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The Potential for the Use of Psychological and Situational Factors in the Targeting of Drink-Drive Countermeasures

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Abstract:

Data collected by the Victoria Police at the time an alleged drink-driving offender undergoes an evidential breath test were analysed to investigate the possibility that certain situational and psychological factors might be associated with drink-driving. The focus of the analysis was the potential for the situational and psychological characteristics associated with drink-driving to be used to target drink-drive countermeasures more effectively in the Victorian context where there are already relatively high levels of enforcement and supporting publicity.

Analysis of the personality data identified five groups of drink-drivers with personality orientations that were over-represented in the drink-driver sample compared to the level expected based on population norms. These groups were then compared to other drink-drivers to further describe them in terms of the situational data collected by the Police. Tentative conclusions are drawn about the likely effects of countermeasures on each of the defined groups of drink drivers.

Key Words
(IRRD except where marked *)

Enforcement, Police, Alcohol,
Driver Behaviour, Drink-Driving*
Personality*, Occupation

EXECUTIVE SUMMARY

In the context of the relatively high levels of drink-drive enforcement and public education campaigns in Victoria, the continued drink-drive behaviour of some drivers suggests that there may be some characteristics shared by some offenders which reduce the impact of current countermeasures. The common characteristics of these drink drivers may, if identified, lead to further developments in the effective targeting of countermeasures. This project sought to investigate this possibility.

Data collected by the Victoria Police at the time an alleged drink-driving offender undergoes an evidential breath test were analysed to investigate the possibility that certain situational and psychological factors might be associated with drink-driving. The Police collect demographic data which includes the location, day of week, and time of day of the offence as well as the age and the occupation of the alleged offender. The focus of the analysis was the potential for the situational and psychological characteristics associated with drink-driving to be used to target drink-drive countermeasures more effectively in the Victorian context.

In part, the results indicate:

- Rural drink-drivers were marginally younger than metropolitan drink drivers.
- Male drink-drivers were more likely than female drink drivers to be unlicensed or to have had their licence cancelled for some reason. Twenty percent of male drink drivers were unlicensed or disqualified from driving.
- Rural drink-drivers were more likely than metropolitan drink drivers to be unlicensed or disqualified from driving.
- Rural drink drivers were more likely than metropolitan drink drivers to consume alcohol prior to the offence at a hotel or at home.

Using a theory of the relationship between some personality characteristics and occupation, drink-drive offenders from the period 1992-1995 were assigned occupational codes which were taken to reflect some aspects of their personality in so far as personality is expressed in occupational choice.

Analysis of the personality data identified five groups of drink-drivers who had personality orientations that were over-represented in the drink-driver sample compared to the level expected based on population norms. These groups were then compared to other drink-drivers to further describe them in terms of the situational data collected by the Police.

The Holland model of personality and occupation, as used in the present context, would allow the identification of thirty separate groups of drink drivers based on personality characteristics. The identification of five of these groups as potentially over-represented groups highlights the potential for further targeting of drink-drive countermeasures.

The five groups identified in this way were:

- Male drink-drivers characterised as acquisitive, adventurous, energetic, extroverted, and socially oriented. This group tended to drink-drive in the Melbourne area at restaurants or clubs and were more likely to be fully licensed. This group would not be strongly

influenced by enforcement-related programs but would be influenced by campaigns that stress the social-leadership values of this group.

- Male drink-drivers characterised as asocial, conforming, reserved, introspective, unpopular, unimaginative, and defensive. This group tended to be detected in rural areas after drinking at hotels or at home. They were more likely to have licence problems and were more likely to have higher BACs than other drink-drivers. It is argued that any programs addressed to this group would need to be concrete and would need to specify the desired behaviour clearly, with role-modelling approaches likely to be beneficial. This group is unlikely to be affected by enforcement-related methods.
- Female drink-drivers characterised as asocial, inflexible, uninsightful, careful, conforming and inhibited. This group tends to drink drive more in rural areas than other female drink drivers. It is argued that role-model based media campaigns and a strong emphasis on the concrete consequences of offending would be beneficial for this group.
- Female drink-drivers characterised as socially oriented, careful, orderly, and defensive. This group was represented across all situational variables investigated here. It is argued that campaigns that emphasise the social consequences of drink-driving would be beneficial.
- Female drink-drivers characterised as socially oriented, adventurous, energetic, and optimistic. This group was not differentiated from other female drink drivers in terms of the situational variables investigated here. It is argued that campaigns emphasising the social-leadership values of this group would be beneficial, and that this group is unlikely to be affected by enforcement-related campaigns.

The data relating to female drink drivers is less reliable than that relating to males as the sample of females was relatively small and it is generally considered that the link between personality and occupation used in the analysis of the data is less certain for females than for males.

More generally, the data analysis is somewhat speculative as it uses the personality-occupation link in a novel way and uses a relatively small sample of drink-drivers with a relatively small number of relevant variables for each drink-driver. The population norms used to link occupations and personality in the drink driving sample are norms from a young adult sample, and while there is known to be a strong relationship between personality as expressed in occupational choice throughout the lifespan of the individual, the appropriateness of the norms for the present sample is still cause for concern. There is a need to conduct further research in this area to validate the tentative conclusions reached so far.

The potential for targeting specific groups of drink-drivers in Victoria's relatively high-enforcement context is considerable. Drivers who are prepared to drink-drive in this context are probably less likely to be influenced by further, simple increases in enforcement levels without consideration to the specific characteristics of these drivers that lead them either to ignore the risks associated with drink-driving or to remain unaffected by the potential negative consequences. Increased understanding of the characteristics of these drink-drivers will ultimately allow drink-drive campaigns to target them more effectively.

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1. INTRODUCTION

This report is concerned with the relationship between psychological and situational factors and drink-driving. The focus of the report is the possibility that drink-driving countermeasures may be targeted more efficiently if the characteristics of drink-drivers are more clearly understood. While the investigation of the characteristics of drink-drive offenders has a relatively long history, application of this knowledge to drink-drive countermeasure development and targeting in Victoria is a relatively recent activity. This report was prepared in an attempt to provide further information to assist in this.

It is important to note that the approach taken in this report is somewhat speculative. Some of the results are based on a novel application of a model of personality and occupation which is generally accepted as an empirically valid and reliable tool in career counselling but which has not been applied outside that context.

While evidence has accrued in the past two decades that there are certain psychological characteristics that are related to drink-driving, this knowledge has not been fully applied in the development of preventative countermeasures. Research on the implications of this link between psychological variables and drink-driving (e.g. Moore, 1994; Nolan, Johnson, & Pincus, 1994) has generally been concerned with remediation or counselling programs for detected drink-drivers. The focus in Victoria has generally been on measures to reduce future instances of drink-driving through deterrence or attitude change. There is considerable potential in this approach for the application of knowledge concerning the psychological characteristics of drink-driving, but the relative novelty of this needs to be stressed.

1.1 Drink-driving and Countermeasures

The Nature of the Drink-driving Problem in Victoria

Drink-drivers continue to represent a substantial road safety problem in Victoria, in spite of the implementation of a range of legislative, enforcement, and public education countermeasures over the last two decades which have succeeded in reducing the problem considerably. It is estimated that 23.8% of fatally injured drivers in 1995 had blood alcohol levels in excess of the legal maximum in Victoria of .05 g/100ml compared with about 50% in 1977. The matching of blood alcohol and crash data does not allow analysis of changes in alcohol-involvement for non-fatal crashes.

There is other evidence suggesting that drink-driving continues to be a problem for some drivers in spite of the extensive countermeasures that have been introduced in the last 30 years. Harrison (1996), for example, has shown that at least 14% of a sample of rural hotel patrons with potentially-illegal blood alcohol levels intended to drive either home or back to work. Of further concern was that these "drink-drivers" tended to live further from the hotel than did the other hotel patrons, increasing their exposure to crash risk.

Countermeasures in Victoria

Random breath testing (RBT) for the presence of alcohol was introduced in Victoria in 1976. RBT campaigns with intensive levels of testing and publicity have been shown to have an impact on crashes (e.g., Armour, Harrison, & South, 1986; Armour, Monk, South, & Chomiak, 1985; Cameron & Strang, 1982), but the generally low level of testing in Victoria compared to New South Wales was thought unlikely to have a sustained impact on drink-driving (Homel, 1988). In 1990 the number of tests was increased substantially, and there have been more recent increases in testing levels in rural areas (Harrison, 1996). The RBT program has been supported by public education programs in the media, with a recent emphasis on emotionally-intense publicity material in a range of road safety areas.

Newstead, Cameron, Gantzer, & Vulcan (1995) have suggested that high-alcohol-hour crashes have been affected by both the public education program and the enforcement program. High alcohol hours are those times of the week which have been shown to represent the greatest risk for alcohol-related crashes (Harrison, 1990). Newstead et al. (1995) modelled crash frequencies during high alcohol hours in the period from 1983 to 1993 and found that the number of preliminary breath tests conducted at bus-based RBT stations was a significant predictor of crashes in the Melbourne Statistical Division, and that a measure of the market penetration of drink-driving publicity was a significant predictor of crashes across the whole State.

Harrison (1996) has highlighted the failure of a parameter based on rural bus-based RBT operations to achieve significance in the Newstead et al. (1995) model. Whether this relates to statistical factors, the use of an incorrect parameter, or to a weaker RBT effect in rural areas is unclear, but Harrison has discussed some potential differences between drink-driving and enforcement in rural areas compared to the metropolitan area as a starting point for consideration of this issue. Harrison also noted that there are some potential areas of concern regarding the broad application of deterrence theory (Homel, 1988) to drink-driving given the likely complexity of the factors that may have a causal influence in this behaviour.

The Potential for Improved Targeting of Countermeasures

The effect of drink-driving countermeasures has been understood in terms of deterrence theory. Deterrence theory argues, in relation to drink-driving, that the likelihood of an individual offending depends (other things being equal) on the likelihood of detection, the perceived likelihood of detection, and on the certainty of punishment following detection (Homel, 1988).

Implicit in the application of this theory to drink-driving is the assumption that all (or certainly most) drivers are more-or-less equally influenced by variations in these factors. This assumption is similar to the stimulus-response view in psychology which argued that human behaviour is largely a response to sometimes complex chains of external events with little or no contribution from factors internal to the person - such as personality, attitudes, values, etc. Both the simple application of deterrence theory and the stimulus-response approach to human behaviour ignore the complexity of behaviour and the complex interaction between psychological variables such as cognition, attitudes, values, and personality, and the external determinants of behaviour.

Countermeasures resulting from the application of deterrence theory generally have been targeted at the whole of the driving population. Some programs have targeted particular age groups or drivers in particular geographical region, but there has been a general view (reflected

in practice) that the greatest gains would be made by using general countermeasures that would impact on the largest number of drivers.

While the overall success of Victoria's drink-drive program is evidence that many drivers are (for whatever reason) affected by intense enforcement and public education levels, there are drivers who continue to drink-drive in spite of the program. This suggests either that these drivers are not, for psychological or social reasons, responsive to a negative-reinforcement based approach to behaviour change or that they would require even greater increases in enforcement levels before being deterred. These possibilities are not mutually exclusive (as implied in Harrison (1996) in his discussion of rural perceptions of the risk of detection), but more research would be needed to determine which is the case. More importantly for the present study, the drivers who continue to offend are unlikely to form a single homogeneous group (Donovan & Marlatt, 1982), but they are likely to share some characteristics that might be useful for the development and targeting of new countermeasures.

Given the likely resistance of the remaining drink-drivers to current levels of current countermeasures, future gains in this area will depend in part on the implementation of countermeasures that target the particular characteristics of these drivers that set them apart from other drivers. Developing and implementing countermeasures focussed on these drivers assumes an adequate knowledge-base concerning their characteristics and the nature of their drink-driving behaviour. This study was conducted to provide additional information concerning some characteristics of a sample of drink-drivers to aid in the development and targeting of countermeasures.

This study could be considered a preliminary one in this area. The sample of drink-drivers was relatively small and the variables relating to psychological and situational variables were less reliable than might be available in a more comprehensive study of the relationship between psychological variables and drink-driving. Never the less, this study used a novel approach to infer the psychological characteristics of drink-drivers that was applied to previously collected data from detected offenders. This and the practical, countermeasure-focussed analysis of the data ensure that the results of the study should be useful as a starting point in the development of countermeasures that may more-effectively influence the behaviour of those drivers who continue to drive under the influence of alcohol.

1.2 Psychological Factors and Drink-Driving

The Complexity of Behaviour

Behaviours such as drink-driving are the result of the interaction between a large number of causal influences, both internal and external to the offender. Increasingly, behaviour is seen as part of an interacting triad of behaviour, environment, and internal factors (e.g. Kazdin, 1989). Thus any instance of drink-driving needs to be seen as having a range of causal factors, some of which will be internal to the offender.

Causal factors that are internal or psychological are the main focus of the present study, with an additional minor focus on some of the environmental factors that might have a relationship with drink-driving.

Literature Concerning Psychological Factors and Drink-Driving

Evidence concerning the links between psychological factors and drink-driving is weak but consistent. It is important to note at this point that behaviour is likely to have many causes, and that any individual factor (such as a personality variable) is unlikely to be highly correlated with behaviour. Sivak (1981) noted this in relation to the correlation between human factors in general and crashes and suggested that the high degree of variability in crash involvement and the involvement of many other factors would be expected to reduce the apparent causal involvement of relatively stable personal characteristics. The same is likely to be true of behaviours such as drink-driving, where the impact of situational and social factors would be expected to reduce the apparent effect of psychological factors.

Internal or psychological variables may be seen as setting the background against which other variables (environment, social influences, etc) act. Taking this approach in the drink-driving area, it might be argued that personality or psychological variables predispose some road users to being influenced by the situational factors that are known to be associated with drink-driving, or predispose others to being less-affected by current drink-drive countermeasures than other drivers. The latter point is critical. Drivers who continue to offend in spite of current enforcement levels may share psychological characteristics which create an immunity to present countermeasures.

Some evidence concerning the relationship between psychological factors and drink-driving is summarised below.

- Brown (1985) used four psychological measures and demonstrated that a sample of drink-drivers differed from the general population (using test norms as a reference) on a number of variables. They were generally more anxious, depressed, hostile, and tense than the general population.
- Craig and Dres (1989) compared first offenders and recidivist offenders using a number of instruments. They found a number of differences between the groups but were only able to account for 10% of the variance between groups using the psychological measures. Craig and Dres used measures with a clinical focus (e.g. the MMPI), suggesting that their results may reflect the lack of clinical involvement in recidivist behaviour and the primacy of other factors such as personality and situational factors.
- McMillen, Adams, Wells-Parker, Pang, and Anderson (1992) similarly compared multiple and first-time drink-drive offenders using a range of psychological instruments. The groups differed in measures of hostility, sensation seeking, emotional adjustment, assertiveness, psychopathic deviance, mania, and depression - with multiple offenders consistently less psychologically healthy than first-time offenders. Multiple drink-drive offenders also had poorer driving records, both in terms of crash involvement and other driving offences.
- Donovan and Marlatt (1982) argued that it is too simplistic to view drink-drivers as a homogeneous group. They presented results from a cluster analysis of data from measures of personality, hostility, and attitudes given to a sample of convicted drink-drivers and defined sub-groups with different characteristics. Two of the sub-groups were considered to have a particularly elevated crash risk (exceeding the already-elevated crash risk of drink-drivers in general). One of these had characteristics suggesting some degree of clinical involvement (depression, low assertiveness, resentment, poor emotional adjustment, and external locus of control). The other group was characterised by high levels of driving aggression, sensation seeking, irritability, high levels of general hostility. Both these groups were heavier users of alcohol than the other groups. Donovan and Marlatt argue strongly that these results have implications for the treatment of drink-drivers. They also have implications for the application of drink-driving countermeasures, as countermeasures that do not take the characteristics of these groups into account are unlikely to be successful

at modifying their behaviour. Nolan, Johnson, and Pincus (1994) confirmed Donovan and Marlatt's findings using another personality inventory.

- Lastovicka, Murry, Joachimsthaler, Bhalla, and Scheurich (1987) examined the possibility of using lifestyle variables to segment young males in a way that might relate to drink-driving. Their interest was improved targeting of drink-drivers. Lastovicka et al. reported that two clusters of young males were more likely to drink and drive (self-reported) than others. One group was characterised by sensation seeking and a macho attitude. The other group was characterised by a history of problem behaviours. The authors advise targeting the first group rather than the second as the second group may be less-influenced by a media-based campaign. The authors did not, however, relate their typology to crash risk. Although it is an empirical question, it is possible that their problem-behaviour group may constitute a more significant safety concern than the other group.
- Stacy, Newcomb, and Bentler (1991) reported the results of an analysis of the mechanism by which personality variables influence drink-driving behaviour. They were interested in whether the relationship reflected the effect of personality on drinking behaviour alone or whether there was a direct link between personality and drink-driving. Their results indicated that some personality variables (sensation seeking and cognitive/motivational factors) acted both directly on drink-driving behaviour and indirectly by increasing alcohol use. Stacy et al. take their results as support for an effect of personality on drink driving that is in part independent of the effect on alcohol consumption.

The data are less clear than implied by the selective review above. Some authors (e.g. Steer, Scoles, & Fine, 1984; Vingilis, Stoduto, Macartney-Filgate, Liban, & McLellan, 1994) have reported more ambiguous results, but the outcomes of research in this area generally point to a relationship between some aspects of personality and drink-driving, and therefore to the possibility that some aspects of driver personality may be used for targeting drink-drive countermeasures.

1.3 Holland Codes and Personality

The Holland Theory

Holland (1973, 1985) developed a theory of career development, within a view of careers that emphasises occupational choice as an expression of the personality of the individual. As Kelso (1986) notes, occupational interest inventories, under Holland's theory, are more-correctly viewed as personality inventories. Holland extends this argument to claim that workers in similar occupations, as a result of similar interests, career development, and personal development, would be expected to have similar personalities in-so-far as their personality is expressed in their occupational choice.

Holland (1985) argued for a typology of occupational interest, and therefore occupation-related personality, composed of six factors or orientations. He defined these in terms of personal characteristics, interests, and competencies. The six factors are summarised in Table 1.

The six-factor structure of occupation-related personality has been largely confirmed in a range of empirical studies (e.g. Naylor and Mount, 1986; Tracey & Rounds, 1992), and a number of studies have largely confirmed that the Holland model has good validity, especially with males.

The results of applying the model to females are more ambiguous, however (Tuck & Keeling, 1986).

It needs to be emphasised that Holland's view is that personality is composed of more or less of each of these six factors. Holland does not argue that an individual is one type or another, but rather than the individual's behaviour (such as occupational choice) is affected by the relative strength of each of these orientations within the individual.

Holland (1973) gave a structure to his model which has also received considerable empirical investigation (e.g. Tracey & Rounds, 1992). Holland argued that the intercorrelations between the six personality factors imply a hexagonal structure as shown in Figure 1. Factors that are close to each other are more similar than those further apart on the hexagon. Thus a person with a high level of the Investigative orientation will be more similar to a person with a high level of the Artistic orientation than he/she is to a person who has a high level of the Enterprising orientation.

Table 1: Holland Personality Orientations (from Kelso, 1986)

Holland Orientation		Personality Description
Realistic	(R)	Possesses mechanical or athletic ability and lacks social competence; values money, power, status; is inclined to be asocial, conforming, frank, genuine, materialistic, persistent, practical, uninsightful, and uninvolved.
Investigative	(I)	Possesses mathematical and scientific ability and lacks leadership ability; values science; is inclined to be analytical, cautious, critical, complex, curious, independent, intellectual, introspective, precise, rational, and unassuming.
Artistic	(A)	Possesses artistic or musical ability; values aesthetic qualities; is inclined to be emotional, expressive, idealistic, imaginative, impulsive, intuitive, original, and sensitive.
Social	(S)	Possesses social competence and likes to help others; values social and ethical activities; is inclined to be cooperative, empathic, friendly, generous, helpful, idealistic, patient, sociable, and tactful.
Enterprising	(E)	Possesses leadership and speaking skills; values political and economic achievement; is inclined to be adventurous, agreeable, ambitious, energetic, extroverted, optimistic, and self-confident.
Conventional	(C)	Possesses clerical and numerical ability; values business and economic achievement; is inclined to be conforming, conscientious, defensive, inflexible, methodical, obedient, orderly, thrifty, and unimaginative.

