APPENDIX C.

AVAILABILITY OF ALCOHOLIC BEVERAGES AND CRIME: AN EXAMPLE OF THE VALUE OF SOCIAL POLICY RESEARCH

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ABSTRACT

While isolated exceptions can be quoted, rehabilitation or treatment programmes, educational activities, severe penalties or increased intensity of enforcement have not reduced the amount of alcohol-related crime, especially in the long term. By contrast, changes in social policy can satisfy the criteria of being both effective, in the short and long term, and economical in operation. Increases in the availability of alcoholic beverages (lowering the legal minimum drinking age, longer hours of sale of alcoholic beverages, and more liquor outlets) in both Australia and overseas countries have been found to be associated with increases in crime indices. Overseas studies indicate that reducing the availability of alcoholic beverages reduces crime, and in particular traffic accidents. There appears to be no reason to suggest that these benefits would not also apply to Australia if the availability of alcoholic beverages was to be reduced. There is also an urgent need for Australian social policy alcohol research in a number of other areas, and in particular with respect to the alcohol content of beer, advertising of alcoholic beverages, and prices of the various alcoholic beverages. Evaluation of the effectiveness of existing countermeasures in both the health and legal fields should also be given some priority to ensure that resources currently available are being used effectively and efficiently.

1. INTRODUCTION

Traditionally the health approach to the alcohol-related crime problem has been to stress the value of treatment for persons convicted of such offences. While isolated instances of the apparent value of these programmes can be found (e.g., Raymond, 1977; Hamilton *et al.*, 1978), there is an air of realistic despondency about the value of rehabilitation for persons convicted of either drink-driving offences (Nichols *et al.*, 1981; South, 1980) or other alcohol-related crime (Brandsma *et al.*, 1980, Ditman and Crawford, 1966). Because these treatment programmes are inevitably ineffective when carefully evaluated, they are also ineffective in the sense that large sums of money are continually required for their operation. Such a conclusion is especially applicable to programmes catering for persons with advanced alcohol problems.

Frequently the conducting of a wide variety of educational campaigns has been stressed as the panacea for alcohol-related problems. Inevitably the outcome of evaluative studies has been that alcohol education programmes do not achieve their very commendable objective of behaviour change. Such a conclusion applies whether one looks at community level programmes (e.g., Staulcup *et al.*, 1979), or programmes which aim to reduce a specific type of alcohol-related crime, as in the case of drunken driving (Nichols *et al.*, 1981). Particularly if mass media advertising is used, the costs are out of all proportion to the results (e.g., Plant *et al.*, 1979).

In the case of the police and the crinimal justice system it would appear that the emphasis has been on increasing the level of enforcement and on having severe penalties. Ross's (1975) classic "Scandinavian Myth" paper is the standard reference to quote to illustrate that severe penalties do not work in the drink-driving area. At the other end of the scale, the lack of deterrence of the death penalty has also been commented upon, a finding no doubt due at least in part to the fact that in approximately half of the cases of homicide the offender is under the influence of alcohol (Roizon and Schneberk, 1978) emotionally aroused and is concerned only with the immediate. After all, penalties only deter the sober.

As with the treatment approach, some examples can be quoted of drink-driving enforcement programmes having a beneficial effect (e.g., Barmack and Payne, 1964; Cameron *et al.*, 1981). Due to cost considerations such programmes are usually of a blitz type orientation rather than ongoing. Furthermore, presumably alcohol-affected drivers come to perceive that even under the new level of enforcement, their probability of arrest is still remarkably low (e.g., 0.00012 if the blood alcohol level is between 0.05% and 0.09%, Beital *et al.*, 1975). Consequently, the beneficial effects of increased enforcement on drink-driving behaviour is usually of a short term nature.

From the above we may conclude that many of the methods currently used or advocated most frequently by both the health and legal fields to reduce alcohol-related crime suffer from the common deficiencies of ineffectiveness, particularly in the medium to long term, and substantial cost to the Government for little or no return. Clearly, this is an unsatisfactory state of affairs and raises the question as to whether there is not another approach which satisfies the criteria of being both effective and economical in operation.

2. SOCIAL POLICY RESEARCH

Almost it seems as a reaction against the large amount of clinical alcohol research which has been conducted while the alcohol problem has become worse, over the past three to five years there has been a growing awareness of the value of social policy research. Such research can focus on either covert or overt changes in Government policy which are relevant to alcohol problems. As can be seen from Figure 1, from the health-legal point of view that changes can be regarded as either positive or negative, although it is possible that the liquor industry might reverse the signs. The two by two classification in Figure 1 is of some importance if social policy research is to be able to pinpoint what should be done to reduce alcohol-related crime, rather than merely cry over the spilt milk of past negative changes, whether they be of an overt or covert nature.

3. AVAILABILITY OF ALCOHOLIC BEVERAGES

The legacy of Prohibition has been to strongly discourage the use of alcoholic beverage control laws as preventive instruments (Moore, 1981). However, controlling alcohol availability has often been and continues to be suggested as a means of preventing alcohol abuse and alcoholism (Levine, 1978). Indeed, as we will see there is increasing scientific evidence that a middle of the road policy has much to commend it, if we are interested in reducing alcohol-related crime.

