Cans.....
TABLE WINE:	OTHER (Specify)
Glasses (4oz).....	.....
PORT/SHERRY:	.....
Glasses (2oz).....	.....
SPIRITS:	.....
Glasses (1oz).....	.....

OFFICE USE ONLY (22) (23)

NORMAL BEER	<input type="checkbox"/>	<input type="checkbox"/>
	(24)	(25)
L.A. BEER	<input type="checkbox"/>	<input type="checkbox"/>
	(26)	(27)
WINE	<input type="checkbox"/>	<input type="checkbox"/>
	(28)	(29)
PORT/SHERRY	<input type="checkbox"/>	<input type="checkbox"/>
	(30)	(31)
SPIRITS	<input type="checkbox"/>	<input type="checkbox"/>
	(32)	(33)
OTHER	<input type="checkbox"/>	<input type="checkbox"/>
	(34)	(35)
TOTAL	<input type="checkbox"/>	<input type="checkbox"/>

ASK ALL DRINKERS IN Q.11

Q.13 Have you ever driven when you felt you had had too much to drink?

- (36)
- YES.....1
 - NO.....2
 - Unsure.....3
 - Refused/Mon't say.....4

ASK ALL DRINKERS IN Q.11

Q.14(a) Since random breath testing was brought in just before Christmas, has you driven when you felt you had had too much to drink?

IF YES TO Q.14(a), ASK:

Q.14(b) About how many times would that be?

IF NO TO Q.14(a), ASK:

Q.14(c) From this card (SHOWCARD 3), could you choose the statement that best describes your reasons for not drinking and driving?

Q.14(d) What would be the second most important reasons for your not drinking and driving?

(37)

- YES.....1-ASK Q.14(b)
- NO.....2-ASK Q.14(c,d)
- Unsure.....3-GO TO Q.15
- Refused/Won't say.....4-GO TO Q.15

(38)

- ONCE.....1
 - TWICE.....2
 - THREE TIMES.....3
 - FOUR TIMES.....4
 - FIVE OR MORE TIMES.....5
 - Unsure.....6
- GO TO Q.15

Q.14(c) (39) Q.14(d) (40)

- IS WRONG.....1
- LEADS TO ACCIDENTS.....2
- CAUGHT AND PUNISHED.....3
- OTHER (Specify).....

Q.14(c).....

Q.14(d).....

Unsure.....y.....y

ASK ALL DRINKERS IN Q.11

Q.15 When they first brought in random breath testing just before Christmas, what effects did it have on you at the time. From this card (SHOWCARD 4) what if anything did you do at the time? (RECORD IN 1ST COLUMN)

Q.16 And what about now ... what effects are random breath testing having on you now? What (SHOWCARD 4) if anything are you doing now?

Q.15 (41)

Q.16 (43)

- . Not using the car as much.....1
- . Driving more carefully at all times.....2
- . Stopped driving to places where you will be drinking.....3
- . Drinking at home more often, drinking away from home less.....4
- . Carefully limiting your drinking when driving.....5
- . Stopped drinking altogether when driving.....6
- . Drinking more soft drinks when driving.....7
- . Switched to low alcohol beer when driving.....8
- . Driving more carefully after drinking.....9
- . Using taxis more often after drinking.....0
- . Using public transport more often after drinking.....x
- . Staying overnight after drinking.....y

(42)

(44)

- . Having someone else drive you home after drinking.....1
- . Sleeping in car instead of driving home after drinking.....2
- . Drinking at places closer to home than before.....3
- . Using special buses or drive home schemes organised by clubs or pubs.....4
- . Have not changed usual behavior.....5

OTHER (Specify) Q.15.....

Q.16.....

ASK ALL DRINKERS IN Q.11

Q.17 There is a legal limit to the amount of alcohol a driver can have in his or her blood. Can you tell me what that legal limit is?

(45)

- LESS THAN .05.....1
- .05.....2
- .06.....3
- .07.....4
- .08.....5
- MORE THAN .08.....6
- OTHER (Specify).....
- Unsure.....y

ASK ALL DRINKERS IN Q.11 (46)
 Q.18 (In fact the legal limit is .05). Since random breath testing was brought in just before Christmas, have you driven when you felt you were over the legal limit of .05?
 YES.....1
 NO.....2
 Unsure.....3
 Refuse/won't say.....4

ASK ALL DRINKERS IN Q.11 (47)
 Q.19 Over the years, about a quarter of a million people in New South Wales have been convicted for drinking and driving. Have you ever been convicted for drinking and driving?
 YES.....1
 NO.....2
 Unsure.....3
 Refuse/Won't say.....4

ASK ALL DRINKERS IN Q.11 (48)
 Q.20 Just supposing you were to drink and drive fairly regularly, from this card (SHOWCARD 5), about how often do you think you could drink and drive over the .05 limit without being caught?
 NOT AT ALL.....1
 ONCE OR TWICE.....2
 ABOUT 5 TIMES.....3
 ABOUT 10 TIMES.....4
 ABOUT 50 TIMES.....5
 ABOUT 100 TIMES.....6
 ABOUT 1000 TIMES.....7
 Unsure.....8

ASK ALL DRINKERS IN Q.11 (49)
 Q.21 I would like you to imagine that you are at a place with a group of friends, and that everyone at that place, that is, all your friends, are all drinking alcoholic drinks. Now thinking of that situation where everyone is drinking alcohol, I would like you to tell me from this card (SHOWCARD 6) how hard or easy you personally would find it to drink less alcohol than your friends?
 EXTREMELY HARD.....1
 VERY HARD.....2
 QUITE HARD.....3
 QUITE EASY.....4
 VERY EASY.....5
 EXTREMELY EASY.....6
 OTHER (Specify).....