Holland's theory can be extended to coding occupations according to the personality characteristics of people likely to be attracted to that particular occupation. This is the basis of a number of occupational scales (e.g. The Vocational Preference Inventory (Holland, 1975) and the Self Directed Search (Holland, 1985; Lokan, 1988)) and is the basis of the method used here. Holland's argument in developing the method used in the Self Directed Search, for example, was that the personality characteristics of people who were in a particular occupation

would be similar and that these characteristics could be used as the basis for advising people seeking career advice. Advice in the Self Directed Search is based on the similarity between the assessed personality characteristics of the person and the "personality characteristics" of the occupations.

In day-to-day use, occupations and individuals are assigned a Holland code of two or three letters from the RIASEC set, referring to the two or three highest or strongest orientation factors for that occupation or individual. Psychologist occupations, for example, are assigned a three-letter code of SIA (Social - Investigative - Artistic) or ISA, for example, depending on the speciality, and electrical engineering occupations are assigned a three-letter code of IRE (Investigative - Realistic - Enterprising). Knowing the two or three letter code of a person allows conclusions to be drawn about some of the personality characteristics of the person, and knowing the occupation of a person similarly allows some knowledge of the person's personality characteristics, with less reliability because of the assumption that the person is appropriately matched to their occupation.

Holland (1985) argued that the occupation of an individual forms a context or environment that can itself have a substantial effect on the interests, competencies, and personality of the individual, and therefore that working in a particular occupation can lead to changes to the individual in the direction of the occupation type. This is an important aspect of Holland's theory and is of some relevance here where it is argued that coding an individual's occupation with the Holland codes allows some conclusions to be drawn about the individual.

There are, therefore, two reasons to believe that the Holland code of an occupation should reflect the Holland code (and therefore the personality) of the individual. The first, already outlined, is that individuals with particular personalities will be attracted towards occupations that match their personality and that there is clear empirical evidence that people in similar occupations share personality characteristics. The second is that once in an occupation, the nature of the work and the work environment will lead individuals to develop some of the behavioural or personality characteristics consistent with the occupation's Holland type.

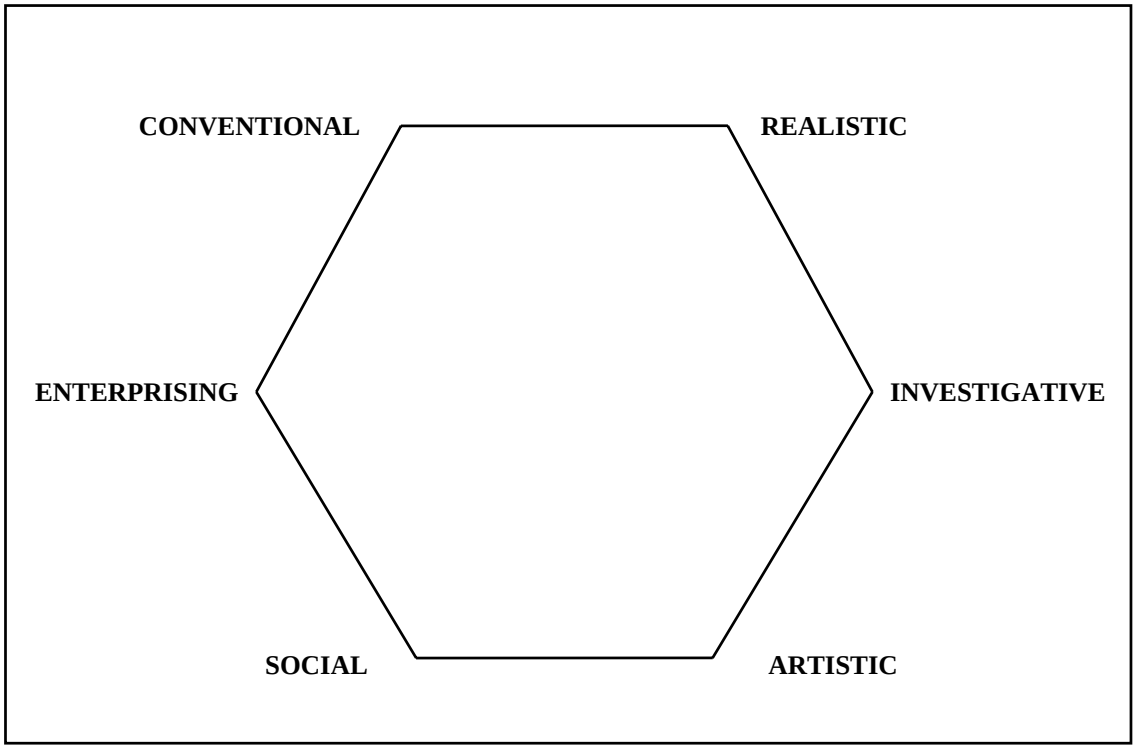

Figure 1: The Structure of Holland's Model

Applying the Holland Approach to Drink-Driving

The argument that occupations may have particular "personality characteristics" was used in the present study as a means of estimating the broad personality characteristics of individuals given knowledge of their occupations. While it follows from the Holland theory that this use of the Holland typology should provide some information concerning the characteristics of drink-drivers based on their occupation, it needs to be emphasised that this is a novel use of the Holland approach. This concern is tempered somewhat by the similarity between the approach used here and the method used in applying the Holland model to career counselling, where it is also assumed (with empirical support) that knowledge about either occupation or personality can lead to some level of understanding of the other.

More positively, there is a high level of empirical support for Holland's argument that personality is expressed in occupational choice and for his particular formulation of this argument. The possibility that occupational data may lead to insights into drink-driving and, more importantly, to more effective countermeasures against drink-driving warrants the use of a relatively novel approach such as that presented here.

In this study, occupational data for a sample of drink-drivers was used to attach 2-letter Holland codes to individuals. Comparison between these codes and the expected code frequencies based on population norms was used to draw some conclusions about the characteristics of drink-drivers compared to the general population. This in turn was expected to allow some recommendations to be made about the future targeting of drink-drive countermeasures.

1.4 Situational Contributors to Drink-Driving

Behaviour is dependent on both internal and external factors, and an association between external factors and drink-driving has been clearly demonstrated (e.g. Diamantopoulou, Cameron, & Mullan, 1995; Homel, 1988).

Knowledge concerning the situations in which drink-driving occurs or which precede drink-driving also has the potential to aid in the development of better-targeted drink-drive countermeasures. The use of deterrence-based countermeasures is based on the role of contextual or situational cues in the generation of behaviour, but countermeasures such as random breath testing or server-intervention aim to impose a context onto the behaviour of the driver. Thus, random breath testing has sought to impose a context that includes the over-riding fear of detection and its consequences, with the expectation that this context would impact on drink-drivers.

An alternative approach is to use the contextual or situational cues as potential targets for drink-drive countermeasures. The extent to which drink-driving occurs in association with a particular environment or context will determine the potential of this approach to countermeasure targeting.

Some evidence has been reported which has direct bearing on this issue, and this study (in part) extends a recent project conducted by Diamantopoulou et al. (1995) who examined various issues including the relationship between some demographic variables and drinking variables that were associated with drink-drivers.

1.5 This Project

The present report details the results of an investigation of the potential for improved targeting of drink-drive countermeasures using data collected by the Victoria Police after drivers have been detected with illegal blood-alcohol concentrations. The Police member giving the evidential breath test collects data concerning the driver and the context of the driver's drinking. This information includes details of the driver's age, sex, and occupation; offence details; and details of the amount and type of alcoholic beverage consumed and the location of drinking.

A sample of these Briefs was collected and the information analysed to address the following issues:

- The extent to which occupationally-based personality information might be used to assist in the targeting of drink-drive countermeasures; and
- The potential use of information about the context of drink-driving in countermeasure targeting.

The issue of appropriate or effective targeting of drink-drive countermeasures is central to this report.

2. METHOD

2.1 Data

Data Source

Data for this study were collected from information obtained by the Victoria Police at the time drink-drivers are apprehended. The drink-drivers sampled for this study were those apprehended at either a random breath test (RBT) station or as a result of a routine licence check or detection for another (non-drink-driving) offence in the period from 1992 to 1995 inclusive who were then required to attend a court for the offence. Less serious, first-time drink-drive offences in Victoria are sometimes dealt with through a penalty notice system in which the offender is not required to attend a court unless they choose to do so.

The use of data for more-serious or recidivist offenders in the present study means that the results are representative of more-serious drink-drive offenders rather than all drink-drive offenders. In the context of the present study which aims to identify characteristics associated with drink driving for future use in countermeasure refinement it was considered that this bias towards more-serious offenders was appropriate.

When drivers are found to be in excess of the legal maximum blood alcohol concentration at a preliminary breath test, they are taken for an evidential breath test. These tests are conducted by trained Police operators and the results are admissible in court as evidence of a drink-driving offence. At the time of the evidential breath test, the breath tester operator completes a data sheet which then forms part of the brief used by the Police prosecutor if and when the offender appears before the court. The information collected at the time of the evidential breath test includes personal details, demographic details, occupation, blood alcohol level, and the drinking location and amount consumed. With the exception of the personal details, the data collected at the time of the evidential test was used in the present study.

Data were used from drivers detected at RBT stations as they were considered to reflect a relatively random sample of the drink-driving population compared to samples that might be obtained from other sources. While drink-drivers detected at RBT stations may not represent a perfectly random sample of drink-drivers, the only alternative likely to produce a more random sample would be to use a road-side survey methodology to detect drink-drivers in the stream of traffic at appropriately sampled sites. Such a method was beyond the scope of this project. RBT stations are set up at locations on higher-volume roads that are largely random, and test either all drivers in the traffic stream if the traffic volume allows, or drivers selected from the stream. Drivers detected drink-driving after being stopped for another reason were also included in the sample as it was considered that they, too, would most likely reflect a relatively-random sample of drink-drivers on the road system. Drivers detected drink-driving by patrols who were not detected for some other offence (such as speeding) were not included in the present analysis.

The sample used might, therefore, be regarded as a relatively random sample of more-serious or repeat drink-drivers in the Victorian population.

Sampling Technique

The drink-driving data (summary offence forms) are held by the Victoria Police. The sampling method is detailed in Diamantopoulou et al. (1995), and additional data collected for this project were collected using the same method.

Data were collected by randomly selecting court briefs for offences that occurred in the years 1992 to 1995 inclusive. Data were only used if the offender was over the age of eighteen years. Two data sets were collected and aggregated, one set for drivers apprehended in the Melbourne Victoria Police districts, and one for drink-drivers who were apprehended in rural Victoria Police districts.

Summary of Sample

The sample consisted of 1232 (65.7%) drink-drivers from Melbourne and 643 (34.3%) from the rest of Victoria. Drink-drivers apprehended in 1992 made up 5.6% of the sample, 54.6% from 1993, 21.2% from 1994, and 18.6% from 1995. The details of the sample are shown in Table 2.

There were more females in the metropolitan sample (13.3%) than in the rural sample (9.2%) ($\chi^2_{(1)} = 6.9$, $p<.05$).

Table 2: Description of the Two Samples of Drink-drivers

		Number (and Percentage) of Drink-Drivers	
		Melbourne Sample	Rural Sample
Sex	Male	1065 (86.7%)	583 (90.8%)
	Female	164 (13.3%)	59 (9.2%)
Age	18-21 years	79 (6.4%)	69 (10.7%)
	22-30 years	352 (28.6%)	216 (33.6%)
	31-40 years	367 (29.9%)	184 (28.7%)
	41-50 years	290 (23.6%)	109 (17.0%)
	51 years and above	141 (11.4%)	64 (10.0%)
Place of Drinking	Hotel	392 (31.9%)	220 (34.2%)
	Restaurant	77 (6.3%)	12 (1.9%)
	Home	160 (13.0%)	115 (17.9%)
	Another House	201 (16.3%)	99 (15.4%)
	Nightclub / Sport Club	110 (8.9%)	50 (7.8%)
	Other	289 (23.5%)	146 (22.7%)
Year of Offence	1992	64 (5.2%)	41 (6.4%)
	1993	677 (55.1%)	346 (53.8%)
	1994	256 (20.8%)	141 (21.9%)
	1995	232 (18.9%)	114 (17.9%)

2.2 Holland Coding Procedure

Offenders' occupations are recorded by Police officers at the time of the evidential breath test. Offenders were assigned a 2-letter Holland code based on their occupation if they were recorded

as having a paid occupation at the time of apprehension or if their usual occupation was recorded in the case of unemployed offenders. Some recorded occupations could not be assigned Holland codes, including pensioners, home duties, WorkCare beneficiaries and similar. WorkCare beneficiaries are generally employees who have been injured at work and who are receiving compensation payments while recovering from the injury.

Holland codes were assigned by referring each occupation to Lokan (1988). Occupations that were not listed in Lokan were assigned the two-letter code of the most similar occupation after consultation between the research assistant and the author. Some occupations were coded using additional data provided as comments in the court briefs to modify the coding of occupation. Thus some occupation types have more than one two-letter code assigned depending on additional data provided in one or more briefs. Frequency counts of occupations in the sample are presented in the Appendix, along with the assigned two-letter Holland codes.

The addition of Holland codes was a difficult task and it is likely that other coding teams may have chosen different codes for some occupations. The impact of this was minimised by referring difficult coding decisions for discussion between the author and the research assistant responsible for the coding, but there remained a number of vaguely-expressed and unusual occupations where the coding was uncertain. These have been included in analysis as there were only a small number where there was this level of doubt and it was considered that the best estimate of the Holland code was unlikely, in these cases, to introduce any systematic bias to the data.

3. RESULTS AND DISCUSSION

3.1 The Sample of Drink-Drivers

Some of the analyses of the data were conducted separately for drink-drivers detected in rural and metropolitan areas. It was thought that Melbourne and rural drink-drivers may differ in a number of respects, as has recently been discussed in Harrison (1996). It was not possible to distinguish between rural and metropolitan drink-drivers for all analyses as the sample size was not large enough to allow this level of disaggregation.

Age, Sex, and Licence Type

Table 3 shows the distribution of drink-driving offenders for both sexes by driver age. The age distribution of males and females did not differ in either the metropolitan sample ($\chi^2_{(4)} = 7.5$, $p>.05$) or the rural sample ($\chi^2_{(4)} = 7.6$, $p>.05$), but there was a difference between the age distributions of the metropolitan and rural samples ($\chi^2_{(4)} = 23.1$, $p<.05$). This difference is shown in Figure 2. It is clear that the rural sample is marginally younger than the metropolitan sample.

Table 3: Age and Sex of Drink-drivers Detected in Rural and Metropolitan Areas

		18-21 yrs	22-30 yrs	31-40 yrs	41-50 yrs	51 yrs & over
Metropolitan Area	MALES	71	300	308	257	129
	FEMALES	8	52	59	33	12
Rest of Victoria	MALES	63	192	166	98	64
	FEMALES	6	24	18	11	0

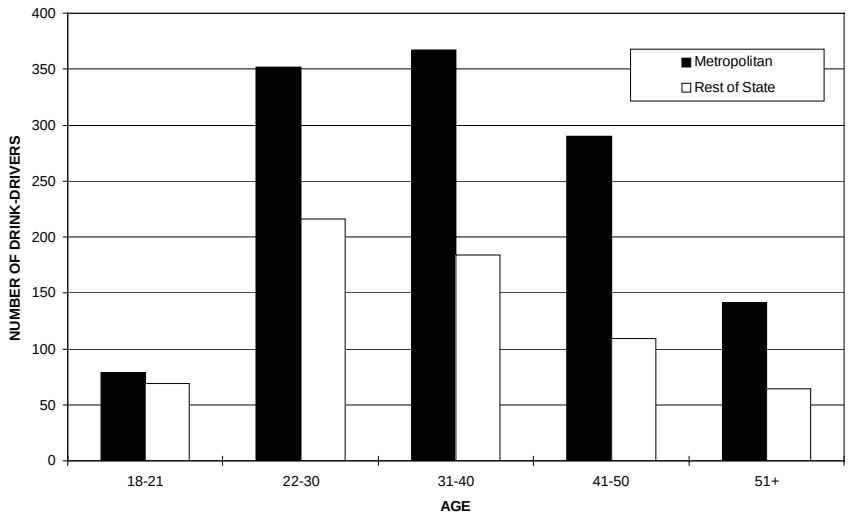

Figure 2: Drink-drivers by Location of Detection and Age Group

The age difference between metropolitan and rural drink-drivers suggests that rural drink-drivers might benefit from educational and enforcement campaigns that target younger offenders, although the difference is not particularly large.

There were significantly less females in the rural sample (9.2%) than there were in the metropolitan sample (13.3%) ($\chi^2_{(1)} = 6.9$, $p<.05$), although the difference is relatively small and may not have any implications for education campaigns conducted in rural and metropolitan areas.

The age of drink-drivers was related to their licence type ($\chi^2_{(12)} = 403.6$, $p<.05$), but this was primarily a result of the large number of younger drink-drivers who held probationary licences. There was also a relationship between sex and licence type ($\chi^2_{(3)} = 17.9$, $p<.05$), which is shown in Figure 3.

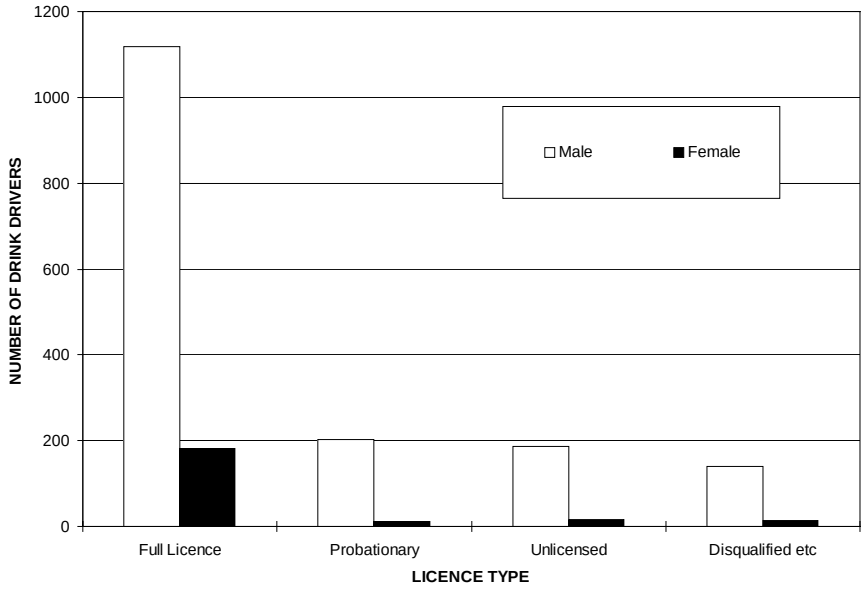

Figure 3: Drink-drivers by Licence Type & Sex

Figure 3 indicates that male drink-drivers were relatively more likely to be probationary licence holders than were female drink-drivers, and that they were more likely to be unlicensed or to have had their licence suspended or disqualified for some prior offence(s). The difference between males and females is particularly noteworthy in the case of probationary licence holders, where 12% of male drink-drivers and 5% of female drink-drivers in the sample held probationary licences. This may have implications for the effectiveness of the zero blood alcohol concentration legislation that applies to probationary licence holders in Victoria, and suggests a need to target male probationary licence holders as a risk group. Similarly, nearly 20% of the male drink-drivers were unlicensed or disqualified and therefore represent another high-risk group.

Licence types of drink-drivers in the rural and metropolitan samples also differed significantly ($\chi^2_{(3)} = 16.0$, $p<.05$). This difference is shown in Figure 4.

The data in Figure 4 indicate that rural drink-drivers were considerably more likely than metropolitan drink-drivers to be unlicensed and slightly more likely to have probationary licences or to be disqualified from driving. The effect of sex and offence location are shown jointly in Figure 5.