The findings of overseas studies and analyses of Australian data of the availability of alcoholic beverages will be used to illustrate the value of social policy research and its potential for reducing the use and abuse of alcohol in Australia, with particular reference to alcohol-related crime.

a. Drinking age

During the seventies a considerable number of American States and Canadian Provinces lowered the legal minimum drinking age at which people could drink in licensed premises or purchase liquor for off-premise consumption. Subsequently a number of these jurisdictions raised their drinking ages. As a detailed literature review is available (Smith, 1983), only a few of the methodological precise studies will be reviewed here.

Douglass *et al.* (1974) conducted a study using a quasi-experimental design to assess the effect of reducing the legal drinking age from 21 to 18 in Vermont, Maine and Michigan.

The Michigan data clearly demonstrated the increase in the accident rate for the 18 to 20 year old drivers, while in Maine the results approached statistical significance. By contrast, no changes were found in Vermont. In a subsequent study it was shown that for Michigan the effect of the reduction in the drinking age measured after the initial 1972 experience appeared to have persisted through to 1975 (Douglass and Freedman, 1977).

A carefully controlled study was conducted by Williams *et al.* (1975) of the lowering of the legal drinking age in Michigan, Wisconsin and Ontario. Data for the three years prior to and the one year after the changes were compared to the contiguous States of Indiana, Illinois and Minnesota where the drinking age had not been lowered during the study period. Significant increases in fatal accident frequences were found for both the 15 to 17 and 18 to 20 year groups in the three experimental States.

A 20% random sample of all reported traffic accidents in Michigan during 1972-79 was analysed by Wagenaar (1981) to determine the effect of the December 1978 *increase* in the legal drinking age from 18 to 21 years. Drivers aged 18 to 20 experienced a significant decrease on both the alcohol-related accident variables, while drivers aged 16 to 17 years also significantly improved on one of the variables. Subsequently Wagenaar (1982a) extended his analysis to include Maine, when the drinking age was raised from 18 to 20 years, and obtained similar results.

The effect of *raising* the legal minimum drinking age on fatal accident involvement was studied by Williams *et al.* (1983) in nine American States and nine control States in which the drinking age remained unchanged during the study period. The results indicated that when States raise their drinking age, there is a decrease in fatal accident involvement among drivers affected by the change. There was also some evidence that raising the drinking age affected younger drivers.

Three roadside surveys of drivers in Washtenaw County, Michigan were conducted as part of evaluation procedures for the Alcohol Safety Action Programme (Clark *et al.*, 1973). Drinking drivers comprised 19% of the sample in 1971, 17% in 1972 and 15% in 1973. Yet, included in the total decrease was a statistically significant increase among 18 to 20 year old drivers from 8% in 1971 (when the drinking age was 21 years), to 12% and 16% in 1972 and 1973 respectively (when the drinking age was 18 years).

These studies show that an increase in the availability of alcoholic beverages in the form of a reduction in the legal drinking age usually, but not always (e.g., Vermont) results in an increase in traffic accidents, and especially fatal accidents of both the new legal drinkers and the age group immediately below. Furthermore, raising the legal minimum drinking age (that is, decreasing the availability) produces the opposite effect. Consequently, on the basis of these overseas studies we may conclude that there exists a causal relationship between the legal minimum drinking age and traffic accidents - an increase in availability causes a significant increase in traffic accidents and vice versa.

Analyses of both South Australian and Western Australian data indicate that the above conclusion is also applicable to Australia with respect to reducing the legal minimum drinking age. South Australia lowered its legal minimum drinking age from 20 to 18 years as from April 8, 1971. From Tables 1 and 2 and Figures 2 and 3 it can be seen that significantly more drivers and motorcyclists in the 16 to 20 year age group were killed and injured in the two years from January 1, 1972 to December 31, 1973 than in the two years prior to December 31, 1970. In comparison to the 21 to 25 year control group, there was a 14.1% increase in the number of 16-20 year old drivers and motorcyclists killed, and a 25.6% increase in the number injured. All the above data was taken from the annual road traffic accident publication of the South Australian Office of the Australian Bureau of Statistics.

In the case of Western Australia the analysis is slightly more complicated as the legal minimum drinking age was lowered from 21 to 18 years at the same time as Sunday alcohol sales were introduced in the metropolitan area. Fortunately,with data from the Western Australian Hospital Morbidity System it has been possible to separate the two effects. Table 3 and Figure 4 show the adverse effect of lowering the drinking age on all types of male traffic accident casualties admitted to public hospitals (codes E810-E819, Eighth Revision, International Classification of Diseases, W.H.O., 1967) in the Perth Statistical Division on weekdays. In comparison to the 21 to 24 year old control group, there was a 20.9% increase in hospital admissions for the 18 to 20 year old males.

The analysis for the Rest of State area (Table 4 and Figure 5) shows that on Saturdays the 21 to 24 year old male age group experienced a 17.1% increase, the 18 to 20 year olds a 39.8% increase, and the 15 to 17 year olds a 73.8% increase in admissions to public hospitals for all types of traffic accident casualties. The finding that the age group immediately below the new legal minimum drinking was also adversely effected is consistent with overseas experience.