 Unsure.....y

ASK ALL DRINKERS IN Q.11 (50)
 Q.22 Now that we have random breath testing, is it easier or harder for you to drink less alcohol than your friends when they are all drinking alcohol?
 EASIER.....1
 HARDER.....2
 NO DIFFERENCE.....3
 Unsure.....4

ASK ALL DRINKERS IN Q.11 (51)
 Q.23 From this card (SHOWCARD 7), how would you rate your chances of being caught by the police if you regularly drove over the .05 limit (IF WOULDN'T DRIVE OVER .05, PROBE: Well, supposing you did ...)?
 DEFINITELY NOT BE CAUGHT.....1
 PROBABLY NOT BE CAUGHT.....2
 PROBABLY WOULD BE.....3
 DEFINITELY WOULD BE.....4
 Unsure.....5

ASK ALL DRIVERS IN Q.11 (52)
 Q.24 Supposing you were random breath tested by the police and found to be over the legal limit of .05. How would you personally rate your chances of actually being arrested for drinking and driving? (SHOWCARD 8)
 CERTAIN.....1
 EXTREMELY LIKELY.....2
 QUITE LIKELY.....3
 EVEN CHANCE.....4
 QUITE UNLIKELY.....5
 EXTREMELY UNLIKELY.....6
 Unsure.....7

INTERVIEWER: SHOWCARD ORDER USED 1 - 7 ...1
 IN Q.24 AND Q.25 7 - 1 ...2

ASK ALL DRINKERS IN Q.11 (53)
 Q.25 If you were arrested for drinking and driving, how would you rate your chances personally of being let off by the court without any penalty? (SHOWCARD 9)
 EXTREMELY LIKELY.....1
 QUITE LIKELY.....2
 EVEN CHANCE.....3
 QUITE UNLIKELY.....4
 EXTREMELY UNLIKELY.....5
 ZERO.....6
 Unsure.....7

ASK ALL DRINKERS IN Q.11

Q.26 For this question, I would like you to imagine that you had been arrested for drinking and driving, and that the court had found you guilty and imposed a punishment. Think about what that punishment would be for you. From this card (SHOWCARD 10), in general, how big a problem would that punishment be in your life?

- (54)
- NO PROBLEM AT ALL.....1
 - HARDLY ANY PROBLEM.....2
 - A LITTLE PROBLEM.....3
 - A BIG PROBLEM.....4
 - A VERY BIG PROBLEM.....5
 - Unsure.....6

ASK ALL DRINKERS IN Q.11

Q.27 Which punishment would you personally find harsher: imprisonment for two weeks, or disqualification from driving for six months?

- (55)
- PRISON.....1
 - DISQUALIFICATION.....2
 - EQUAL.....3
 - Unsure.....4

ASK ALL DRINKERS IN Q.11

Q.28 If you did drink and then drive, how worried would you be about being asked to take a random breath test ... not at all worried, not very worried, quite worried, or very worried?

- (56)
- NOT AT ALL WORRIED.....1
 - NOT VERY WORRIED.....2
 - QUITE WORRIED.....3
 - VERY WORRIED.....4
 - Unsure.....5

ASK ALL DRINKERS IN Q.11

Q.29 How easy or hard is it to actually avoid driving past where police are carrying out random breath testing ... is it very easy, quite easy, quite hard or very hard to avoid them?

- (57)
- VERY EASY.....1
 - QUITE EASY.....2
 - QUITE HARD.....3
 - VERY HARD.....4
 - Unsure.....5

ASK ALL DRINKERS IN Q.11

Q.30 If you did drive past where police were carrying out random breath testing on your side of the road, how likely is it that you would actually be pulled over and asked to take the test? (SHOWCARD 11)

- (58)
- EXTREMELY LIKELY.....1
 - QUITE LIKELY.....2
 - EVEN CHANCE.....3
 - QUITE UNLIKELY.....4
 - EXTREMELY UNLIKELY.....5
 - Unsure.....6

ASK ALL DRINKERS IN Q.11

Q.31 In your daily life, from this card (SHOWCARD 12), how essential is it for you to be able to drive a car or other motor vehicle?

- (59)
- ESSENTIAL FOR JOB.....1
 - ESSENTIAL AS NO PUB.TRANS.....2
 - ESSENTIAL, BUT.....3
 - USEFUL, NOT ESSENTIAL.....4
 - DON'T NEED TO DRIVE.....5

DEMOGRAPHICS - ASK ALL

And now, to make sure we have a good sample, could you tell me your approximate age?

17-20	21-24	25-34	35-44	45-54	55-64	65+
1	2	3	4	5	6	7

(60)

SEX (BY OBSERVATION)

Male.....1

Female.....2

(61)

NO. OF 18+ IN HOUSEHOLD FROM RANDOM SELECTION GRID

(62)

What is the highest level of education you have reached so far? (63)

- Less than 3 years at high school.....1
- 3 or more years at high school.....2
- Gained HSC/L.C./Matric.....3
- Gained Uni degree/College diploma.....4

What is your occupation? (64)

WRITE IN:

LOCATION

SYDNEY	NEWCASTLE	WOLLONGONG	BATHURST	LISMORE	GOULBURN	WAGGA	YAMWORTH	PARKES/DUBBO
1	2	3	4	5	6	7	8	9

(65)

NAME OF RESPONDENT: Mr/Mrs/Miss/Ms.....

ADDRESS:.....

TELEPHONE NO.....

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INTERVIEWER'S STATEMENT: I hereby certify that this is a true and accurate record of this interview, and that I have made a thorough check of all responses to questions so as to comply with the survey briefing and instructions.

(INTERVIEWER'S NAME AND SIGNATURE)

DATE OF INTERVIEW:..... LENGTH OF INTERVIEW:..... minutes