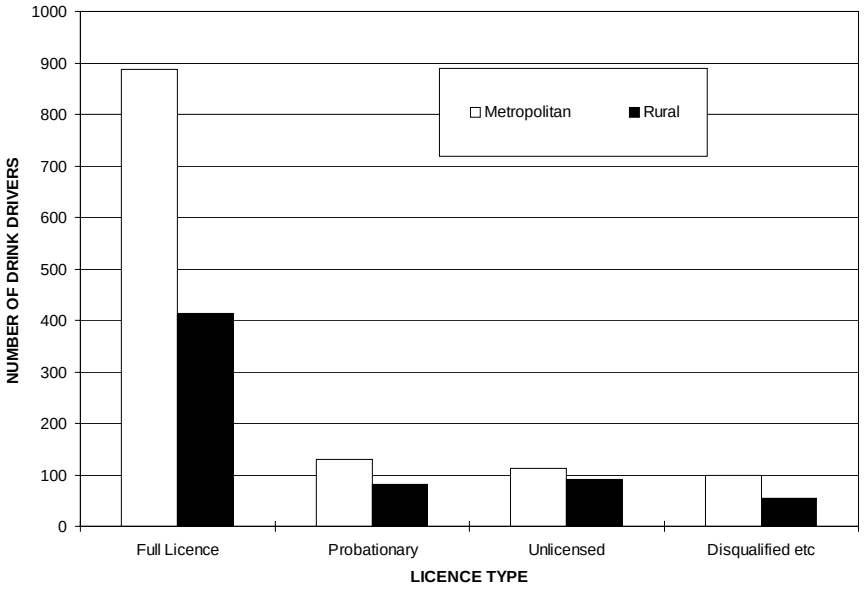

Figure 4: Drink-drivers by Licence Type & Location

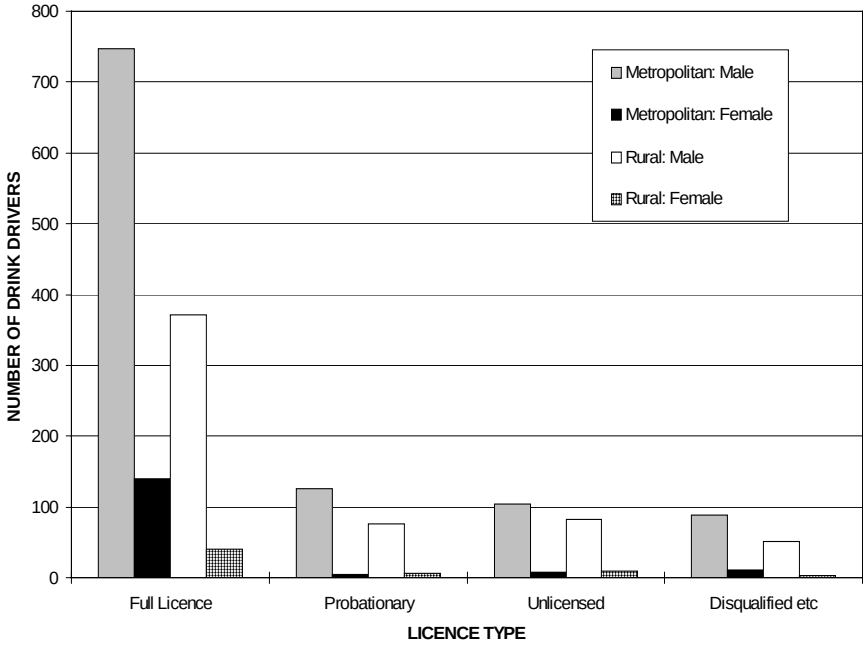

Figure 5: Drink-drivers by Licence Type, Location, and Sex

The relationship between sex and licence type noted above (in Figure 3) held for metropolitan drink-drivers ($\chi^2_{(3)} = 19.0$, $p<.05$) but not for drink-drivers in the rest of the State ($\chi^2_{(3)} = 1.6$,

p>.05). It is clear from Figure 5 that metropolitan male drink-drivers have a similar distribution of licence types to rural drink-drivers, and that metropolitan female drink-drivers are relatively more likely to be fully licensed drivers. This has consequences for drink-drive countermeasures as it suggests that there may be a subgroup of drink-drivers who are not fully licensed and who are more likely to be rural residents or males in the metropolitan area.

Blood Alcohol Concentration

The blood alcohol concentration (BAC) distribution of the sample was related to the location of the offence and the sex of the offender. Metropolitan offenders tended to have a lower proportion of high BACs ($\chi^2_{(2)}$ = 6.2, p<.05) than rural offenders, and females tended to have a lower proportion of high BACs ($\chi^2_{(2)}$ = 9.0, p<.05) than males. The difference between males and females was significant in the metropolitan sample ($\chi^2_{(2)}$ = 9.7, p<.05), but not in the rural sample ($\chi^2_{(2)}$ = 4.2, p>.05). The differences between the rural and metropolitan samples and the males and females were generally small. The BAC data for males and females in the two regions are shown in Figure 6.

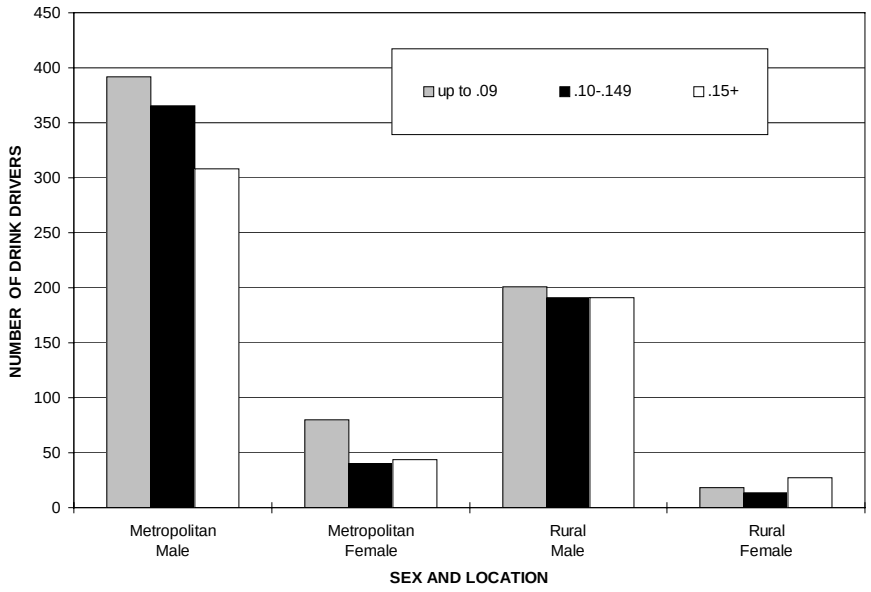

Figure 6: Drink Drivers by Location, Sex, and BAC

3.2 Drinking Location

The Police data includes details of the location at which alcohol had been consumed, as reported by the offender. These locations were classified into broad groups, and the results are shown in Figure 7 for rural and metropolitan drink-drivers and Figure 8 for male and female drink-drivers.

The self-reported drinking locations of rural and metropolitan drink-drivers differed ($\chi^2_{(5)}$ = 25.7, p<.05), with rural drivers relatively more likely to report having consumed alcohol at a hotel or at home and metropolitan drivers being relatively more likely to report drinking alcohol in restaurants and at other locations.

Drinking locations also differed for males and females ($\chi^2_{(5)}$ = 16.2, p<.05). Female drink-drivers were relatively more likely to report having consumed alcohol in restaurants and at their own or another person's home than were males, while male drink-drivers were relatively more likely to report having consumed alcohol in hotels or nightclubs and sporting clubs. Males were also more likely to report having consumed alcohol in other locations. Other locations included places of employment and outdoor locations.

The results concerning the relationship between sex and location and drinking location suggest that programs directed towards rural drivers would benefit from an emphasis on drinking at home or at hotels, while campaigns for metropolitan drink-drivers could use the restaurant as the drinking context and still impact on a subgroup of drink-drivers. This is not to suggest, however, that any drinking location should be excluded from future programs in metropolitan or rural areas, particularly given the large number of both groups consuming alcohol in hotels.

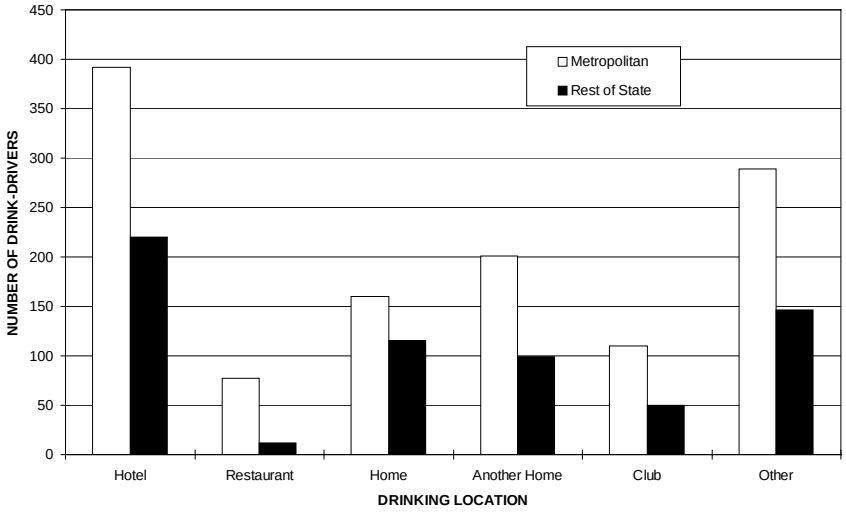

Figure 7: Drink-drivers by Drinking Location and Location of Detection

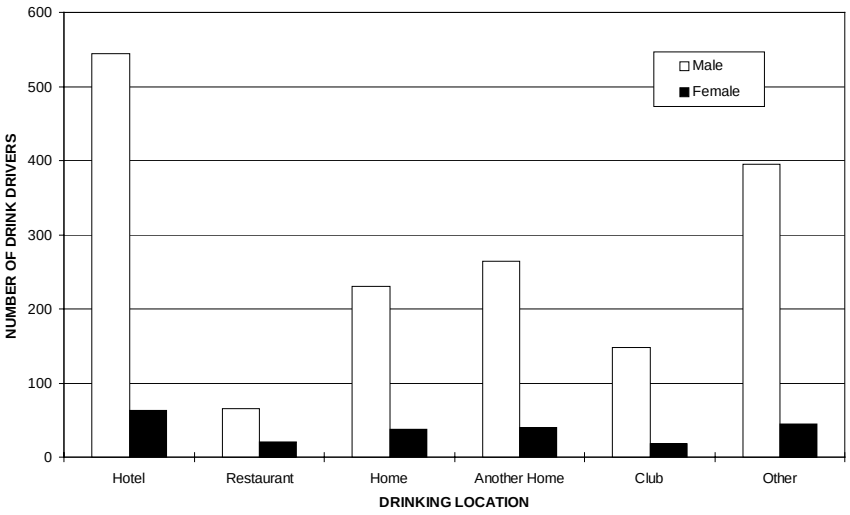

Figure 8: Drink-drivers by Drinking Location and Sex

The relationship between location and sex together and drinking location is shown in Figure 9. This graph emphasises the potential for targeted campaigns for specific subgroups of the drink-driving population.

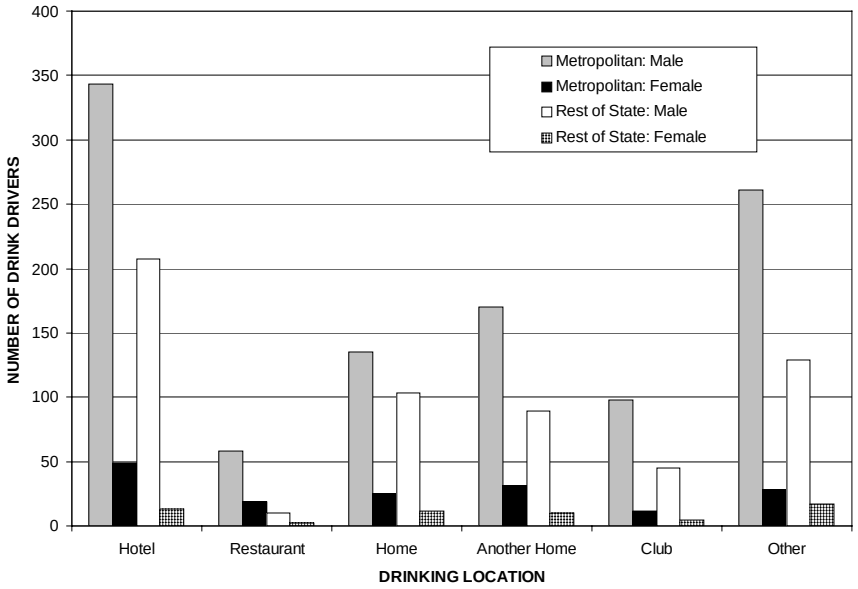

Figure 9: Drink Drivers by Drinking Location, Location of Detection, & Sex

The data in Figure 9 lead to a number of conclusions about the use of specific drinking situations or contexts in drink-driving campaigns. Campaigns that emphasise hotels as a drinking context, for example, are less likely to impact on female drink-drivers outside the metropolitan area than the other groups. Rural female drink-drivers were more likely to drink alcohol at home or in another person's home or other locations than they were to drink at a

hotel. Programs that use restaurants as drinking locations may impact on some metropolitan drink drivers, but are less likely to have a significant impact on the rural drink drivers.

The age distribution of drink-drivers was related to the self-reported drinking location ($\chi^2_{(20)}$ = 46.6, p<.05). This is shown in Figure 10.

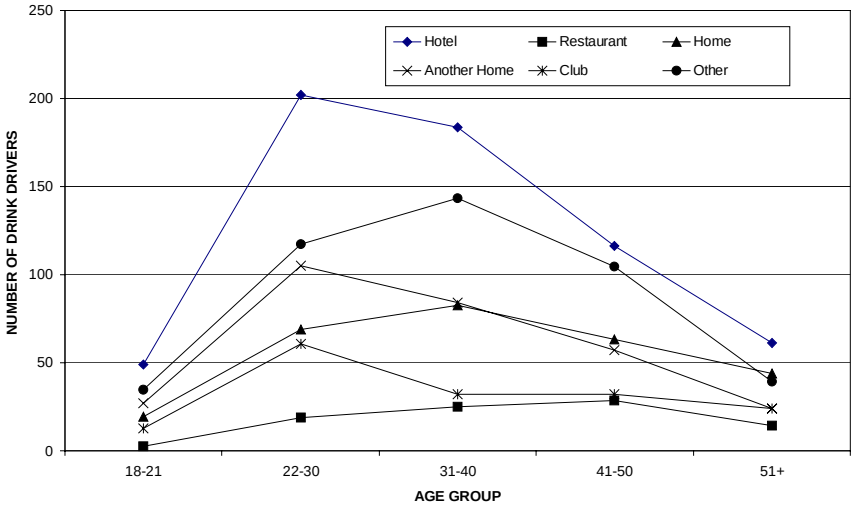

Figure 10: Drink-Drivers by Drinking Location & Age

The data presented in Figure 10 suggest that some aspects of drinking location and age might assist the targeting of drink-driving campaigns. Drink-drivers who reported consuming alcohol in hotels, another home, and nightclubs or sporting clubs were generally younger than those who reported drinking alcohol in restaurants, at home, or in other locations. This suggests that older drink-drivers, as a target group, may be more accurately targeted in material that emphasises restaurants, home, and others' homes as drinking locations.

3.3 Time of Detection

The Police record the time of the test when recording other details. For the present analysis, times were aggregated into four times representing day time (6.00am-3.59pm), late afternoon and evening (4.00pm-7.59pm), night time (8.00pm-11.59pm), and early morning (12.00am-5.59am).

The distribution of times did not differ for males and females ($\chi^2_{(3)}$ = 6.9, p>.05) or drink-drivers detected in rural and metropolitan areas ($\chi^2_{(3)}$ = 3.5, p>.05). The age distribution of drivers detected at different times did differ, however ($\chi^2_{(12)}$ = 176.4, p<.05). This is shown in Figure 11 which presents the age distributions of drink-drivers detected during the four time periods.

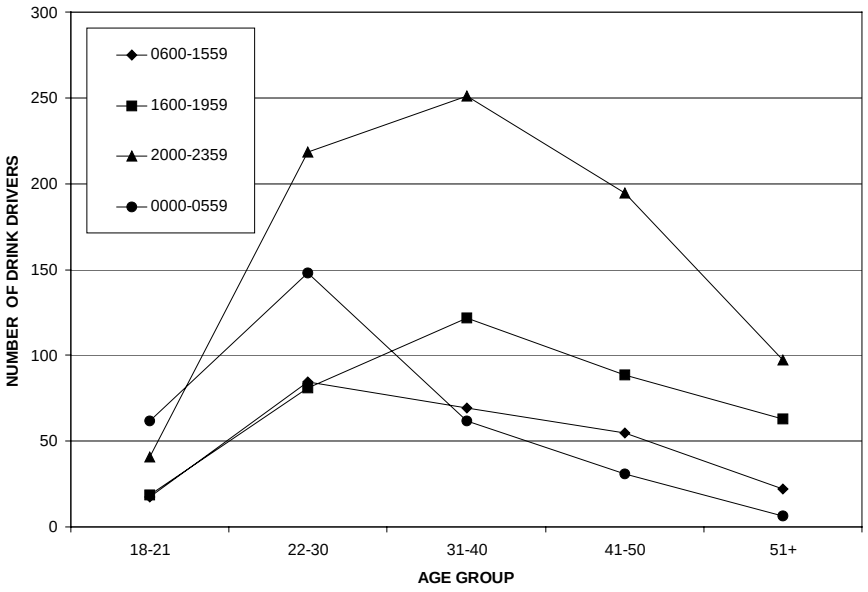

Figure 11: Drink-drivers by Time of Detection and Age

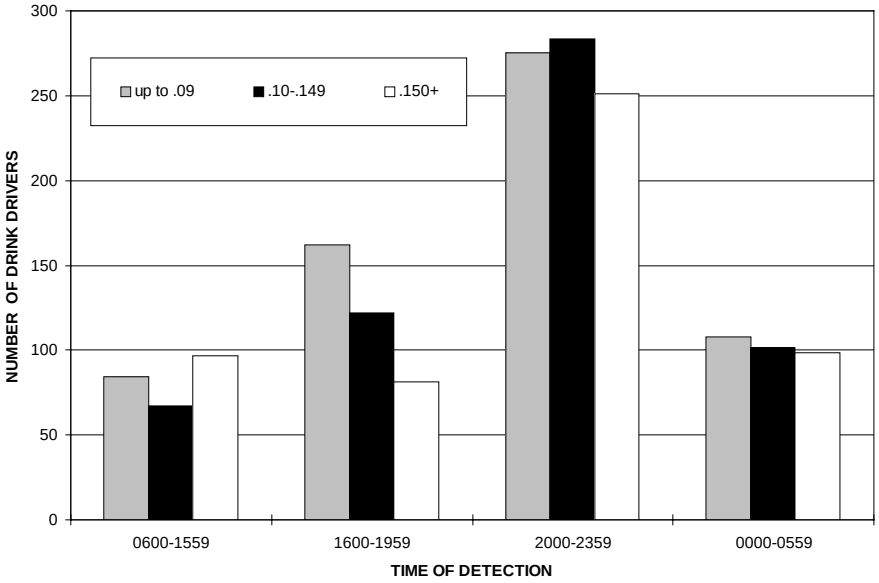

Figure 12: Drink-drivers by Time of Detection and BAC

The pattern of results in Figure 11 suggests that drink-drivers detected early in the morning and during the day are more likely to be younger than those detected in the afternoon/evening and at night. This suggests that younger drivers are likely to represent a drink-driving risk at different times to older drivers, and that time of day may have some potential for use in drink-driving campaigns in combination with the age of potential offenders.

The BAC distribution of drink-drivers also depended on the time of detection ($\chi^2_{(6)} = 26.5$, $p<.05$). This relationship is shown in Figure 12, where it is clear that drink-drivers during the

afternoon and evening were less likely to have high BACs than were drink-drivers detected at other times.