Unfortunately, the detrimental effects of the 18 year old drinking age in Western Australia were not restricted to traffic safety. Although the number of cases was small, there was a significant increase in the number of males aged 15 to 20 years admitted to public hospitals in the Perth Statistical Division for homicide and injury purposely inflicted to other persons (codes E961 to E968). Compared to the 21 to 24 year old control group, the increase was 32.7% (Table 5 and figure 6).

The above results appear to indicate the importance of ensuring that the existing 18 year old legal minimum drinking age is enforced and wherever possible increased. In this respect, it should be noted that no less than 15 States in the U.S. raised their drinking age between September 1976 and April 1981 after having lowered it (Wagenaar, 1982b).

b. Hours of sale

The hours of sale in both package stores and public drinking places are now, and have been for many years, widely regulated in the belief that this is an effective control measure (Popham *et al.*, 1976). Research papers have focussed on the extension of trading hours, hours of sale for alcoholic beverages in general, or the introduction of Sunday alcohol sales.

In Victoria on February 1, 1966 the closing time of hotel bars was altered from 6 p.m. to 10 p.m., Monday to Saturday. (Raymond (1969) reported an analysis of the effects of this change on casualty road accidents in the Melbourne metropolitan area. The change in the hotel closing time brought no change in the number or proportion of such accidents which occurred in the 6 p.m. to 11 p.m. period. However, significant changes did occur in the hourly distribution of accidents within the above time period. Of particular note was a sharp decrease in accidents from 6 p.m. to 7 p.m. and an increase from 10 p.m. to 11 p.m. A similar change in the trading hours for New Zealand hotels gave identical results (Toomath and Nguyen, 1974).

Popham (1962) found a correlation between opening hours of beer parlours in Toronto and the hourly pattern of arrests for drunkenness exhibited between 8 a.m., Monday and 8 a.m. the following Sunday. However, when arrests were plotted for the period 8 a.m. Sunday to 8 a.m. Monday, during which time all the beverage outlets were closed, an almost identical pattern emerged. It appears that the opening hours of beer parlours may be important in determining when arrests for drunkenness occur.

A descriptive study was undertaken of the relationship between a number of alcohol availability measures and a range of indices for the use and abuse of alcohol in Michigan from 1970 to 1977 (Douglass *et al.*, 1980). The number of new Sunday sales permits had significant positive correlations with police reports of homicide and assault, and mortality variables for motor vehicle accidents, work accidents and liver cirrhosis. A number of other availability measures also had significant, positive correlations with the above dependent variables. This, together with the failure to include a control area, meant that causalty could not be attributed to the increase in the number of Sunday sales permits for the changes in the dependent variables.

In a recent paper (Smith, 1978) comparisons were made of the number of persons killed and casualty accidents in the three years before and after the introduction of Sunday alcohol sales in the Perth metropolitan area. A significant increase in the proportion of persons killed and the number of casualty accidents on Sundays as compared to the other six days of the week occurred (Tables 6 and 7). For the Rest of State area, where no changes in the alcohol trading hours occurred, no such increases were evident (Tables 8 and 9). It was concluded that the results of the study indicated that the new law had a detrimental effect on traffic safety.

The findings of the Perth study may also be viewed from an economic point of view as distinct from an humanitarian perspective. Troy and Butlin (1971) determined the cost of fatal and injury accidents in the Australian Capital Territory for the 1965-66 year. By adjusting the values Troy and Butlin (1971) obtained by subsequent increases in the Consumer Price Index, it can be estimated that as at March, 1983 the cost of a fatal accident is approximately $190,000.00, while the cost of a casualty accident is approximately $8,500.00. A similar method was used by Andrews (1972) to obtain an estimate of the cost of traffic accidents in Australia as at 1970.

In the three years after the introduction of Sunday alcohol sales in the Perth metropolitan area, there was a 38.9% increase in the number of persons killed on Sundays, compared to the three years before. From July 1, 1970 to June 30, 1982 a total of 290 persons were killed in Sunday traffic accidents in Perth. Thus we may deduce that approximately 113 persons died in the twelve year period as a consequence of the increased availability of alcohol. At $190,000.00 per person, the cost for the 113 persons is approximately $21,500,000.00. For casualty accidents the corresponding figures are 14.7% of 6959 which is 1023 accidents at $8,500 giving a total of approximately $8,700,000.00. In total, therefore, the introduction of Sunday alcohol sales in Perth has cost the Western Australian community an estimated $30,200,000.00 at current prices for only traffic accidents.

As was the case for the lowering of the legal minimum drinking age in Western Australia, the introduction of Sunday alcohol sales also had an adverse effect on male public hospital admissions for homicide and injury purposely inflicted to other persons (codes E961 to E968, W.H.O., 1967). To eliminate any confounding due to the simultaneous lowering of the drinking age, the analysis in Table 10 and Figure 7 was restricted to males over 21 years of age.

As from April 3, 1970 Sunday alcohol sales were permitted within 40 miles of Brisbane. From Table 11 and Figure 8 it can be seen that the number of fatal traffic accidents in the Brisbane City Council area occurring between 12 noon and midnight on Sundays increased by 100%. For casualty accidents the increase of 27.3% was also significant (Table 12 and Figure 9). For both of these analyses the number of the appropriate accidents occuring on the other six days of the week between 12 noon and midnight were used as the control data for the two year before and after periods. Unpublished data supplied by the Brisbane Office of the Australian Bureau of Statistics was used for the calculations.

In November 1978 the Legislative Assembly in New South Wales formed a Select Committee under the chairmanship of E.N. Quinn (1979) to inquire into liquor trading hours in that State. The following quotation illustrates how the Committee overcame the findings of the study by Smith (1978):-

> "This Committee believes that the drinking sessions, introduced in Perth, could reproduce the 'swill' conditions, familiar in New South Wales in the 6.00 o'clock closing days, and is confirmed in this belief by its observation of the sessional Sunday drinking on the Gold Coast area of Queensland".

The Committee then recommended that a ten hour session be introduced on Sundays and stated that it did not consider that the new Sunday trading would bring about an increase in the per capita consumption. Furthermore, the Committee stated that:-

> "The absence of sessional drinking is an additional factor leading to the conclusion that existing traffic problems are unlikely to be aggravated by our recommendations on Sunday trading hours".

Unfortunately, empirical data does not support the reasoning of the Select Committee. As can be seen from Table 13 and Figure 10, in 1980 and 1981 there was a significant increase in the number of persons killed on Sundays between 12 noon and midnight compared to 1978 and 1979. In comparison to the other six days of the week the increase was 28.5%, or 32 fatalities per annum which represents an annual cost to the New South Wales community of approximately $6,000,000.00. For casualty accidents the results were also significant (Table 14 and Figure 11), with the 8.2% increase representing 185 casualty accidents per annum or approximately $1,600,000.00 at current prices per year. The accident data for the above analysis was taken from Supplements to the annual Statistical Statement issued by the Traffic Accident Research Unit.

From a theoretical point of view, the results of the introduction of Sunday hotel alcohol sales in New South Wales are quite important for they show that if alcohol is already available (that is, sold by clubs) and is made more available, then the community will experience an adverse effect over and above that already existing.

If the Australian community is concerned about the above results of the introduction of Sunday alcohol sales in Perth, Brisbane and New South Wales, then the paper by Poikolainen (1982) is reassuring. Concerned about growing alcohol problems, the availability of alcohol was experimentally restricted in Finland by not opening the retail shops on Saturdays during the summer months of 1978. Total consumption of alcohol decreased by an estimated 3.2% and public drunkenness also appeared to decrease.

For some time now the Ledermann Curve has been looked upon with favour as the model to explain alcohol consumption. Basically, the Ledermann Curve asserts that within the community there is a single unimodal curve of consumption which has a lognormal distribution. To date the interpretation placed on the curve has been that if one wishes to reduce the number of drinkers above any level, one has to only reduce the mean per capita consumption. Certainly this is one way of presumably reducing excessive alcohol consumption, but it appears that the possibility of changing the shape of the distribution or curve has been overlooked. If we can identify the type of beverage, place of drinking or time of drinking of the people with the at risk level of consumption, perhaps we can intervene to advantage.

To illustrate, the results analysis has just been completed for a study in Perth which sought to determine whether permitting selected hotels or taverns to open early (e.g., 6 a.m. or 7 a.m.) rather than at 10 a.m. had an adverse effect. A group of 72 men who patronised early opening hotels were interviewed before 10 a.m., and a control group of 87 men were interviewed as soon as they entered nearby hotels with 10 a.m. openings. The

two groups were very similar on biographical characteristics, yet the men in the early opening group scored significantly higher on the Short Form of the Michigan Alcoholism Screening Test (SMAST, Selzer *et al.*, 1975) and had significantly higher levels of alcohol consumption. It appears that the early opening hours was facilitating problem drinking.

Similarly, if we were to ascertain the drinking habits of people convicted of alcohol-related crime and find that such people were over-represented amongst hotel patrons leaving at closing time, then closing hotels an hour earlier could have a very beneficial effect in reducing the alcohol consumption of our target group. Because such a policy change would presumably pose little inconvenience to the majority of the population, who are not problem drinkers, one could even suggest that research findings in the area of hotel closing times might have some chance of being implemented.

c. Number of liquor outlets

Some studies of the changes in the number of liquor outlets have included crime indices, although per capita consumption has been the most frequent dependent variable.

The number of supermarkets with off-premise licenses in England and Wales increased substantially from 1966, as did the number of convictions for drunkenness for persons under 18 years of age and women under 30 years of age. Williams (1975) also presented data showing that in the Police Districts with the greatest increase in the number of supermarket off-premise licenses, the increase in drunkenness offences for persons under 18 years was significantly greater. Greater accessibility for women and increased impulse buying could be important factors in determining supermarket alcohol sales (Smart, 1974).

In the Michigan study (Douglass *et al.*, 1980) it was found that the number of new on-premise outlets had significant positive correlations with traffic accident mortality, homicide and assault data. The traffic accident variable also had a significant correlation with the number of new off-premise licenses. However, the descriptive nature of the study means that causalty cannot be attributed to the changes in availability of alcoholic beverages.

The number of liquor store employees per 100 000 persons was used by Parker and Wolz (1979) as their index of off-premise availability. It was a significant predictor of current tangible consequences (respondent's alcohol-related problems with spouse, relatives, friends, job, police, finances and health), but not alcoholism rates or frequent heavy drinking. The index was directly associated with current tangible consequences when per capita income and urbanism were controlled.