Figure 13 shows the day of the week on which the drink drivers were detected disaggregated by location ($\chi^2_{(6)} = 35.5$, $p<.05$). It is clear that both rural and metropolitan offenders were more likely to be detected late in the working week and over the weekend than at other times. Metropolitan drivers were more likely than rural drivers to be detected late in the working week, and detection of rural offenders was relatively high on Sundays.

It is not clear, however, to what extent the data in Figure 13 reflect the drink-driving behaviour of offenders. It may be the case, for example, that the differences between days of the week and the interaction with location reflect the operational characteristics of the Police in their performance of drink-drive enforcement.

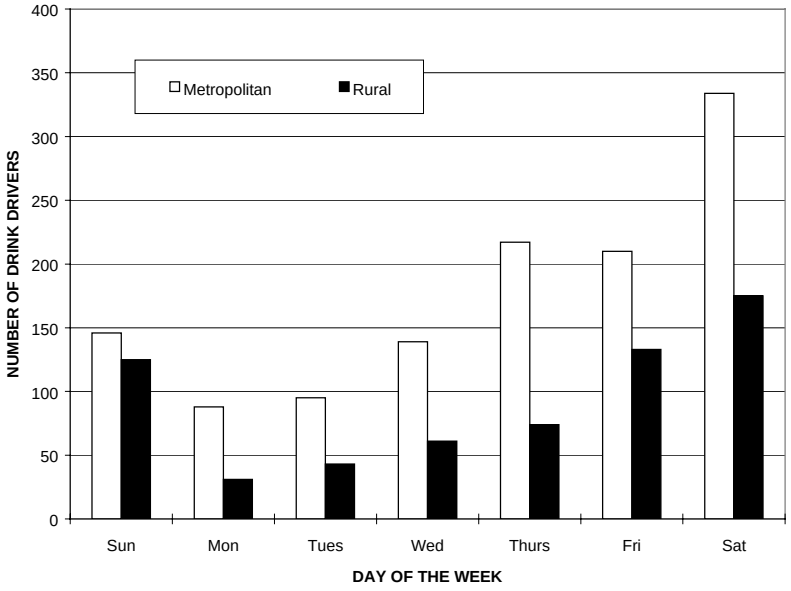

Figure 13: Drink Drivers by Day of Week and Location

3.4 Occupation Codes

This section details the analysis of the Holland occupational codes assigned to drink-drivers on the basis of their occupations recorded by the Police. A number of issues concerning this use of the Holland theory were discussed in the Introduction to the present report.

One issue that was not addressed relates to the expected distribution of occupation or personality codes amongst drink-drivers and the application of the expected distribution to the issue of targeted programs. The Holland typology could be used in two ways. It might be possible to use the assigned codes to draw conclusions about the personality characteristics most often associated with drink-driving, and then recommend that these characteristics be used in the targeting of future campaigns. This would allow targeted campaigns to address the most common factors associated with the drink-driving problem in terms of the number of drink-

drivers exhibiting those characteristics, but it does not allow any conclusions to be drawn about which personality types are more common amongst drink-drivers than the normal population.

Personality characteristics are not evenly distributed in the normal population. Given evidence cited earlier about the personality characteristics of drink-drivers, it would be expected that the sample of drink-drivers used in the present report would differ from the general population in terms of the Holland personality characteristics. Estimating the personality differences between the general population and drink-drivers would be an alternative approach to the targeting of drink-drive countermeasures. Under this approach, personality characteristics that are over-represented amongst drink-drivers would be used in targeting as these characteristics may be part of the problem.

The benefits of both approaches for the use of personality data in the targeting of drink-drive countermeasures are clear, and the analysis presented here details results from both and discusses the implications of both approaches for countermeasure development.

Bias in the Coding of Holland Data

The coding of Holland occupational codes for the sample of drink-drivers was incomplete. Some drink-drivers were unemployed and some reported no occupation or were retired. The Holland codes for these drink-drivers were coded as missing. Some drink-drivers reported their occupation as "housewife" and could not be coded, and some occupations were unable to be coded as no equivalents could be found in Lokan (1988).

A total of 1340 (71.6%) of the sample of drink-drivers were able to have Holland occupation codes assigned. The successful coding of Holland occupation codes was related to a number of other variables. The results of this coding are shown in Table 4, with the results of chi-squared tests to determine the extent of bias in the application of Holland codes.

The variations in the percentage of drink-drivers who were not able to be assigned a Holland code most likely relates to variations in the level of employment and the type of employment between groups. Thus the relatively high levels of unknown Holland codes in younger drink-drivers, rural drink-drivers, those who were unlicensed or disqualified, and those who had consumed their alcohol at home or in another's home rather than a restaurant would reflect the level of unemployment amongst these drink-drivers. The relationship between sex and Holland coding is probably the result of the number of female drink-drivers who reported their occupation as housewife - for which no Holland code is available - and the high percentage of unknown Holland codes for older drink-drivers most likely relates to the number of retired people in the sample.

The effect of the bias in the application of Holland codes is an empirical question that would need to be examined in any further research. For the present analysis, the bias in the coding of Holland Occupation codes away from unemployed or retired drink-drivers was not considered to represent a substantial difficulty. Of some concern, however, was the large difference between males and females. 26% of male drink-drivers and 43% of female drink-drivers could not be assigned occupation codes.

This is of particular concern given some doubts about the direct application of the Holland theory of occupations and personality to women. It is thought that men and women may differ in the relationship between personality and occupational preferences. The results relating to female drink-drivers should, therefore, be considered more speculative than those relating to

male drink-drivers, although it was still considered appropriate to use the data for women to draw some conclusions about the characteristics associated with drink-driving.

First Letter Holland Codes

Figure 14 shows the distributions of Holland occupation codes (first letter code only) for metropolitan and rural drink-drivers, and Figure 15 shows the Holland occupation codes for male and female drink-drivers.

Table 4: Bias in the Coding of Holland Occupational Codes

VARIABLE		SUCCESSFUL HOLLAND CODE	UNABLE TO CODE OCCUPATION	STATISTICAL TEST RESULT
Age Group	18-21	79	69 (47%[1])	$\chi^2_{(4)} = 42.6$, $p<.05$
	22-30	417	151 (27%)	
	31-40	399	152 (28%)	
	41-50	315	84 (21%)	
	50+	130	75 (37%)	
Location	Metropolitan	928	310 (25%)	$\chi^2_{(1)} = 24.0$, $p<.05$
	Rest of State	412	230 (36%)	
Drinking Location	Hotel	454	158 (26%)	$\chi^2_{(5)} = 27.8$, $p<.05$
	Restaurant	74	15 (17%)	
	Home	181	94 (34%)	
	Other Home	187	113 (38%)	
	Club	121	39 (24%)	
	Other	323	112 (26%)	
Sex	Male	1212	436 (26%)	$\chi^2_{(1)} = 25.7$, $p<.05$
	Female	128	95 (43%)	
Licence Type	Full Licence	996	304 (23%)	$\chi^2_{(3)} = 58.3$, $p<.05$
	Probationary	141	72 (34%)	
	Unlicensed	115	89 (44%)	
	Disqualified etc	88	66 (43%)	

[1]Percentages represent the percentage of the respective group of drink-drivers for whom Holland Codes were not able to be assigned

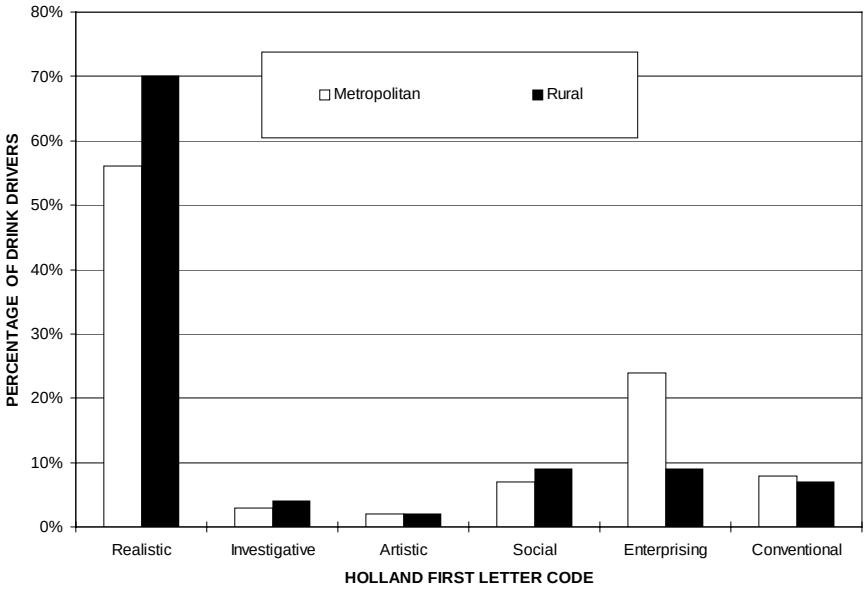

Figure 14: Distribution of Holland First Letter Codes for Metropolitan and Rural Drink-drivers

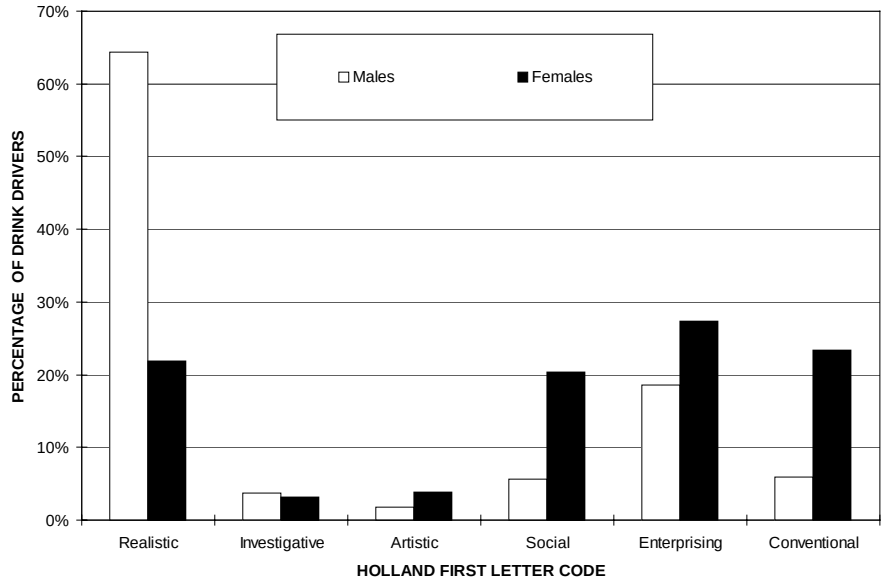

Figure 15: Distribution of Holland First Letter Codes of Male and Female Drink-Drivers

The most salient feature of Figures 14 and 15 is the large percentage of drink-drivers who belong to Holland's Realistic type. It will be recalled that Realistic types are associated with behavioural characteristics such as asocial, inflexible, conforming, hardheaded, practical, and uninsightful. The Enterprising type is the next most common, associated with behavioural characteristics such as adventurous, ambitious, extroverted, sociable, and energetic. Two types, Investigative and Artistic, are rare among drink-drivers. Characteristics associated with these types are analytical, cautious, introspective, reserved, complicated, expressive, impractical, nonconforming, and sensitive.

The distribution of Holland codes was different for drink-drivers in metropolitan areas and rural areas ($\chi^2_{(5)} = 47.2$, $p<.05$). Rural drink-drivers were more likely to be in occupations matching Holland's Realistic type, and metropolitan drink-drivers were relatively more likely to be in occupations matching Holland's Enterprising type. Metropolitan drink-drivers are somewhat more likely, therefore, to be extroverted, sociable, and adventurous than rural drink-drivers, who in turn are more likely to be asocial, conforming, and uninsightful than metropolitan drink-drivers. This type of data has direct relevance to the targeting and content of drink-drive countermeasures in the two regions of Victoria.

The distribution of Holland first letter codes differed substantially between male and female drink-drivers ($\chi^2_{(5)} = 123.6$, $p<.05$). Male drink-drivers were more likely than females to have occupations coded as Realistic, while females were more likely to have occupations coded as Social, Enterprising, or Conventional. Males who drink-drive are therefore likely to be less social and insightful than female drink-drivers, who in turn are likely to be more sociable, warm, extroverted, adventurous, and optimistic than male drink-drivers. Some female drink-drivers are characterised by obedience, order, persistence, and efficiency (the Conventional Holland code).

The implication of these results is that drink-drivers in different parts of Victoria, and male and female drink-drivers, may have different psychological characteristics which could be used either as the focus for drink-driving campaigns or, alternatively, as a guide to what aspects of drink-driving countermeasures might reduce the level of this behaviour.

Using these results in the targeting of drink-driving campaigns might involve taking into account the personality characteristics of drink-drivers when creating publicity campaigns. This could involve selecting drink-driving characters in publicity that reflect the more common personality characteristics outlined above - e.g. females who are outgoing and adventurous compared to males who are less sociable.

The use of the results to guide countermeasure development could take into account the relatively introverted personality common among male drink-drivers, for example, which would imply that programs relying on the use of nominated non-drinking drivers in a group may not be as successful among males as they might be among female drink-drivers. Taking characteristics of drink-drivers into account when predicting the outcome of potential countermeasures may improve the effectiveness of the process of developing new countermeasures.

Comparison with Population Norms

It was noted above that comparison of the Holland data to the distribution of codes expected given the distribution in the population may provide further insight into the personality characteristics of drink-drivers.

The difficulty here is that population norms for psychological instruments are not normally disaggregated by variables such as licence type. This is especially problematic in the case of the Holland model as there are a number of instruments available that measure Holland characteristics, most of which have been normed using younger subjects, often secondary or tertiary students. The most comprehensive norms for Australians are provided by Lokan (1988). Her norms are based on a large sample of secondary students, however, so their use here as a comparison for adult drink-drivers assumes that Holland personality codes remain

relatively constant over time. The empirical evidence strongly supports this assumption (Campbell, 1966, 1971).

The Lokan (1988) norms are based on the use of the Self-Directed Search (Holland, 1985; Lokan, 1988), and therefore represent the norms relating to the use of that particular instrument rather than the normative distribution of Holland types through the population independent of the type of test instrument used to measure occupational orientation. While it would be ideal to have instrument-independent normative data, such data are not available for psychological constructs.

Figure 16 shows the first letter code distribution for males and females and the expected distribution given the Australian norms in Lokan (1988).

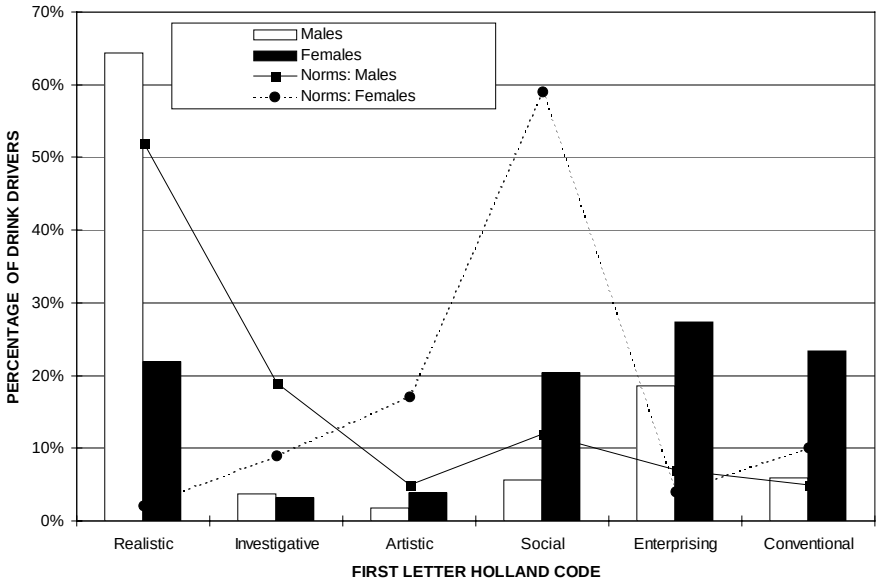

Figure 16: First Letter Holland Codes of Male and Female Drink-drivers Compared to Population Norms

The Realistic and Enterprising types were over-represented amongst male drink-drivers, and the Realistic, Enterprising, and Conventional types were over-represented amongst female drink-drivers. Although the percentage of females with Social Holland codes was relatively high (20%), it is clear in Figure 16 that the social type is substantially under-represented amongst female drink-drivers, as is to a lesser extent the Investigative Holland code. The Investigative and Social types were also under-represented amongst male drink-drivers.

These results allow some conclusions to be drawn about the relationship between drink-drivers and other people. Male drink-drivers are more likely to be asocial, materialistic, and uninsightful (Realistic), or acquisitive, ambitious, and excitement seeking (Enterprising). They are less likely to be analytical, cautious, intellectual, rational, idealistic, empathic, or responsible than other people.

Female drink-drivers are similar in these respects to male drink-drivers, but in some cases are more likely than others to be careful, defensive, orderly, and unimaginative (Conventional).

The use of two-letter codes to code occupations of drink-drivers allowed a further refinement of the analysis. Figures 17 and 18 show, for males and females respectively, the distribution of two-letter codes and the expected distribution based on Lokan (1988).

Figure 17 shows the comparison between the two-letter codes for male drink-drivers and the population norms. Three two-letter codes are over-represented amongst male drink-drivers - RI, RC, and ES. The RI/RC combinations suggest a person who is asocial, conforming, reserved, introspective, unpopular, orderly, careful, unimaginative, and defensive. This combination accounts for 42% of male drink-drivers. The ES combination suggests a person who is acquisitive, adventurous, ambitious, energetic, extroverted, friendly, and generous. This combination accounts for 16% of male drink-drivers.

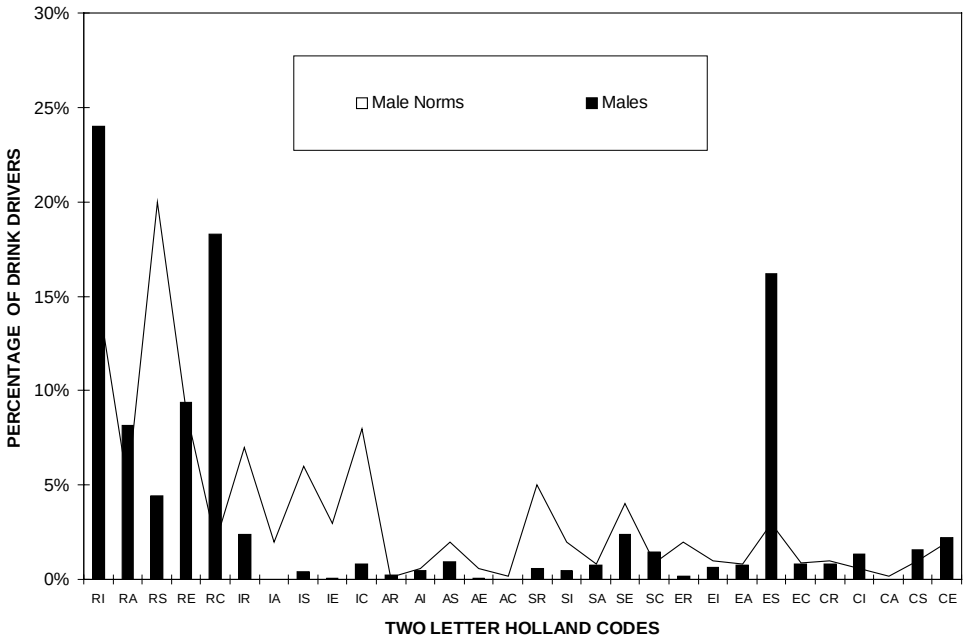

Figure 17: Two Letter Holland Codes for Male Drink-drivers Compared to Population Norms

It is possible, therefore, to draw some conclusions about the personality or psychological characteristics of two over-represented groups of drink-drivers that together account for 58% of male offenders in the present sample. The potential for using this information in the targeting of drink-driving campaigns is substantial.