Donnelly (1978) correlated per capita liquor store sales for the population aged 15 years and over for the 67 counties in Pennsylvania with the total number of arrests for drunkenness, driving under the influence, liquor law violations and disorderly conduct per 100 000 population aged 15 years and over. The two

variables had a correlation of 0.50. Similar results were obtained by Lumsden (1983) when he correlated per capita liquor licensing fees from licensed victuallers for the eleven statistical divisions in Queensland with drink-driving appearances and Court appearances for assault and drunkenness (Spearman rank correlation co-efficients = 0.55, 0.84 and 0.71 respectively). The per capita alcohol consumption in the 24 counties and three largest towns in Sweden as at 1976 was correlated by Norstrom (1981) with the number of drink-driving convictions in each area, expressed as a fraction of the number of licensed drivers. For driving with a blood alcohol concentration of 0.15% or more, the correlation with per capita consumption was 0.73, while for convictions resulting from a blood alcohol concentration of between 0.05% and 0.15%, the correlation was 0.47. For the 1950-1976 period the Royal College of Psychiatrists Special Committee (1979) obtained a correlation of 0.91 between per capita consumption and convictions for drunkenness. A cross-sectional analysis by Rabow and Watts (1982) also gave similar results for the 51 Counties in California. In view of these five studies the question arises as to what evidence there is that the number of liquor outlets affects per capita consumption, and hence alcohol-related crime.

Papers by Loeb (1978) and Barnes and Borgeouis (1977) reported a positive relationship between the number of liquor stores and consumption of spirits and wine. The total number of on-premise and off-premise licences also appears to be positively related to per capita consumption (Magruder, 1976; Parker *et al.*, 1978; McGuinness, 1980; Colon, 1981; Colon *et al.*, 1981). Although not beyond methodological criticism, these studies indicate that the number of alcohol outlets may be a factor in determining the level of alcohol-related crime. This conclusion may also apply in other cultural settings. A Mombasa study (Wasikhongo, 1976) showed a direct relationship between the number of drinking compounds and the number of assaults.

The problem of determining the direction of the apparent causation has been commented on by a number of researchers (e.g., Douglass *et al.*, 1980; Colon, 1981; McGuinness, 1980). Does increased availability cause the increased use and abuse of alcohol, or does the demand for more alcohol lead to more alcohol outlets? Alternatively, perhaps a third variable (e.g., increasing urbanisation, Brenner, 1980) increases the demand and simultaneously facilitates the provision of more licensed premises.

To answer this question a large study is currently being undertaken in Perth. From Table 15 can be seen that as from 1970 to 1982 there was a considerable increase in the number of liquor outlets in Western Australia. The relationship between this increase and per capita consumption, mortality, morbidity and alcohol-related crime will be determined and then compared to similar analyses for Queensland where the number of liquor outlets has been more stable (Table 15). The use of Queensland as a control State within a quasi-experimental design should enable some very interesting results to be obtained, and if a significant difference is found between the two States, for a causal interpretation to be placed on the findings.

4. ALCOHOL CONTENT OF BEER

The availability of alcoholic beverages is by no means the only area in which social policy research can and should be undertaken with a view to reducing alcohol-related crime. As will be seen, the topic of the alcohol content of beer has intriguing possibilities.

In a number of Australian States breweries have, of their own accord, marketed a low alcohol beer which has approximately 20% less alcohol than the standard beer. With the exception of South Australia, the price of the low alcohol and standard beer is the same. In the case of South Australia, as from January 1, 1982 the license fee for low alcohol beer was only 2% as compared to 9% for regular beer.

Data available indicates that the low alcohol beer has not achieved any degree of market penetration in draught form, but it does account for 8-13% of packaged beer sales. A small study conducted in Perth in 1980 indicates that purchases of the low alcohol beer in liquor stores were the converted in the sense that they had significantly lower SMAST (Selzer *et al.*, 1975) scores and spent less money each week on alcohol than age and sex matched purchasers of normal beer in the same liquor stores.* The implication, as far as alcohol-related crime is concerned, is that the introduction of the various low alcohol beers has been a non-event.

Let us therefore consider the implications for alcohol-related crime if the maximum alcohol content of beer permitted to be sold in Australia was to be reduced to that of the low alcohol beers currently available (approximately 3.7% by volume).

Between January, 1972 and December, 1981 post mortem blood alcohol levels were assessed for 1025 drivers killed in traffic accidents in Western Australia (Reports of the Government Chemical Laboratories, 1972 to 1981). From column ii in Table 16 we need to deduct a proportion to allow for the drivers who presumably would have been drinking wine and spirits. As at 1976-77, the midpoint of the distribution, at a national level wine and spirits accounted for 34% of total litres of alcohol consumed (Commonwealth Department of Health, 1979). Having made the necessary adjustment (column iii), we can now use the Grand Rapids study** (Borkenstein *et al.*, 1974) to arrive at an accident involvement index for each blood alcohol level category if the drivers consumed normal neer or low alcohol beer. Two assumptions should be noted at this point: firstly, due to the shape of the Grand Rapids curve it has been assumed that no reduction in the accident involvement index would have occurred for drivers with a blood alcohol level of 0.05% or less; secondly, as 0.150% was the highest blood alcohol level for which Borkenstein *et al.* (1974) provided an accident involvement index, all drivers with

* A summary of the study is to be found on page 9 of the November, 1981 issue of *Connexions*.

* The Grand Rapids study was used in preference to the only Australian controlled study (McLean and Holubowycz, 1981) as the former had considerably larger samples and also gave lower accident involvement indices, thus leading to more conservative estimates of potential reductions in alcohol-related crime.

a blood alcohol level of 0.150 or more were assumed to be at this level. From the Table, it can be seen that the accident involvement index at blood alcohol level of 0.15% is 111, whereas at a blood alcohol level 20% lower (0.12%) it is only 82. Working on the assumption that 82/111 of the 241 drivers with the reduced blood alcohol level would still have been killed, there is a saving of 63 drivers. Over all the blood alcohol levels, the total hypothesised saving is 89 drivers, or 25.7% of all the beer-affected drivers with a blood alcohol level of 0.151% or more. However, if expressed as a percentage of all drivers killed in the ten year period, the saving is only 8.7%.

While we do not know the blood alcohol level distributions for other types of alcohol-related crime, we do know from Roison and Schneberk's (1978) review that alcohol is a factor in about 50% of homicides, from 24 to 72% of assaults, 65% of the rape situations involving a white offender and a white victim (Amir, 1967), and 7 to 12% of robbery and burglary offenders. Recently, Jeffs and Saunders (1983) found that 41% of their theft offenders and 26% of their burglars reported alcohol intake in the four hours prior to the commission of their offence. If the blood alcohol level distribution for the alcohol affected offenders in these crimes is similar to that of killed and injured drivers admitted to hospital, then we can postulate that similar reductions might also be experienced in these areas of criminal activity. However, the reductions would only be in relationship to the proportion of the various offences which are beer-related.

The standard criticisms of lowering the alcohol content of beer are relatively easily dealt with. In a small study, Milner (1979) showed that beer drinkers cannot tell if they are drinking low alcohol or regular beer. For a drinker to achieve the same level of intoxication he or she would need to consume 20% more fluid and thus spend 20% more, an unlikely event for as we will see below (Section 7) price is an important determinant of consumption. The problem of beverage substitution would be eliminated if wine was to be taxed at an appropriate rate.

While the proposal would require a far more detailed analysis than that undertaken here, there does not appear to be any education or treatment programme, increase in enforcement or penalties which has the potential to bring about such a reduction in alcohol-related crime as lowering the alcohol content of regular beer, especially at no cost to the State or Federal Governments.

5. DRINK-DRIVING

No alcohol social policy research paper would be complete without reference to the area of drink-driving. While random breath testing

is currently attracting the limelight in this area, it should be remembered that there are numerous countermeasures which can be implemented.

The countermeasure which will be used to illustrate the value of social policy research in this area is that of the reduction from 0.08% to 0.05% in the legal blood alcohol level for driving in New South Wales. The operative date for the lower blood alcohol level was December 15, 1980.

A feature of young drivers is that they are particularly vulnerable to small amounts of alcohol (Zylman, 1973), with the implication that the reduced blood alcohol level was especially likely to result in less accidents for 17-20 year old drivers. The power of the analysis can also be increased by restricting it to males admitted to hospital due to the lower levels of alcohol found in female drivers and less severe casualty accidents. Male car drivers aged 30 years or more admitted to hospital were used as a within State control group. The 20-29 year age group was omitted as the reduced blood alcohol level would presumably have less relevance due to the experience of these drivers.

From Table 17 it can be seen that in 1981 significantly less male car drivers aged 17-20 years were admitted to hospital in New South Wales than in the preceding year. In comparison to the control group, there was a 13.9% accident reduction, with the 106 accidents representing a saving to the New South Wales community of an estimated $901,000.00 at current prices.

The above result indicates that the requirement in Tasmania that provisional drivers should not drive with any alcohol in their blood, and the Western Australian 0.02% blood alcohol limit for provisional drivers, could also be having a beneficial effect in reducing casualty accidents.

6. ADVERTISING OF ALCOHOLIC BEVERAGES

As noted above (Section 3c), alcohol-related crime has a significant positive relationship with per capita consumption. Consequently we can expect that any initiative which reduces per capita consumption will also have a beneficial effect on the amount of alcohol-related crime.

One area in which there is a particular pressing need for social policy research is that of the effect on consumption of the advertising of alcoholic beverages. The liquor industry steadfastly maintains that advertising is only aimed at beverage and brand changing, while the health people equally strongly assert that advertising does increase consumption, irrespective of whether brand and beverage changing also results.

The liquor industry can quote studies in support of its stand (e.g., Ogborne and Smart, 1980), while the health sector can do the same (e.g., McGuinness, 1980). However, when the studies are critically examined from a methodological viewpoint it could be said they merely indicate that the conducting of research in this area is difficult,

and that a well controlled study of the effect of advertising on consumption is required. If it is found that advertising does increase consumption, then in view of the expenditure on alcohol advertising, its elimination could have important implications for reducing consumption and hence, alcohol-related crime.

It is possible that the advertising-consumption issue is not as clear cut as each side makes out. For instance, some advertising might increase consumption by recruiting new drinkers, while advertising aimed at older people possibly only affects brand and beverage preferences, as these people established their drinking habits early in life.