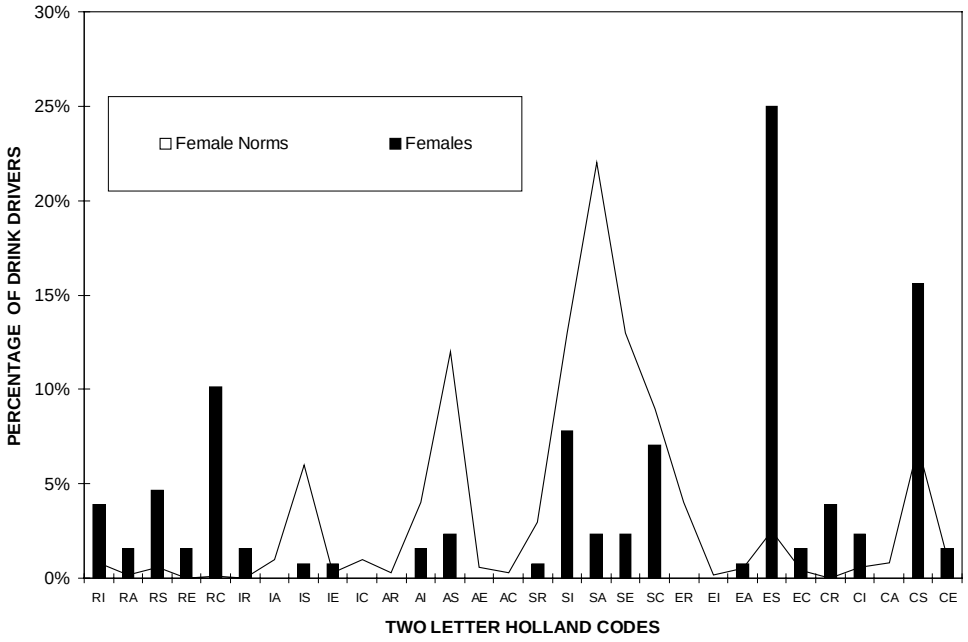

Figure 18: Two Letter Holland Codes for Female Drink-drivers Compared to Population Norms

The pattern for female drink-drivers (Figure 18) differs from that for male drink-drivers and appears to be more complex. The two-letter codes ES and CS are clearly over-represented amongst female drink-drivers. These codes suggest socially-oriented, friendly people who are either adventurous, energetic, and optimistic (ES) or careful, orderly, and defensive (CS). These codes account for 25% (ES) and 16% (CS) of female drink-drivers. The pattern of results for the two-letter codes that include R as the first letter is more complicated. The RC type is over-represented, as is the CR type in the Conventional area. Together, the RC/CR combination suggests an asocial, inflexible, uninsightful person who is also careful, conforming, and inhibited. This combination accounts for 14% of the female drink-drivers.

The remaining Realistic two-letter types are less clear. Without these, however, it is possible to draw some conclusions about the personality of 55% of the female drink-drivers in this sample.

Over-Represented Groups Compared to Other Drink-drivers

The drink-drive Holland groups identified above - female CR/RC, CS, and ES, and male ES, and RI/RC - were each compared to other drink-drivers on a range of relevant variables to determine the extent to which there might be characteristics of the groups that could be used to improve targeting in addition to the personality data discussed above.

Female CR/RC

This group of female drink-drivers accounts for 14% of female drink-drivers and may be characterised as asocial, inflexible, uninsightful and careful, conforming, and inhibited. Members of those group did not differ significantly from other female drink-drivers in age, BAC, licence type, or place of drinking. They were, however, significantly more likely to have

been detected drink-driving in a rural area than other females ($\chi^2_{(1)} = 6.5$, $p<.05$). This relationship is shown in Figure 19.

Figure 19 shows that almost 45% of female CR/RC drink-drivers were drink-driving outside the Melbourne metropolitan area, compared to 15% of the other female drink-drivers. This suggests that the female CR/RC drink-driver group is more likely to consist of rural residents or residents of rural population centres.

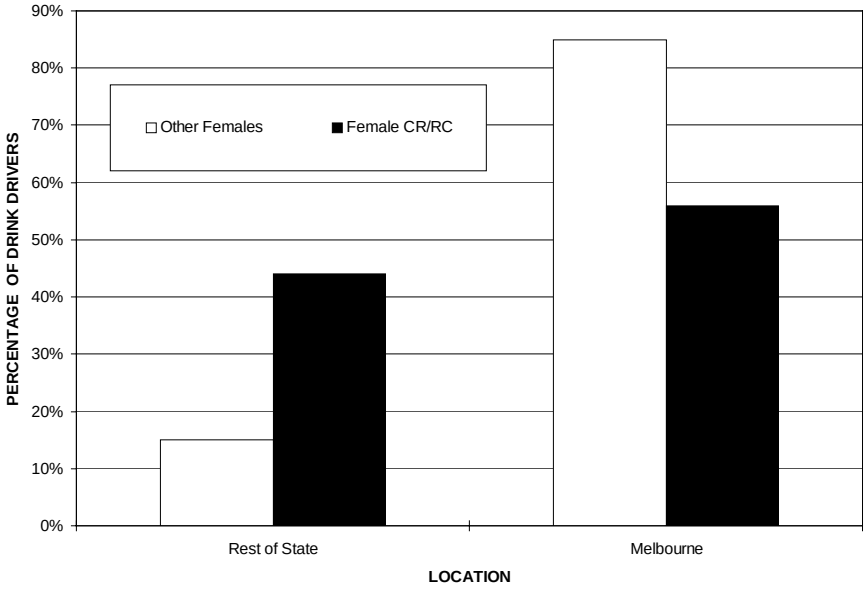

Figure 19: Percentage of Female CR/RC Drink-drivers Detected in Melbourne and the Rest of Victoria

Female CS

Female CS drink-drivers accounted for 16% of female drink-drivers and were characterised above as socially oriented, friendly people who are careful and ordered. They did not differ from other females in age, BAC, licence type, location of drink-driving, place of drinking, or time of offence. This suggests that this group of drink-drivers is evenly distributed across these variables and that any targeting of this group will need to rely only on the personality characteristics that set this group apart from other female drink-drivers.

Female ES

This group of drink-drivers accounted for a substantial 25% of the female drink-drivers in the sample, but did not differ from other female drink-drivers in age, BAC, licence type, location of offence, place of drinking, or time of offence. As was the case for female CS drink-drivers, this suggests that this group is distributed across all these variables and that targeting this large group will need to rely on the defined personality characteristics which included social and friendly combined with adventurousness and optimism.

Male ES

Male ES drink-drivers accounted for 16% of male drink-drivers, and were characterised above by social friendliness combined with optimism, energy, and adventurousness. This group did not differ from other male drink-drivers in age, BAC, or the time of the offence, but they did differ in licence type ($\chi^2_{(3)} = 9.1$, $p<.05$), location of the offence ($\chi^2_{(1)} = 36.5$, $p<.05$), and the place of drinking ($\chi^2_{(5)} = 45.0$, $p<.05$).

Figure 20 shows the difference between the licence type of ES males and other males in the sample. Each column represents the percentage of ES or other males with each type of licence. It is clear that this group of drivers are less likely to be probationary licence holders or to be unlicensed when detected drink-driving.

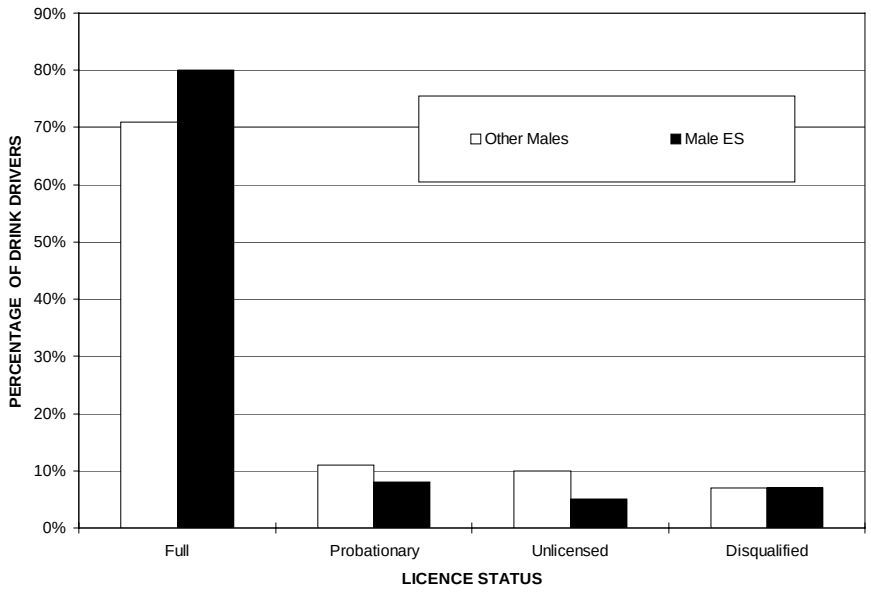

Figure 20: Percentage of Male ES and Other Male Drink-drivers with Different Licence Status

Figure 21 shows the difference between male ES drink-drivers and other male drink-drivers in the location of the drink-driving offence. The data indicate that male ES drink-drivers are significantly more likely to offend in the metropolitan area, with 87% of male ES drink-drivers being detected in the Melbourne area compared to 63% of other male drink-drivers.

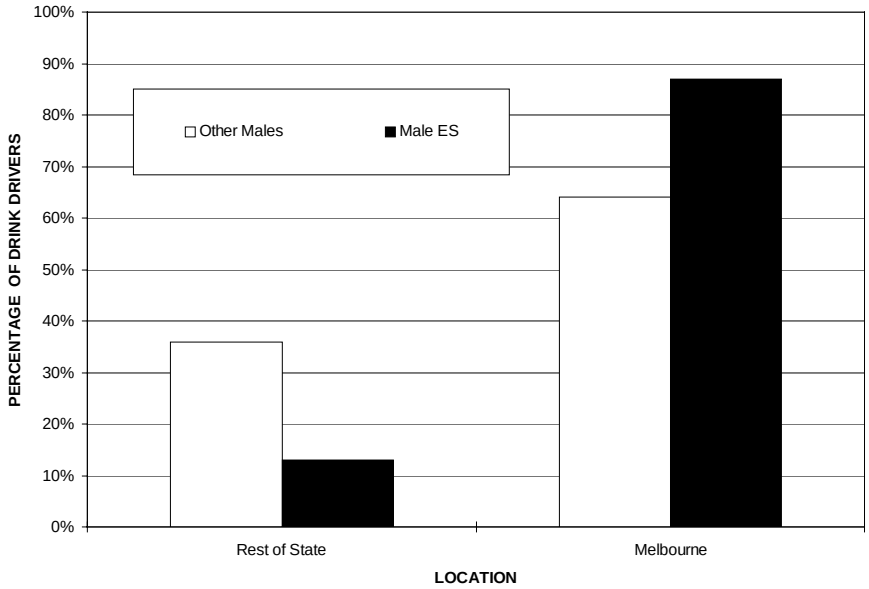

Figure 21: Percentage of Male ES and Other Male Drink-drivers Detected in Melbourne and the Rest of the State

The difference between the place of drinking of male ES drink-drivers and other males is shown in Figure 22.

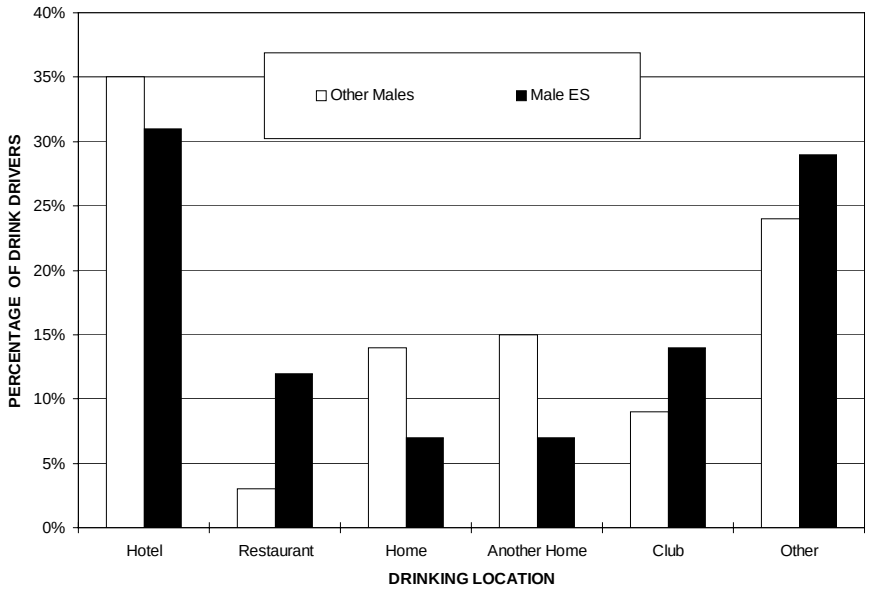

Figure 22: Percentage of Male ES and Other Male Drink-drivers Drinking at Different Locations

It is clear in Figure 22 that male ES drink-drivers are more likely than other male drink-drivers to have consumed their alcohol in restaurants, night- or sporting clubs, and at other locations

(e.g. outdoors, at work). They are less likely to consume their alcohol at a hotel or at their own or another person's home.

In summary, male ES drivers, in addition to the personality or behavioural characteristics discussed above, also differ from other drivers in that they are more likely to have a full licence, to live (or drive) in the Melbourne area, and to drink alcohol in restaurants or clubs. These differences suggest that it may be possible to target the male ES group using these variables in addition to the personality variables.

Male RI/RC

This group accounted for 42% of the sample of male drink-drivers, and was characterised as asocial, conforming, reserved, orderly, and unimaginative. The group did not differ from other male drink-drivers in the time of the offence, but did differ in age ($\chi^2_{(4)} = 17.3$, $p<.05$), BAC ($\chi^2_{(2)} = 8.8$, $p<.05$), licence type ($\chi^2_{(3)} = 13.1$, $p<.05$), location of offence ($\chi^2_{(1)} = 37.6$, $p<.05$), and place of drinking ($\chi^2_{(5)} = 18.8$, $p<.05$).

Figure 23 shows the difference in age distributions between the male RI/RC drink-drivers and other male drink-drivers. Male RI/RC drink-drivers were younger, on average, than other male drink-drivers. 42% of male RI/RC drink-drivers were 30 years of age or younger, compared to 32% of other male drivers.

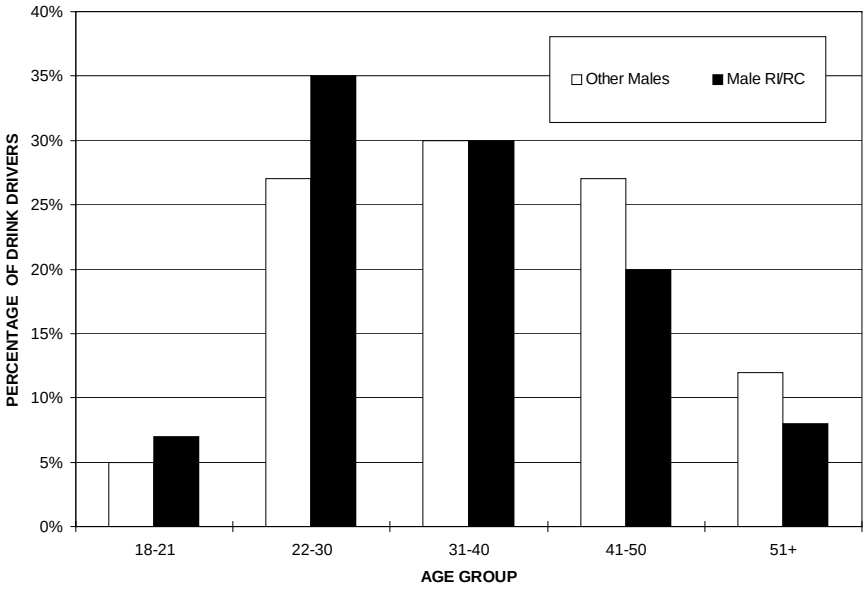

Figure 23: Age Distributions of Male RI/RC Drink-drivers and Other Male Drink-drivers

The BAC distributions of male RI/RC drink-drivers and other male drink-drivers are shown in Figure 24. The graph indicates that male RI/RC drink-drivers are more likely to have higher BACs when tested than are other male drink-drivers. This suggests that this group of drink-drivers may be heavier drinkers of alcohol than other male drink-drivers.

Figure 25 shows the licence types of male RI/RC drink-drivers and other male drink-drivers. The RI/RC drink-drivers were less likely than other male drink-drivers to have a full licence and were more likely to be unlicensed or disqualified from driving.

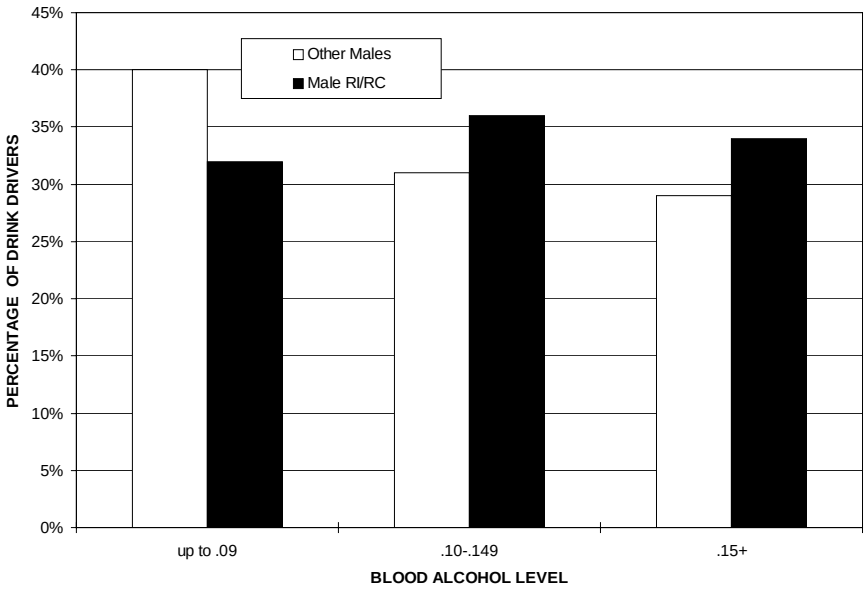

Figure 24: Percentage of Male RI/RC Drink-drivers and Other Male Drink-drivers at Different BAC Levels

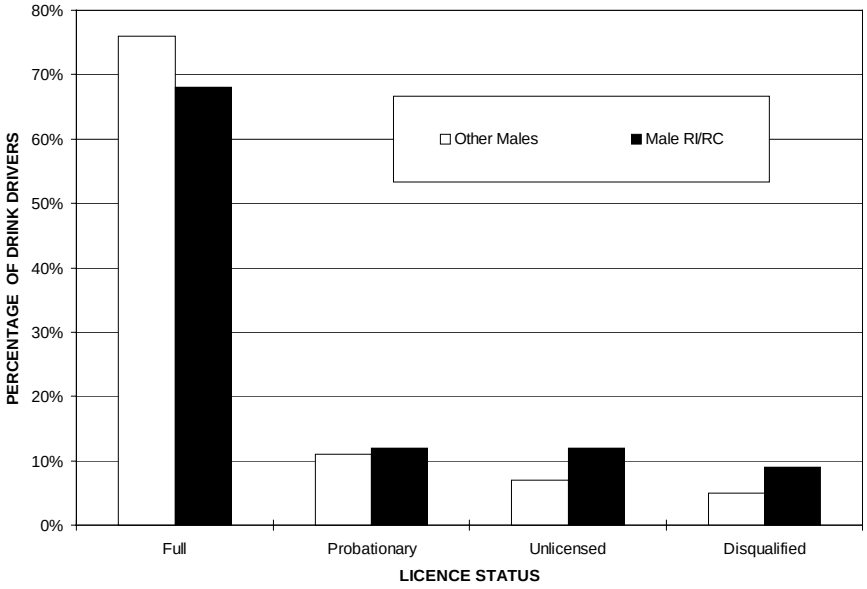

Figure 25: Percentage of Male RI/RC Drink-drivers and Other Male Drink-drivers With Different Licence Types

The location of the drink-driving offence and the place in which alcohol was consumed prior to detection are shown for the male RI/RC drink-drivers and other male drink-drivers in Figures 26 and 27 respectively.