7. PRICE

It is now clear that alcohol behaves like other commodities in the sense that price increases reduce consumption, although the elasticities for beer, wine and spirits are different (Ornstein, 1980). At the national level we need to know the effect on consumption, and hence alcohol-related crime, of the tendency for the price of alcohol to become less in comparison to, say, the average weekly wage. At the State or Territory level there is the opportunity to document the effect of changes in liquor licensing fees. Recently, Cook (1981) exmained changes in liquor taxes among 30 license states in the U.S. between 1961 and 1975 in order to ascertain whether state liquor tax increases led to statistically discernible changes in consumption, liver cirrhosis mortality and traffic accident deaths. The results indicated that even relatively small changes in prices may have an effect on decreasing consumption, and in particular, those portions of total consumption associated with the above two indices.

8. EVALUATION

Unfortunately, while programme evaluation has often been advocated (e.g., Senate Standing Committee on Social Welfare, 1977), relatively little of it has actually occurred in the alcohol field in Australia. There is a need to evaluate the effectiveness of existing counter-measures in both the health and legal fields to ensure that the resources currently available to combat alcohol-related crime are being used effectively and efficiently.

Some people are possibly deterred from evaluating because of the possibility of obtaining insignificant results. To those people the point should be made that it is possible to have programmes in the alcohol-crime area which can withstand the scruting of scientific evaluation. Jeffs and Saunders (1983) showed that alcohol-related offences may be minimised by the enforcement of the existing licensing legislation. In the case of treatment programmes, for this paper a re-analysis was undertaken of that part of the data base of the Serenity Lodge evaluation study (Smith, 1983) applicable to persons in both the treatment and control groups who had contact with the Police in the month prior to entering the study. During the follow-up period the treatment group consumed significantly less alcohol and had significantly less convictions for drunkenness and disorderly behaviour. As noted in the Introduction, papers by Raymond (1977) and Hamilton *et al.* (1978) also indicate that some treatment programmes

for persons convicted of alcohol-related crime are of value.

9. IMPLEMENTATION

Even if the necessary social policy research is conducted and results obtained indicating that alcohol-related crime can be reduced by the implementation of the recommendations, the necessary legislative and fiscal changes may still not occur. Regrettably, but realistically, there appears to be considerable public ignorance as to the adverse effects of alcohol within Australia (e.g., Henderson and Freedman, 1979) with the consequence that there is little community pressure for implementation of findings from social policy research. There is a need for education programmes aimed at the non-problem drinkers which impart factual information on the adverse effects of alcohol and promote favourable attitudes towards reduced alcohol consumption. These are tasks which enlightened educational practises can achieve (Dorn, 1977; Goodstadt *et al.*, 1982), even though they will not affect the behaviour of problem drinkers who will, it is presumed, be encouraged to alter their drinking habits as a result of the social policy changes (Hochheimer, 1981).

10. CONCLUSIONS

(i) While isolated exceptions can be quoted, rehabilitation or treatment programmes, educational activities, severe penalties or increased intensity of enforcement have not reduced the amount of alcohol-related crime, especially in the long term. By contrast, changes in social policy can satisfy the criteria of being both effective, in the short and long term, and economical in operation.

(ii) Increases in the availability of alcoholic beverages (lowering the legal minimum drinking age, longer hours of sale of alcoholic beverages, and more liquor outlets) in Australia and overseas countries have been found to be associated with increases in crime indices.

(iii) Overseas studies indicate that reducing the availability of alcoholic beverages reduces crime, and in particular traffic accidents. There appears to be no reason to suggest that these benefits would not also apply to Australia if the availability of alcoholic beverages was to be reduced.

(iv) There is also an urgent need for Australian social policy alcohol research in a number of other areas, and in particular with respect to the effect on consumption and hence alcohol-related crime of the alcohol content of beer, advertising of alcoholic beverages, and prices of the various alcoholic beverages.

(v) Evaluation of the effectiveness of existing countermeasures in both the health and legal fields should also be given some priority to ensure that resources currently available are being used effectively and efficiently.

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TABLE 1

SUMMARY OF ANALYSIS OF VARIANCE FOR THE EFFECT ON DRIVERS AND MOTORCYCLISTS KILLED OF THE LOWERING OF THE DRINKING AGE IN SOUTH AUSTRALIA FROM 20 TO 18 YEARS

Source of variation	S.S.	d.f.	Var. est.	F
Time	15.125	1	15.125	0.608
Age	630.125	1	630.125	25.332**
Age x Time	78.125	1	78.125	3.141
Within	99.500	4	24.875	
Total	822.875	7		

** p. < 0.01

TABLE 2

SUMMARY OF ANALYSIS OF VARIANCE FOR THE EFFECT ON DRIVERS AND MOTORCYCLISTS INJURED OF THE LOWERING OF THE DRINKING AGE IN SOUTH AUSTRALIA FROM 20 TO 18 YEARS

Source of variation	S.S.	d.f.	Var. est.	F
Time	318003.12	1	318003.12	11.301*
Age	1131760.12	1	1131760.12	40.218**
Age x Time	107880.13	1	107880.13	3.834
Within	112561.50	4	28140.38	
Total	1670204.87	7		