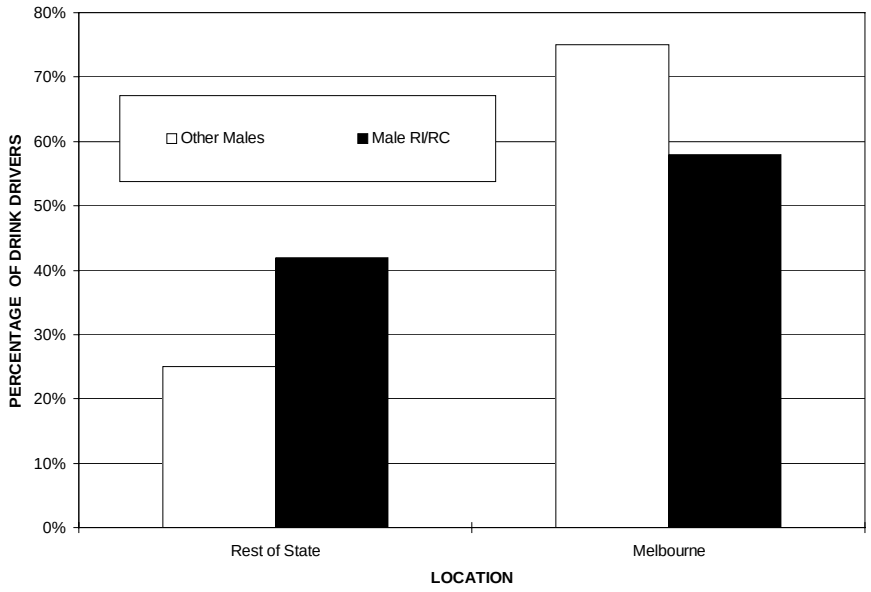

Figure 26: Percentage of Male RI/RC Drink-drivers and Other Male Drink-drivers Detected in Melbourne and the Rest of the State

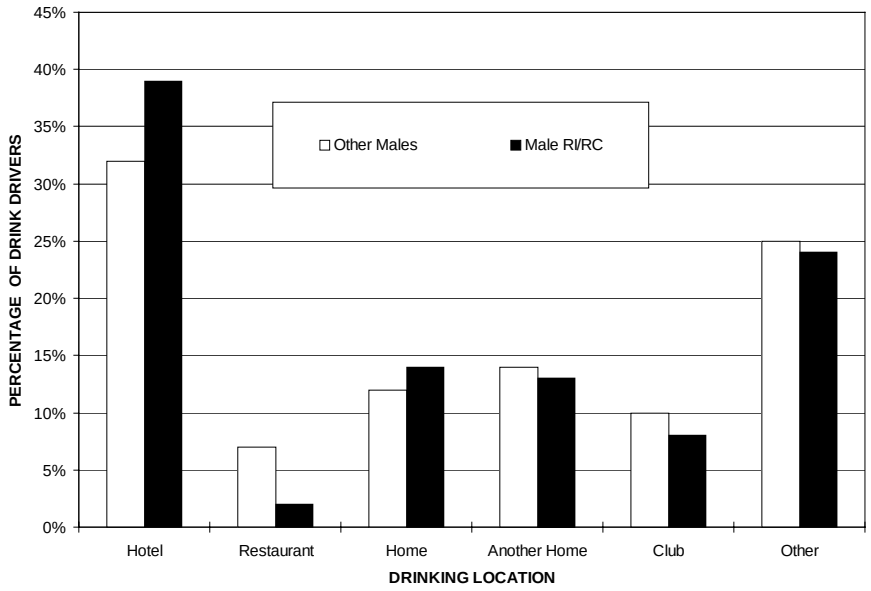

Figure 27: Percentage of Male RI/RC Drink-drivers and Other Male Drink-drivers Who Consumed Alcohol at Different Locations

Male RI/RC drink-drivers were significantly more likely than other male drink-drivers to have been detected drink-driving in a non-metropolitan area, and were more likely to have been consuming alcohol at a hotel or in their own home.

The combination of characteristics of this group of drink-drivers - younger drink-drivers who consumed more alcohol in rural hotels and who were more likely to have licence problems - suggests a target for future drink-driving campaigns.

3.5 Summary of Results

The results relevant to the targeting of drink-drive countermeasures and programs are listed below.

General Results

- Rural drink-drivers were younger than metropolitan drink-drivers.
- Male drink-drivers were more likely than females to be unlicensed, disqualified, or to hold a probationary licence.
- Nearly 20% of males were unlicensed or disqualified from driving.
- The licence status of rural drink-drivers and males in the metropolitan area was similar.
- The BAC of rural drink-drivers was greater than that of metropolitan drink-drivers.
- Rural drink-drivers were more likely to drink at a hotel or a home, while metropolitan drink-drivers were more likely (than rural drink drivers) to drink at a restaurant or a night- or sporting club.
- Male drink-drivers were more likely to drink at hotels or clubs, female drink-drivers were more likely to drink at restaurants or a home.
- Younger drink-drivers were more likely than other age groups to be detected in the early morning.

Holland Results

- Drink-drivers were often people with occupations coded as Realistic or Enterprising.
- Male drink-drivers tended to be assigned Realistic and Enterprising codes.
- Female drink-drivers were biased towards Enterprising, Social, Conventional, and Realistic codes.
- These results were confirmed when the first letter Holland codes assigned here were compared to the population norms.
- The two letter codes suggested that there were two identifiable groups of male drink-drivers (RI/RC and ES) and three identifiable groups of female drink-drivers (ES, CS, and RC/CR).
- The characteristics associated with these personality groups are summarised in Table 5, with further information obtained from comparisons between each group and other drink-drivers of the same sex.
- The results for females are considered less reliable than those for males.

Table 5: Characteristics Associated with Holland Subgroups of Drink-drivers

Holland Code	Personality Descriptors	Relationship with:				
		Age	Location	Drinking Location	BAC	Licence Status
Female **CR/RC** 14% of females	Asocial, inflexible, uninsightful, careful, conforming, inhibited		Tend to drink-drive outside the Melbourne area			
Female **CS** 16% of females	Socially oriented, friendly, careful, orderly, defensive					
Female **ES** 25% of females	Socially oriented, friendly, adventurous, energetic, optimistic					
Male **ES** 16% of males	Acquisitive, adventurous, ambitious, energetic, extroverted, friendly, generous		Tend to drink-drive in the Melbourne area	Tend to drink in restaurants and night- or sporting clubs		Tend to be fully licensed
Male **RI/RC** 42% of males	Asocial, conforming, reserved, introspective, unpopular, orderly, careful, unimaginative, defensive	Tend to be younger than other male drink-drivers	Tend to drink-drive outside the Melbourne area	Tend to drink in hotels and in their own home	Tend to have higher BACs	Are more likely to have licence problems

4. GENERAL DISCUSSION

The analysis presented in this report provides results that could be used to refine the targeting of drink-drive campaigns and countermeasures.

The key outcome of the study was the identification of five groups of drink-drivers defined in terms of their occupation-based Holland personality codes. These groups account for over 50% of male and female drink-drivers and represent personality types that are strongly over-represented in the drink-drive sample used in this study when compared to the population norms.

The five types represent opportunities for the use of psychological and other information in the development and targeting of drink-drive programs. While two of the groups appear to occur equally across the variables analysed here, the remaining three are related to certain situational or contextual variables that may also assist in countermeasure development and targeting.

There are potentially two ways of using the results of this study. The first would be to use the data to select specific targets for drink-drive countermeasures. This might involve the selection of a sub-group of the drink-drive population identified here and the application of either a current or a new countermeasure to the sub-group. One example might be rural drink-drivers drinking in hotels. These drink-drivers (regardless or personality orientation) represent a large sub-group who, according to Harrison (1996), perceive a relatively low risk of the probability of detection for drink-driving. Current countermeasures (e.g. enforcement) could be specifically targeted to impact on this subgroup. At a finer level, the RI/RC males could be treated as a sub-group (as they account for 42% of the current sample of male drink-drivers) and countermeasures could be developed for or specifically targeted at these offenders. This use of these results would recognise that the identified groups are continuing to offend in spite of current levels and types of enforcement and education and that they need to be targeted in some additional way.

The second way of using these results would be to use the characteristics of the offenders identified here as part of public education campaigns conducted in the media. Characters in media material who represent offenders could be given characteristics similar to the characteristics identified here as an aid to realism, and material in the campaigns could be developed with the characteristics of the target groups in mind.

Both uses of the data are discussed below in relation to the five potential target groups identified above.

4.1 Female CR/RC Drink-drivers

This group of female drink-drivers represented 14% of the sample of female drink-drivers and was characterised as asocial, inflexible, uninsightful, careful, conforming, and inhibited. Holland (1985) suggests that occupationally they are likely to tend towards activities that allow the combination of clerical or organisational abilities and mechanical, manual, or sporting abilities. They are less likely than other females to demonstrate significant creative or artistic competencies or interests, and are less likely to have well-developed social skills or interests.

In a more negative sense, this combination of Holland codes suggests a group of women who would tend towards low levels of social involvement, flexibility, and insight, and who value tangible or concrete things and financial success (Holland, 1985; Kelso, 1986), although Holland argues that Conventional and Realistic types are the least likely of all the personality types to achieve either occupational or other success.

In the sample of drink-drivers used for the present project, this group of drink-drivers was more likely than other female drink-drivers to have been detected in a non-metropolitan area, but were undifferentiated from other female drink-drivers in terms of age, BAC, licence type, or place of drinking.

Targeting this group of drink-drivers specifically could involve either using a similar group of drinkers in drink-drive publicity campaigns as relevant role models to these women, or stressing consequences to drink-driving that would impact on these women. The first approach stresses the potential, role-modelling strength of media publicity, and might involve a number of similar women making decisions not to drive after consuming alcohol in a range of (mostly) rural drinking locations. The role-modelling approach would be appropriate for this group especially as their relatively undeveloped imaginative skills and insight may make it difficult for them to develop alternative strategies in potential drink-drive situations.

The second approach - stressing consequences relevant to this group - would require some additional research, although it is likely that women drink-drivers in this group would be less affected by media treatments that require imaginative skills or which rely on social pressures. Instead, stressing the financial consequences of drink-driving (both legal and crash-related) and perhaps the employment-related consequences may prove useful. Both of these are relatively concrete and therefore more appropriate for CR/RC drink-drivers.

Enforcement approaches to drink-driving may not be as successful with this group as with other groups, although continued high levels of enforcement are a necessary back-up to any other methods. Enforcement effectiveness is based on drivers developing a learnt association between drink-driving and detection and punishment. Learning this relationship relies on cognitive skills that may not be as strong in this group of women compared to other women, so stressing an enforcement solution for the drink-driving problem may not impact as much on this group as on other groups. This is an area that would benefit from additional research.

4.2 Female CS Drink-drivers

This group of female drink-drivers represented 16% of the sample of female drink-drivers and was characterised as socially oriented, friendly, careful, defensive and orderly. Holland (1985) suggests that they are likely to tend towards occupations that encourage a combination of clerical or organisational abilities and interaction with other people or the provision of support to others. They are less likely than other females to demonstrate investigative skills or significant conceptual abilities.

This combination of Holland codes suggests a group of women who would tend towards a low levels of interest in the world around them and a relatively low level of logical-thinking skills, and who value social contact and orderliness (Holland, 1985; Kelso, 1986). Dependability and conformity to a social group or to social norms would be expected to be dominant values for this group of women.

In the sample of drink-drivers used for the present project, this group of drink-drivers was generally undifferentiated from other female drink-drivers in terms of age, BAC, licence type, location of offence, or place of drinking. This suggests that the only defining characteristic of those investigated here was the personality or occupational code of this group, which in turn indicates that any attempt to target this group of drink-drivers will need to focus on intrapersonal characteristics rather than situational characteristics that are more likely to be associated with these drink-drivers than with others.

Targeting this group may need to rely on the likely importance of social values and contact and orderliness to this group. Material that stresses the social consequences of drink-driving may have an impact, as might material that stresses the disorderliness of the consequences of drink-driving (e.g. court appearances, disruption to work and other aspects of life, loss of licence). As was the case with the female CR/RC drink-drivers, this group would benefit from a role-modelling approach in media material, perhaps based around a social group of similar women and the social and order-related consequences of offending. This type of campaign, combined with high levels of enforcement, would have considerable potential with this group.

Stressing the financial consequences of drink-driving is unlikely to have much impact on this group, and presenting a reasoned argument about drink-driving and its likely impact on others is similarly unlikely to have great impact. This group is likely to respond more strongly to emotive, socially-based material.

4.3 Female ES Drink-drivers

This group of female drink-drivers represented 25% of the sample of female drink-drivers and was characterised as socially oriented, friendly, adventurous, ambitious, energetic, and optimistic. Holland (1985) suggests that they are likely to tend towards occupations that encourage a combination of interpersonal, persuasive abilities and leadership, and interaction with other people or the provision of support to others. They are less likely than other females to demonstrate investigative skills or significant conceptual abilities, and are unlikely to show either interests or competencies in manual or outdoors activities.

This combination of Holland codes suggests a group of women who would tend towards a low levels of investigative interest in the world around them and a relatively low level of logical-thinking skills, and who value social contact and leadership or business and social success (Holland, 1985; Kelso, 1986). Optimism, energy, and social leadership would be expected to be dominant values for this group of women.

In the sample of drink-drivers used for the present project, this group of drink-drivers was generally undifferentiated from other female drink-drivers in terms of age, BAC, licence type, location of offence, or place of drinking. This suggests, as was the case with the female CS drink-drivers discussed above, that the only defining characteristic of those investigated here was the personality or occupational code of this group. This implies that any attempt to target this group of drink-drivers would have to focus on intrapersonal characteristics.

The energy and optimism of this group of women may be one of the characteristics that originally leads to their drink-driving problem, and it is unlikely that this particular characteristic could easily be used to build a countermeasure except in so far as it may represent a characteristic to use in a role-modelling approach in a media campaign. The optimism of this

group may act against any approach that emphasises the likelihood of detection or punishment as they may have an attitude to enforcement and crashes based on "it will not happen to me".

One possible starting point for a campaign targeting these drink-drivers would be the value they place on their own success and social leadership. If drink-driving could be presented to this group as a potential risk to success and their position as social leaders, it may be possible to have an impact on the behaviour of the female ES drink-drivers.

4.4 Male ES Drink-drivers

These drink-drivers represented 16% of the sample of male drink-drivers and was characterised as socially oriented, friendly, adventurous, ambitious, energetic, and optimistic. Holland (1985) suggests that they are likely to tend towards occupations that encourage a combination of interpersonal, persuasive abilities and leadership, and interaction with other people or the provision of support to others. They are less likely than other males to demonstrate investigative skills or significant conceptual abilities, and are unlikely to show either interests or competencies in manual or outdoors activities. In these respects, this group is similar to the female ES drink-drivers discussed above.

This combination of Holland codes suggests a group of men who would tend towards a low levels of investigative interest in the world around them and a relatively low level of logical-thinking skills, and who value social contact and leadership or business and social success (Holland, 1985; Kelso, 1986). Optimism, energy, and social leadership would be expected to be dominant values for this group of men.

In the sample of drink-drivers used for the present project, this group of drink-drivers was more likely to be fully licensed than other males, was more likely to be detected drink-driving in the Melbourne area, and was more likely to have consumed alcohol at a restaurant or club. In terms of age, BAC, and time of detection, this group was undifferentiated from other male drink-drivers.

The tendency of this group to represent drink-drivers who consumed their alcohol in Melbourne restaurants and clubs could be used as a focus for a media campaign. The use of a group of similar role models in this type of environment dealing effectively with the drink-driving problem might prove beneficial as a central component of a campaign.

As was the case for the ES women discussed above, the energy and optimism of this group of men may be one of the characteristics that originally leads to their drink-driving problem. The optimism of this group may also act against any approach that emphasises the likelihood of detection or punishment.

Again, the importance placed on success and social leadership may prove a useful starting point for any campaign targeting this group of drink-drivers. If drink-driving could be presented to this group as a potential risk to success and their position as social leaders, it may be possible to have an impact on the behaviour of these drink-drivers.

4.5 Male RI/RC Drink-drivers

This group of male drink-drivers represented 42% of the sample of male drink-drivers and was characterised as asocial, conforming, reserved, unpopular, careful, unimaginative, and defensive. Holland (1985) suggests that they are likely to tend towards occupations that allow the combination of mechanical, manual, or sporting abilities and either numeric or scientific interests or skills and competencies in the ordered use of information to solve problems using clearly defined methods or techniques.. They are less likely than other males to demonstrate significant creative or artistic competencies or interests, and are less likely to have well-developed social skills or leadership interests.

In a more negative sense, this combination of Holland codes suggests a group of men who would tend towards low levels of social involvement, flexibility, and insight, and who value tangible or concrete things and financial success (Holland, 1985; Kelso, 1986). Holland's comment noted above that R and C people are the least likely to attain success equally applies to this group male drink-drivers.

In the sample of drink-drivers used for the present project, this group of drink-drivers was more likely than other male drink-drivers to have been detected in a non-metropolitan area, to have higher BACs, to have licence problems, and to have consumed alcohol either in a hotel or in their own home. They tended to be younger than other male drink-drivers, but they were not detected drink-driving at different times to other male drink-drivers.

Of all the groups of drink-drivers identified so far, this group is the most clearly differentiated from other drink-drivers and may, therefore, be more easily targeted with a campaign that relies on the use of similarities between the drivers presented in the campaign and the target audience. These drink-drivers tend to be younger, rural men drinking more than others in hotels or at home, with a history of offences leading to licence problems. These factors, plus the information above concerning their personality and social behaviour would be invaluable in developing a campaign specifically relevant to them.

As was the case with the other groups, targeting this group of drink-drivers specifically could involve either using a similar group of drinkers in drink-drive publicity campaigns as relevant role models to these men, or stressing consequences to drink-driving that would impact on them specifically. The first approach could involve a number of similar men making decisions not to drive after consuming alcohol in a range of (mostly) rural hotels. As was the case with the CR/RC women, the role-modelling approach would be appropriate particularly as their relatively undeveloped imaginative skills and insight may make it difficult for them to develop alternative strategies in potential drink-drive situations.

It is likely that male drink-drivers in this group would be less affected by media treatments that require imaginative skills or which rely on social pressures. The alternative suggested in relation to the CR/RC women, stressing the financial consequences of drink-driving (both legal and crash-related) and perhaps the employment-related consequences, may prove useful. Both of these are relatively concrete and therefore more appropriate for these drink-drivers. The curiosity and problem-solving interests inherent in the RI group of drink-drivers might also be useful in campaign development - perhaps presenting drink-driving situations as problems to be solved and presenting a range of potential, safe solutions to the problem. Again, there needs to be considerably more research conducted in this area before firm recommendations about campaign content can be made.

Enforcement approaches to drink-driving are unlikely to be as successful with this group as with other groups for reasons discussed in relation to female CR/RC drink-drivers, so stressing an enforcement solution for the drink-driving problem may not impact as much on this group as on

other groups. This is an area that would also benefit from additional research as there is little evidence bearing on the differential impact of enforcement on different personality types.

4.6 Other Drink-drivers

The groups defined using the Holland Codes account for 55% of female drink-drivers and 58% of male drink-drivers in the sample. This leaves almost half of the drink-drivers spread across the remaining Holland two-letter codes. In the present context, where Holland codes are the only psychological measure used to group drink-drivers in the sample, it is not possible to draw any conclusions about the remaining drink-drivers, nor to make any recommendations concerning targeting them as a group.

4.7 Summary of Implications for Targeting

Table 6 summarises the implications for countermeasure targeting for each of the five Holland-based groups of drink-drivers identified above. It is important to stress, however, the need for additional research on each of these groups and their characteristics. The use of the Holland occupation codes was argued to be tentative earlier in the report, and there are some concerns about the reliability of this use of the Holland approach. In light of these concerns, the ideas in Table 6 should be seen as initial pointers for countermeasure programs and for further research.

4.8 Relation Between These Results and Other Research

Other research that has attempted to link psychological characteristics and drink-driving has proved ambiguous, but with the weight of evidence suggesting some relationship between offending and psychological variables.

The present research needs to be seen in the context of high levels of drink-drive enforcement and publicity which forms the environment in which the sample of drink-drivers analysed here chose to offend. This sample, then, is likely to be more homogeneous than samples of drink-drivers in other jurisdictions where countermeasure levels are less intense. In the Victorian context, only drivers who are somehow unaffected by the intensive countermeasures would be expected to drink-drive, and so any sample of drink-drivers in Victoria would be more likely to have identifiable psychological characteristics than a sample of drink-drivers collected in jurisdictions where there is less pressure not to drink and drive.

Table 6: Implications for Targeting

Holland Type	Aspect of Media Campaigns	Aspects of Enforcement
Female CR/RC	Role model based campaigns (women in rural locations) with clear specification of desired behaviours are most likely to work. Best if including an emphasis on financial or employment consequences of detection for drink-driving. Campaigns need to be kept concrete for this group.	Enforcement and punishment based campaigns are less likely to be successful with this group than with others unless the possibility of detection is very high and the consequences are concrete.
Female CS	Campaigns would best address the social and order values of this group, perhaps emphasising the social consequences (exclusion etc) and disorder-related consequences (i.e. the hassle involved) of drink-driving. Role modelling of appropriate behaviour is also likely to be beneficial.	Enforcement is most likely to be effective when it has potential social consequences for the offender.
Female ES	Campaigns targeting the social leadership values of this group would be beneficial, perhaps through material that spells out the community or social-group consequences of detection for drink-driving.	This group is less likely to be affected by enforcement than other groups due to the sense of optimism that group members exhibit. The probability of detection would need to be perceived as very high before this group would be affected.
Male ES	Campaigns would need to stress the same factors as for the female ES group, with the additional feature that any role modelling would need to lean towards fully-licensed drivers drinking alcohol in restaurants or clubs in metropolitan areas.	As above, the perceived probability of detection needs to be addressed for this group to counter their level of optimism.
Male RI/RC	Campaign material for this group needs to be concrete - both in the specification of desired behaviour and in the emphasis given to the consequences of drink-driving. Role modelling would be ideal, leaning towards younger males drinking in rural hotels who, perhaps, have a history of drink-driving or other offences.	This group is unlikely to be affected by enforcement measures.

This research supports the argument, presented by Donovan and Marlatt (1982), that it is inappropriate to treat drink-drivers as a homogeneous group. Using a sample of drink-drivers in the American state of Washington, Donovan and Marlatt identified five groups of drink-drivers using a cluster-analysis technique, two of which had higher crash involvements than the others. While it is not possible to compare the clusters reported by Donovan and Marlatt with the results of the present study due to the different data and the different contexts in which drink-driving occurs in Victoria, it is important to note that Donovan and Marlatt stressed that two of their five clusters represented significant crash problems.

The importance of targeted programs increases when this result is considered in the Victorian context. There is no reason to suppose that the five groups identified here all present similar crash risks or road safety problems when intoxicated. It may be the case, for example, that the psychological characteristics of one or more of the groups would lead individuals to drive more

carefully when intoxicated and so not present a significantly-increased crash risk. If this is the case - and this is an empirical question - then it would be most appropriate to target those identified groups of drink-drivers who are also more likely to crash. Refinement of the targeting of drink-drive programs to this level will require considerable research which would need to be conducted in the Victorian context rather than in other jurisdictions.

4.9 Alcohol Abuse and Personality

Some authors have suggested that recidivist drink drivers or drink drivers with high levels of alcohol in their blood may drink-drive as a result of already-existing alcohol use disorders (McCord, 1984; Macdonald, 1989; Vingilis, Stoduto, Macartney-Filgate, Liban, & McLellan, 1994). This possibility was not investigated here, but there are some personality characteristics which are known to be associated with these disorders.

Evidence concerning the relationship between personality and alcohol abuse suggests that alcoholics are not a homogeneous group, but rather that there are a number of subgroups of alcoholics with similar personality characteristics (eg. Schinka, 1995). Some of the personality characteristics associated with alcohol use disorders include antisocial personality characteristics (especially in males), depressive or negativistic personality characteristics (especially in women), and compulsive personality characteristics (eg. Matano, Locke, & Schwartz, 1994).

The antisocial group of alcoholics may be of particular interest here as:

- Antisocial personality characteristics include failure to conform to social norms, deceitfulness, impulsivity, aggressiveness, and disregard for the safety of self and others (American Psychiatric Association, 1994).

- These characteristics have been associated with crash involvement (eg. Cale, 1992; Elander, French, & West, 1993).

- These characteristics have been associated with drink-driving (eg. McMillen et al., 1992; Murty & Roebuck, 1991)

Some of these personality characteristics are similar to those found in the female CR/RC and the male RI/RC groups identified here. In the case of the male drink-drivers, this group accounted for 42% of the sample.

Saltstone & Poudrier (1989) stress the relevance of the link between drink-driving and alcohol use disorders by noting that those drink drivers with alcohol related disorders would be unlikely to change their drink-drive behaviour without appropriate treatment for the disorder. There may be a case, therefore, for measures which remove drink-drivers from the road environment more effectively than licence cancellation or disqualification from driving (Harrison, in press) such as alcohol interlock devices. There may also be a case for the use of alternative measures that offer drink-drivers with alcohol use disorders access to treatment programs.

4.10 Implications for Future Research

This report presents an analysis of the data collected by the Police at the time of conducting an evidential breath test. The data collected by the Police are directly relevant to their needs, which revolve around the preparation of a case against the offender, and for that reason are limited for the present context. The analysis has, never the less, pointed towards some similarities between some drink-drivers (and differences between them and the general population) that may prove useful in more-effective targeting of drink-driving campaigns.

There is a clear need, however, for additional research to be conducted in this area. This need arises from the tentative nature of the analysis presented in this report and from the potential of targeting to impact on the incidence of drink-driving in the current, Victorian context of high levels of enforcement and emotive public education campaigns.

The tentative nature of the present analysis has been emphasised a number of times. This project has made use of data intended for another purpose, but which fortunately included variables that allowed an analysis in terms of some psychological characteristics. This analysis was not intended to present a detailed picture of the psychological characteristics associated with drink-driving, as such an analysis would require the collection of data specifically relevant to this issue.

The results do point, however, towards a number of groups of drink-drivers that share some psychological characteristics. Confirmatory research is clearly warranted, and would most likely take the form of a planned collection of psychological data from an identified group of drink-drive offenders. The collection of this type of data would be especially appropriate in the Victorian context, as research conducted in the drink-driving area has been conducted in overseas jurisdictions that do not have the same intensive level of drink-drive countermeasures in place. Drink-drivers in Victoria are likely to differ from those in other jurisdictions as they represent a group of drivers who have continued to offend in spite of the high levels of enforcement and publicity. It is likely to be easier, with Victorian drink-drivers, to identify psychological characteristics that are associated with offending.

The high level of enforcement and publicity argues strongly for the need to further refine the targeting of drink-drive countermeasures towards those groups of drivers who continue to offend. It is clear that current offenders are likely to share psychological characteristics that in some sense reduce the impact of the drink-drive countermeasures currently used in Victoria. Targeting this group will require improved knowledge of their psychology, which in turn requires additional research conducted specifically in the Victorian context. Research here would most likely also involve the collection of specific psychological information from drink-drivers and an analysis of the clustering of psychological characteristics amongst this group.

The final area of additional research would involve an examination of the relationship between crash measures and group membership. As was discussed above, the extent to which a group should be targeted for additional mass-media or enforcement attention should in part be determined by the crash-risk associated with membership of that particular group of drink-drivers.

5. CONCLUSION

The study reported here involved an analysis of the situational and psychological factors associated with drink driving, using a sample of drink-drive offenders detected either at a random breath testing station or as a result of another offence or licence check. The analysis of psychological factors relied on the use of Holland's theory of occupational choice which emphasises the role of the individual's personality in decisions about careers and occupations.

The analysis of situational factors relating to drink driving indicated, in part, that rural drink-drivers were marginally younger than metropolitan drink drivers; male drink-drivers were more likely than female drink drivers to be unlicensed or to have had their licence cancelled for some reason; twenty percent of male drink drivers were unlicensed or disqualified from driving; rural drink-drivers were more likely than metropolitan drink drivers to be unlicensed or disqualified from driving; and rural drink drivers were more likely than metropolitan drink drivers to consume alcohol prior to the offence at a hotel or at home.

The psychological characteristics of drink-drive offenders were estimated by applying the Holland theory to the occupations recorded at the time of the evidential breath test, and five groups of drink-drive offenders were identified who had occupational or personality characteristics which were over-represented in the drink-driving sample compared to the general population. These groups of drink-drivers were then discussed in terms of situational drink-drive factors and potential countermeasures.

There was some uncertainty about the relatively novel approach used to deduce personality characteristics as there do not appear to be any similar applications of the Holland theory in the literature. In spite of this uncertainty, the method has tentatively identified groups of drink-drivers which might be targeted more effectively using the psychological and situational factors associated with them to inform the countermeasure-development process. The importance of further targeting of countermeasures is underscored by the continuing level of drink-driving in spite of the high levels of enforcement and supporting publicity in Victoria, suggesting that there are some characteristics of current drink-drivers that serve to immunise them from the effects of current countermeasures.

The importance of further improvements in targeting and the potential success of the method applied here in identifying targetable groups of drink drivers supports the need for (and potential of) further research to validate the conclusions reached so far.

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APPENDIX

LIST OF OCCUPATIONS AND HOLLAND CODES FOR THE DRINK-DRIVER SAMPLE

OCCUPATION	HOLLAND CODE	COUNT
"NOTHING"		1
ABATTOIRS	RC	1
ABATTOIR WORKER	RC	1
ACCOUNT MANAGER	ES	1
ACCOUNTANT	CE	10
ACCOUNTS OFFICER	CS	1
ACCOUNTS SUPERVISOR	CE	1
ADMIN OFFICER	ES	1
ADMINISTRATION ASSISTANT	CS	1
ADMINISTRATIVE SERVICES	ES	1
ADMINISTRATOR	ES	1
ADVERTISING	ES	2
ADVERTISING EXECUTIVE	AE	1
	ES	1
ADVERTISING, SALES REP	ES	1
ADVISER	CE	1
AIRCRAFT ENGINEER	RI	1
AIRCRAFT MECHANICAL ENGINEER	RI	1
ALARM INSTALLER	RA	1
ALARMS OPERATOR	RA	1
AMBULANCE OFFICER	SR	1
ANTENNAE TECHNICIAN	RI	1
ANTIQUE DEALER	ES	1
APPLIANCE TECHNICIAN	EI	1
APPRENTICE PLUMBER	RE	1
APPRENTICE BUTCHER	RS	1
APPRENTICE CARPENTER	RI	1
APPRENTICE CHEF	RI	1
APPRENTICE ELECTRICIAN	RI	1
APPRENTICE GARDENER	RI	1
APPRENTICE MOTOR MACHINE	RI	1
APPRENTICE PAINTER	RA	1
ARBORIST	RI	1
ARCHITECT	IR	1
AREA MANAGER	SE	1
ARMY APPRENTICE	RC	1
ARTIST	AS	2
ASPHALT PLANT	RI	1

OCCUPATION	HOLLAND CODE	COUNT
MANAGER		
ASSISTANT GREEN KEEPER	RI	1
ASSISTANT MANAGER	ES	1
	SE	1
ASSISTING ADMINISTRATOR	ES	1
ASSOCIATE DIRECTOR	ES	1
ATTENDANT CARER	RC	1
AUDIO ELECTRONIC SALES	ES	1
AUTO MACHINIST	RE	1
AUTO PARTS MANAGER	ES	1
AUTOMATIC MACHINIST	CR	1
AUTOMECHANIC	RI	1
BAKER	RC	2
BANK MANAGER	EC	3
BANK OFFICER	CS	5
BANK TELLER	CS	1
BANKER	CS	1
BAR TENDER	SE	1
BARMAN	SE	5
BARRISTER	EA	2
BINDERY ASSISTANT	RA	1
BLENDER	RI	1
BLOCK MANAGER	SE	1
BLOCK WORKER/LABOURER	RC	1
BOARDING HOUSE PROPRIET	CS	1
BOILER MAKER	RI	4
BOILERMAKER	RI	11
BOILERMAKER SUPERVISOR	RI	1
BREWERS ASSISTANT	RC	1
BRICKIES LABOURER	RC	1
BRICKLAYER	RE	9
BRICKLAYER & GARBO	RE	1
BRICKLAYERS LABOURER	RC	1
BROKER	EC	1
BUILDER	RC	11
BUILDING CONSULTANT	IR	1

OCCUPATION	HOLLAND CODE	COUNT
BUILDING SUPERVISOR	SR	1
BUS DRIVER	RC	5
BUSINESSMAN	CI	1
BUTCHER	RS	10
BUTCHER DELIVERIES	RC	1
C & E		1
CABINET MAKER	RA	5
CABLE ASSEMBLER	RI	1
CABLE JOINER	RI	1
CAR DEALER	ES	2
CAR SALESMAN	ES	1
CAR WHOLESALER	ES	1
CARE WORKER	RC	1
CARETAKER	SR	1
CARPENTER	RI	31
CARPET CLEANER	RS	1
CARPET LAYER	RC	2
CARPET SALESMAN	ES	1
CASUAL LABOURER	RC	2
CASUAL WORK		1
CATERER	SC	1
CATERING ASSISTANT	SC	1
CERAMIC TILER	RC	1
CHARCOAL BURNER	RA	1
CHARTERED ACCOUNTANT	CE	1
CHEESE MAKER	RI	2
CHEF	RI	9
CHICKEN BONER	RS	1
CHIEF EXEC. OF FLORENCE	ES	1
CHILDREN'S SERVICE OFFIC	ES	1
CHOOK FARMER	RE	1
CIVIL ENGINEER	IR	1
CLEANER	RS	12
CLEANING	RS	1
CLERICAL OFFICER	CS	1
CLERK	CR	1
	CS	12
CLOTHING MANUFACTURER	EI	1
CLUB MANAGER	ES	1
COMMERCIAL ARTIST	AS	1
COMMUNITY HEALTH NURSE	SI	1
COMMUNITY LIAISON OFFIC	SI	1

OCCUPATION	HOLLAND CODE	COUNT
COMPANY DIRECTOR	ES	10
COMPANY MANAGER	ES	3
COMPUTER ANALYST	IR	2
COMPUTER CONSULTANT	RI	1
COMPUTER MANAGER	ES	1
COMPUTER OPERATOR	CR	1
COMPUTER PROGRAMMER	RI	1
COMPUTER REP	ES	1
COMPUTER TECHNICIAN	RI	1
CONCRETER	RC	6
CONCRETER	RC	4
CONSULTANT	ES	1
CONTRACTOR	RI	2
COOK	RI	3
COORDINATOR AT GURWID'S	SI	1
CORRECTION OFFICER	SI	1
COSTING CLERK	CE	1
COURIER	RC	3
CRANE DRIVER	RE	2
CRANE OPERATOR	RE	1
CURATOR	ES	1
CURRENTLY ON WORKCARE		1
CUSTOMER CO-ORDINATOR	SC	1
CUSTOMER LIAISON OFFICER	SC	1
CUSTOMS/SHIPPING MANAGE	ES	1
DAIRY HAND	RC	1
DANGEROUS GOOD INSPECTO	IR	1
DATA ENTRY OPERATOR	CR	1
DATA PREPARER TELECOM	CR	1
DEAN OF EDUCATION	SA	1
DIESEL MECHANIC	RI	1
DELI MANAGER	SE	1
DELIVERY DRIVER	RC	1
	RE	1
DEMOLITION	RC	1
DENTAL NURSE	SR	1
DENTAL TECHNICIAN	RA	2
DEPARTMENT MANAGER	ES	1
DEPT MANAGER	SE	1
DESIGN DRAUGHTSMAN	AI	1
	CR	1
DESIGNER	AI	2

OCCUPATION	HOLLAND CODE	COUNT
DIESEL MECHANIC	RI	3
DIRECTOR	ES	4
DIRECTOR ENGINEER	ER	1
DIRECTOR OF RESEARCH	IR	1
DISPATCH SUPERVISOR	SC	1
DISTRIBUTOR	ES	1
DOCTOR	IS	3
DOMESTIC ASSISTANT	RS	1
DOZER DRIVER	RE	1
DRAIN LAYER	RE	1
DRAINAGE CONTRACTOR	RE	2
DRAUGHTSMAN	CR	1
DRIVER	RC	2
	RE	19
DRIVER'S ASSISTANT	RC	1
DRIVER/CUTTER	RE	1
DRIVER/STOREMAN	RC	1
DRIVEWAY ATTENDANT	RC	1
DRY CLEANER	RC	1
DYE SETTER	RE	1
ELECTRICAL OPERATOR	RI	1
ELECTRICAL CONTRACTOR	RI	5
ELECTRICAL ENGINEER	IR	1
ELECTRICAL FITTER	RI	1
	RS	3
ELECTRICIAN	RI	22
ELECTRICIAN/BUILDER	RI	1
ELECTRONIC SERVICE MANA	ES	1
ELECTRONICS SERVICE ENG	IR	1
ELECTRONICS TECHNICIAN	RI	2
ELECTROPLATER	RI	1
ENGINEER	IR	5
ENGLISH TEACHER	SA	1
ENGRAVER	RC	1
ENVELOPE MACHINIST	RC	1
EXCAVATION CONTRACTOR	ER	1
EXECUTIVE	ES	1
EXHAUST FITTER	RI	2
EXPORT CLERK	CI	1
EXTRUDER OPERATOR	RC	2
FABRICATION MANAGER	ES	1
FACILITATOR (BUSINESS A	CE	1
FACTORY HAND	RC	5

OCCUPATION	HOLLAND CODE	COUNT
FACTORY MANAGER	ES	2
FACTORY WORKER	RC	2
FACTORY INSPECTOR	RC	1
FARM HAND	RC	3
FARM MANAGER	RS	1
FARMER	RI	4
FARMHAND	RC	1
FARM WORKER	RS	1
FASHION AGENT	AI	1
FENCER	RA	1
FENCING CONTRACTOR	RA	3
FIBREGLASS LAMINATOR	RA	1
FIBRO PLASTERER	RA	1
FIELD ASSISTANT	CR	1
FILM PRODUCER	AS	1
FINANCE BROKER	EC	1
FINANCIAL CONSULTANT	CE	1
FINANCIAL PLANNER	CE	1
FIRE ARM INSTALLER	EI	1
FIRE OFFICER	IC	1
FIREWOOD CUTTER	RA	1
FISH MANAGER	ES	1
FISH/CHIP SHOP PROPRIET	ES	1
FISHERMAN	RI	2
FISHING CO-OP	RI	1
FISHMONGER	RC	1
FITTER	RI	4
FITTER & TURNER	RI	11
FITTER AND TURNER	RI	5
FITTER WELDER	RI	1
FITTER/WELDER	RI	1
FLEET SALESMAN	ES	1
FOOD PROCESSOR	RC	1
FOREMAN	RC	5
FORK LIFT DRIVER	RC	4
FORK LIFT MECHANIC	RI	1
FORK LIFT OPERATOR	RC	1
FORKLIFT DRIVER	RC	7
FRENCH POLISHER	RA	1
FRUIT PICKER	IC	2
FRUIT SHOP	EI	1
FUEL MERCHANT	EC	1
FULL TIME SOLDIER	RC	1
FURNACE OPERATOR	RI	1
FURNACEMAN	RI	1
FURNITURE POLISHER	RA	1
FURNITURE REMOVALIST	RE	3
GANGER	RC	1

OCCUPATION	HOLLAND CODE	COUNT
GARBAGE MAN	RC	1
GARDENER	RC	1
	RI	3
GARDENER/HANDYMAN	RI	1
GAS & FUEL CONTRACTOR	RC	1
GAS AND FUEL	RC	1
GAS CONVERTER	RC	1
GENERAL ANYTHING'		1
GENERAL HAND	RC	1
GENERAL MAINTENANCE	RA	1
GENERAL MANAGER	ES	1
GENERAL MANAGER MARKETI	ES	1
GEOLOGIST	IR	1
GLAZIER	RA	2
GOLD MINER	IR	1
GRAPE PICKER	IC	1
GRAPHIC DESIGNER	AI	1
GREEN HOUSE BUILDER	RC	1
GROUNDSMAN	RI	2
GYMNASTICS INSTRUCTOR	IE	1
HAIRDRESSER	RS	7
HANDYMAN	RA	2
HEAD WAITER	EC	1
HIGH SCHOOL PRINCIPAL	SE	1
HOME DUTIES		23
HORSE TRAINER	RI	1
HOSPITAL ORDERLY	SR	1
HOSPITALITY TRAINER	SE	1
HOTEL MANAGER	SE	3
HOTEL MANAGERESS	SE	1
HOTEL WORKER	CS	1
HOUSE BLOCKING	RA	1
HOUSE DUTIES		1
HOUSE RE-STUMPER	RA	1
HOUSE WIFE		1
HOUSEBOAT OPERATOR	RI	1
HOUSEKEEPER		1
HOUSEWIFE		5
HR PLANNING SYSTEMS CO-	IR	1
INDUSTRIAL ENGRAVER	RC	1
INSTRUMENTAL TECHNICIAN	RI	1
INSULATION INSTALLER	RA	1
INSURANCE AGENT	ES	1
INSURANCE ASSESSOR	ES	1
INSURANCE BROKER	ES	2
INSURANCE LOSS ASSESSOR	ES	1
INTELLECTUAL DISABILITI	SI	1
INTERIOR DESIGNER	AI	1
INVALID PENSIONER		3
INVENTORY CONTROL	ES	1
INVENTORY MANAGER	SE	1
INVESTMENT CONSULTANT	ES	1
IRRIGATION SPECIALIST	RI	1
JEWELLER	AR	2
JILLAROO	RC	1
JOCKEY	RE	2
JOINER	RI	4
KITCHEN HAND	RS	3
LAB TECHNICIAN	RC	1
LABOURER	RC	60
LABOURER TELECOM	RC	1
LABOURER/STOREMAN	RC	1
LAND SURVEYOR	IR	1
LANDSCAPE GARDENER	RA	3
LANDSCAPE GARDENER	RA	1
LANDSCAPER	IR	1
	RA	1
LANDSCAPE CONTRACTOR	IR	1
LAWYER	EA	2
LASER CUTTER	RI	1
LEADING HAND		1
LEADING HAND/DRIVER	RC	1
LEADING SHUNTER V-LINE	RC	1
LETTER CUTTER/HENDER	RA	1
LINEMAN	RS	1
LINESMAN	RS	4
LOADER AT ANSETT	RI	1
LOCAL LAWS OFFICER	CR	1
LOCKSMITH	RI	2
MACHINE OPERATOR	RI	5
MACHINIST	CR	4
MAINTENANCE AND GARDENI	RI	1
MAINTENANCE FITTER	RA	2
	RI	1
MAINTENANCE OFFICER	RA	1
MAINTENANCE PERSON	RA	1
MAINTENANCE FITTER	RA	1
MANAGEMENT	ES	1

OCCUPATION	HOLLAND CODE	COUNT
CONSULTANT		
MANAGER	ES	14
	SE	3
MANAGER GARDEN SUPPLY	ES	1
MANAGER, CAR RENTALS	ES	1
MANAGER-SHED HAND	SE	1
MANAGER/MOTOR MECHANIC	RI	1
MANAGING DIRECTOR	ES	2
MANCHESTER WHOLESALER	ES	1
MARINE ENGINEER	RI	1
MARKET RESEARCH CONSULT	IR	1
MARKETING MANAGER	ES	3
MATERIAL HANDLER	RE	1
MATHS CONSULTANT	SA	1
MEAT INSPECTOR	RS	1
MEAT WORKER	RS	1
MEAT WORKER/SLICER	RC	1
MECHANIC	RI	18
MECHANICAL ENGINEER	IR	1
MECHANICAL FITTER	RI	1
MEDIA CONSULTANT	ES	2
MEDICAL PRACTITIONER	IS	2
MEDICAL RECEPTIONIST	CS	1
MEDICAL SECRETARY	CS	1
MERCHANT SEAMAN	CE	3
METAL POLISHER	RA	1
METAL WORKER	RI	1
MILL HAND	RI	1
MILL OPERATOR	RI	1
MILL WORKER	RI	1
MOTEL PROPRIETOR	SE	1
MOTHER		4
MOTOR MECHANIC	RI	16
MOTOR TRIMMER	RA	1
MOTOR WRECKER	RA	1
MOTOR-MECHANIC	RI	1
MOULDER	RI	1
MUM'		1
MUSICIAN	AS	3
NANNY	SR	1
NAVAL OFFICER	CE	1
NETWORK SUPERVISOR	SC	1
NURSE	SI	5
NURSE/STUDENT	SI	1

OCCUPATION	HOLLAND CODE	COUNT
MANAGER	ES	14
	SE	3
MANAGER GARDEN SUPPLY	ES	1
MANAGER, CAR RENTALS	ES	1
MANAGER-SHED HAND	SE	1
MANAGER/MOTOR MECHANIC	RI	1
MANAGING DIRECTOR	ES	2
MANCHESTER WHOLESALER	ES	1
MARINE ENGINEER	RI	1
MARKET RESEARCH CONSULT	IR	1
MARKETING MANAGER	ES	3
MATERIAL HANDLER	RE	1
MATHS CONSULTANT	SA	1
MEAT INSPECTOR	RS	1
MEAT WORKER	RS	1
MEAT WORKER/SLICER	RC	1
MECHANIC	RI	18
MECHANICAL ENGINEER	IR	1
MECHANICAL FITTER	RI	1
MEDIA CONSULTANT	ES	2
MEDICAL PRACTITIONER	IS	2
MEDICAL RECEPTIONIST	CS	1
MEDICAL SECRETARY	CS	1
MERCHANT SEAMAN	CE	3
METAL POLISHER	RA	1
METAL WORKER	RI	1
MILL HAND	RI	1
MILL OPERATOR	RI	1
MILL WORKER	RI	1
MOTEL PROPRIETOR	SE	1
MOTHER		4
MOTOR MECHANIC	RI	16
MOTOR TRIMMER	RA	1
MOTOR WRECKER	RA	1
MOTOR-MECHANIC	RI	1
MOULDER	RI	1
MUM'		1
MUSICIAN	AS	3
NANNY	SR	1
NAVAL OFFICER	CE	1
NETWORK SUPERVISOR	SC	1
NURSE	SI	5
NURSE/STUDENT	SI	1

OCCUPATION	HOLLAND CODE	COUNT
ODDS AND ENDS?		1
OFFICE ADMINISTRATOR	ES	1
OFFICE MANAGER	ES	1
ON HEALTH BENEFITS		1
OPERATIONS MANAGER	ES	4
OPERATOR	CI	1
	RI	1
ORANGE PICKER	IC	1
ORDERLY	SR	1
OWNER DRIVER	RC	2
	RE	7
OWNER/DRIVER	RE	1
PAINTER	RA	12
PAINTER & DECORATOR	RA	1
PAINTER & DECORATOR	RA	6
PAINTER/DECORATOR	RA	1
PANEL BEATER	RI	10
PANELBEATER	RI	1
PARENT		1
PART TIME RECEPTIONIST	SC	1
PART-TIME COURIER	RC	1
PART-TIME DELIVERY	RC	1
PART-TIME LABOURER	RC	1
PARTS MANAGER	ES	1
PARTS SALESMAN	ES	1
PASTRY COOK	RC	1
	RI	1
PAY CLERK	CS	1
PENSION		3
PENSIONER		42
PERSONAL ASSISTANT	CS	2
PERSONNEL MANAGER	ES	2
PEST CONTROL OPERATOR	RI	1
PHARMACIST	IR	1
PHARMACY ASSISTANT	ES	1
PHOTOGRAPHER	AI	1
PHOTOGRAPHIC RETAILER	ES	1
PHYSIOTHERAPIST	IS	1
PICKER	IC	1
PICTURE FRAMER	RA	2
PILOT	RI	1
PIZZA SHOP OWNER	ES	1
PLANT OPERATOR	CI	3
	RC	4
PLANT OPERATOR (BUT CUR	RC	1
PLASTERER	RA	11
PLASTIC MOLDER	RE	1

OCCUPATION	HOLLAND CODE	COUNT
PLUMBER	RE	24
POLICE SERGEANT	RS	1
PORTER	RS	1
POSTAL DELIVERY CONTROL	CS	1
POSTMAN	RC	5
PRESS SECRETARY	AS	1
PRIMARY PRODUCER	RC	1
PRINT OPERATOR	RA	1
PRINTER	RA	8
PRINTER'S ASSISTANT	RA	1
PRINTERS ASSISTANT	RA	1
PRINTING MANAGER	ES	1
PROCESS WORKER	CI	1
PROCESS WORKER	CI	8
PRODUCER CHANNEL 9	AS	1
PRODUCER CHANNEL NINE	AS	1
PRODUCTION ASSISTANT	RA	1
PRODUCTION CLEANER	RS	1
PRODUCTION MANAGER	ES	4
PRODUCTION OPERATOR/FAR	RC	1
PROPERTY MANAGER	EC	1
PROPRIETOR		1
PSYCHIATRIC NURSE	SI	1
PUBLIC RELATIONS CONSUL	ES	1
PUBLIC SERVANT	ES	6
PUBLICAN	ES	1
PURCHASING MANAGER	ES	1
PURCHASING OFFICER	CI	2
QUALITY CONTROLLER	IR	1
QUARANTINE OFFICER	IR	1
RADIO ANNOUNCER	EA	1
RAILWAY SUPERVISOR	RS	1
RAILWAYS	RC	1
RANGER & ORDERLY	IR	1
REAL ESTATE AGENT	EC	4
RECEPTIONIST	SC	2
RECORDS OFFICER	CS	1
REFRIGERATION ENGINEER	RI	1
REFRIGERATION MECHANIC	RI	2
REFRIGERATOR MECHANIC	RI	1
REG & LICENCE OFFICER	ES	1
REGISTERED NURSE	SI	3

OCCUPATION	HOLLAND CODE	COUNT
REMOVALIST	RE	1
RENOVATIONS	RA	1
RESORT MANAGER	SE	1
RESTAURANT MANAGER	SC	1
RESTAURATEUR	SC	1
RESTAURATEUR	SC	1
RETAIL MANAGER	SE	1
RETAILER	ES	1
RETIRED		24
RETIRED POLICEMAN	RS	1
RETIRED TEACHER	SA	1
RIGGER	CE	3
ROOF PLUMBER	RE	3
ROOF TILER	RA	2
ROOFING CONTRACTOR	RA	1
RUBBER WORKER	RI	1
RURAL COUNCILLOR (COUNS	SE	1
SALES	ES	5
SALES ASSISTANT	ES	1
SALES CLERK	CE	1
SALES CONSULTANT	ES	3
SALES ENGINEER	ES	1
SALES EXECUTIVE	ES	2
SALES MANAGER	ES	11
SALES PERSON	ES	5
SALES REP	EI	1
	ES	23
SALES REPRESENTATIVE	ES	1
SALESMAN	ES	21
SALESPERSON	ES	2
SALES REP	ES	1
SCAFFOLDER	RC	2
SCHOOL PRINCIPAL	SE	1
SCHOOL TEACHER	SC	1
SCUBA DIVING INSTRUCTOR	IE	1
SEAMAN	CE	1
SEASONAL FRUIT PICKER	IC	1
SEASONAL WORKER	IC	2
SECOND HAND DEALER	ES	1
SECRETARY	CS	5
SECURITY	RI	1
SECURITY GUARD	RI	2
SECURITY OFFICER	RI	1
SELF EMPLOYED		20
SELF EMPLOYED CARPENTER	RI	1
SELF EMPLOYED CONCRETER	RC	1
SELF EMPLOYED CONCRETER	RC	1
SELF EMPLOYED ELECTRICI	RI	1
SELF-EMPLOYED		11
SEMI-RETIRED		2
SEMI-RETIRED TRUCK DRIV	RE	1
SENIOR LECTURER IN CHEM	SA	1
SENIOR TELECOM TECHNICA	RI	1
SERVICE ENGINEER	IR	1
SERVICE MANAGER	ES	4
SERVICE STATION OWNER	ES	1
SERVICING OFFICE EQUIPM	RI	1
SHAREBROKING CLERK	CE	1
SHEARER	RC	6
SHEET FIXER	RI	1
SHEET METAL WORKER	RI	4
SHEETMETAL WORKER	RI	3
SHIFT WORKER		1
SHIPPING AGENT	CI	1
SHOP ASSISTANT	ES	3
SHOPKEEPER	ES	1
SHOWER SCREEN INSTALLER	RA	1
SICKNESS BENEFITS		2
SIGNWRITER	AI	1
	AS	2
SINGLE MOTHER		3
SLAUGHTERMAN	RC	2
SOFTWARE ENGINEER	IR	1
SOLDIER	RC	3
SOLE PARENT		6
SOLE PARENT PENSION		1
SOLICITOR	EA	5
SPARE PARTS MANAGER	ES	1
SPARE PARTS SALESMAN	ES	1
SPRAY PAINTER	RI	7
SPRAYPAINTER/FRUITPICKE	RI	1
STATE ENROLLED NURSE	SI	1
STEEL WORKER	RI	1
STEVEDORE	RC	1
STOCK CONTROL	SE	1

OCCUPATION	HOLLAND CODE	COUNT
MANAGER		
STORE PERSON	RC	1
STOREMAN	RC	17
STOREMAN & PACKER	RC	1
STOREMAN/COURIER	RC	1
STOREPERSON	RC	2
STUDENT		23
SUBURBAN GUARD	CR	1
SUPER ANNUANT		1
SUPERINTENDENT	ES	1
SUPERMARKET MANAGER	ES	1
SUPERVISOR	SC	8
SUPERVISOR	SC	1
SUPERVISOR	SC	1
SUPERVISOR	SC	1
SURVEYOR	IR	2
SWIMMING POOL INSTALLER	RA	1
TAPPER AND SETTER	RI	1
TAX CONSULTANT	CE	1
TAXI DRIVER	RE	3
TEACHER	SA	7
TEACHER'S AID	CE	1
TECH SUPPORT ADMINISRAT	ES	1
TECHNICAL ASSISTANT		1
TECHNICAL CONSULTANT	ES	1
TECHNICAL MANAGER	ES	1
TECHNICAL OFFICER	RI	3
TELECOM LINESMAN	RS	1
TELECOM TECHNICIAN	RI	1
TELEPHONE TECHNICIAN	RI	1
TELEVISION MECHANIC	RI	1
TELEVISION PRODUCER	AS	1
TELLER	CS	1
TEXTILE MECHANIC	RI	2
TEXTILE WORKER	RE	1
TILER	RA	4
TITLES CLERK	CI	1
TOOLMAKER	RI	1
TOURISM OFFICER	CS	1
TOURIST INFORMATION OFF	SC	1
TOY MAKER	RC	1
TRADE COMMISSIONER	ES	1
TRADE UNION OFFICIAL	ES	1
TRADER	ES	1
TRADES ASSISTANT	RC	2

OCCUPATION	HOLLAND CODE	COUNT
STORE PERSON	RC	1
STOREMAN	RC	17
STOREMAN & PACKER	RC	1
STOREMAN/COURIER	RC	1
STOREPERSON	RC	2
STUDENT		23
SUBURBAN GUARD	CR	1
SUPER ANNUANT		1
SUPERINTENDENT	ES	1
SUPERMARKET MANAGER	ES	1
SUPERVISOR	SC	8
SUPERVISOR	SC	1
SUPERVISOR	SC	1
SUPERVISOR	SC	1
SURVEYOR	IR	2
SWIMMING POOL INSTALLER	RA	1
TAPPER AND SETTER	RI	1
TAX CONSULTANT	CE	1
TAXI DRIVER	RE	3
TEACHER	SA	7
TEACHER'S AID	CE	1
TECH SUPPORT ADMINISRAT	ES	1
TECHNICAL ASSISTANT		1
TECHNICAL CONSULTANT	ES	1
TECHNICAL MANAGER	ES	1
TECHNICAL OFFICER	RI	3
TELECOM LINESMAN	RS	1
TELECOM TECHNICIAN	RI	1
TELEPHONE TECHNICIAN	RI	1
TELEVISION MECHANIC	RI	1
TELEVISION PRODUCER	AS	1
TELLER	CS	1
TEXTILE MECHANIC	RI	2
TEXTILE WORKER	RE	1
TILER	RA	4
TITLES CLERK	CI	1
TOOLMAKER	RI	1
TOURISM OFFICER	CS	1
TOURIST INFORMATION OFF	SC	1
TOY MAKER	RC	1
TRADE COMMISSIONER	ES	1
TRADE UNION OFFICIAL	ES	1
TRADER	ES	1
TRADES ASSISTANT	RC	2

OCCUPATION	HOLLAND CODE	COUNT
TRAIN CONTROLLER	EI	1
TRAINEE GOLF PROFESSION	ES	1
TRAINEE MANAGER	ES	1
TRAINEE TRAIN DRIVER	RC	1
TRAINING OFFICER	SE	2
TRAM CONDUCTOR	RC	1
TRANSPORT	RC	1
TRANSPORT DRIVER	RC	1
TRANSPORT MANAGER	ES	4
TRAVEL CONSULTANT	EI	1
TREASURY DEALER	ES	1
TREE LOPPER	RA	1
TRUCK DRIVER	RE	21
TRUCK JOCKEY	RE	1
TRUCK/VAN DRIVER	RE	1
TRUCKDRIVER	RE	1
TYPE TRANSCRIBER	CS	1
TYRE FITTER	RI	1
TYRE MAKER	RI	1
TYRE RETREADER	RI	1
U/E CHEF	RI	1
UNEMPLOYED		1
UNEMPLOYED		311
UNEMPLOYED (BOILERMAKER	RI	1
UNEMPLOYED (PLUMBER)	RE	1
UNEMPLOYED (SALESMAN)	ES	1
UNEMPLOYED BLOCK MANAGE	ES	1
UNEMPLOYED CARPENTER		1
UNEMPLOYED DECK HAND	RI	1
UNEMPLOYED GARDENER	RI	1
UNEMPLOYED LABOURER	RC	1
UNEMPLOYED MOTOR MECHAN		1
UNEMPLOYED MUSICIAN	AS	1
UNEMPLOYED PAINTER	RA	1
UNEMPLOYED THEATRE TECH	AR	1
UNEMPLOYED		1
UNKNOWN		22
UPHOLSTERER	RI	2
USED CAR SALESMAN	ES	1
VEHICLE ROAD TESTER	CR	1
VET NURSE	RI	1
VINEYARD WORKER	IC	1
VOLUNTARY WORKER		1
WAITER	RS	1
WAITRESS	RS	2
WAREHOUSE MANAGER	ES	1
WASTE OPERATOR	RE	1
WATERSIDE WORKER	SC	1
	SR	1
WELDER	RI	8
WELDER, FITTER	RI	1
WAREHOUSE MANAGER	ES	1
	SE	1
WHOLESALER	ES	1
WINDOW CLEANER	RS	2
WINDSCREEN REPAIRER	RC	1
WINE BROKER	IR	1
WITH THE RAAF BASE	RC	1
WOOD MACHINIST	RI	1
WOODCUTTER	RA	1
WOOLWORTH EMPLOYEE	EI	1
WORK CARE		1
WORK ON TRUCKS	RI	1
WORK S AT CLAYTON RSL	SC	1
WORKCARE		3
WORKING AT THE GALLERY	SE	1
WORKSHOP FOREMAN	RC	1
WORKSHOP SUPERINTENDENT	ES	1
YARD MANAGER	ES	1
Grand Total		1871