* p. < 0.05 ** p. < 0.01

TABLE 3

SUMMARY OF ANALYSIS OF VARIANCE FOR THE EFFECT OF LOWERING THE DRINKING AGE FROM 21 TO 18 YEARS ON THE NUMBER OF ALL TYPES OF MALE TRAFFIC ACCIDENT CASUALTIES ADMITTED TO PUBLIC HOSPITALS IN THE PERTH STATISTICAL DIVISION ON WEEKDAYS

Source of variation	S.S.	d.f.	Var. est.	F
Time	24.2	1	24.2	0.334
Age	500.0	1	500.0	6.897*
Age x Time	405.0	1	405.0	5.586*
Within	1160.0	16	72.5	
Total	2089.2	19		

* p. < 0.05

TABLE 4

SUMMARY OF ANALYSIS OF VARIANCE FOR THE EFFECT OF LOWERING THE DRINKING AGE FROM 21 TO 18 YEARS ON THE NUMBER OF ALL TYPES OF MALE TRAFFIC ACCIDENT CASUALTIES ADMITTED TO PUBLIC HOSPITALS IN THE REST OF STATE ON SATURDAYS

Source of variation	S.S.	d.f.	Var. est.	F
Age	999.27	2	499.64	8.409**
Time	448.54	1	448.54	7.549*
Age x Time	54.07	2	27.03	0.455
Within	1426.00	24	59.42	
Total	2927.88	29		

* p. < 0.05 ** p. < 0.01

TABLE 5

SUMMARY OF ANALYSIS OF VARIANCE FOR THE EFFECT OF LOWERING THE DRINKING AGE FROM 21 TO 18 YEARS ON THE NUMBER OF MALES ADMITTED TO PUBLIC HOSPITALS IN THE PERTH STATISTICAL DIVISION ON MONDAYS TO SATURDAYS WITH A DIAGNOSIS OF E961 TO E968

Source of variation	S.S	d.f.	Var. est.	F
Age	28.8	1	28.8	4.881*
Time	16.2	1	16.2	2.746
Age x Time	5.0	1	5.0	0.848
Within	94.8	16	5.9	
Total	144.8	19		

* $p. < 0.05$

TABLE 6

TRAFFIC ACCIDENT FATALITIES IN THE PERTH STATISTICAL DIVISION BEFORE AND AFTER THE INTRODUCTION OF SUNDAY ALCOHOL SALES

Period	Sunday	Rest of week	Total
Before	50	403	453
After	82	404	486
Total	132	807	939

$\chi^2 = 6.134$, d.f. = 1, $p. < 0.05$

TABLE 7

CASUALTY ACCIDENTS IN THE PERTH STATISTICAL DIVISION BEFORE AND AFTER THE INTRODUCTION OF SUNDAY ALCOHOL SALES

Period	Sunday	Rest of week	Total
Before	1439	10159	11598
After	1690	10180	11870
Total	3129	20339	23468

$\chi^2 = 16.85$, d.f. = 1, $p. < 0.001$

TABLE 8

TRAFFIC ACCIDENT FATALITIES IN THE REST OF STATE AREA BEFORE AND AFTER THE INTRODUCTION OF SUNDAY ALCOHOL SALES IN THE PERTH STATISTICAL DIVISION

Period	Sunday	Rest of week	Total
Before	91	415	506
After	91	433	524
Total	182	848	1030

$\chi^2 = 0.032$, d.f. = 1, N.S.

TABLE 9

CASUALTY ACCIDENTS IN THE REST OF STATE AREA BEFORE AND AFTER THE INTRODUCTION OF SUNDAY ALCOHOL SALES IN THE PERTH STATISTICAL DIVISION

Period	Sunday	Rest of week	Total
Before	579	2367	2946
After	630	2798	3428
Total	1209	5165	6374

$\chi^2 = 1.595$, d.f. = 1, N.S.

TABLE 10

SUMMARY OF ANALYSIS OF VARIANCE FOR THE EFFECT OF INTRODUCING SUNDAY ALCOHOL SALES ON THE NUMBER OF MALES OVER THE AGE OF 21 YEARS ADMITTED TO PUBLIC HOSPITALS IN THE PERTH STATISTICAL DIVISION WITH A DIAGNOSIS OF E961 TO E968

Source of variation	S.S.	d.f.	Var. est.	F
Day	2714.45	1	2714.45	74.985***
Time	149.25	1	149.25	4.123
Day x Time	8.05	1	8.05	0.222
Within	579.20	16	36.20	
Total	3450.95	19		

*** p. < 0.001

TABLE 11

SUMMARY OF ANALYSIS OF VARIANCE FOR THE EFFECT OF INTRODUCING SUNDAY ALCOHOL SALES WITHIN 40 MILES OF BRISBANE ON THE TOTAL NUMBER OF FATAL TRAFFIC ACCIDENTS FROM 12 NOON TO MIDNIGHT IN THE BRISBANE CITY COUNCIL AREA

Source of variation	S.S.	d.f.	Var. est.	F
Day	3570.06	1	3570.06	152.567***
Time	7.56	1	7.56	0.323
Day x Time	5.06	1	5.06	0.216
Within	280.75	12	23.40	
Total	3863.43	15		

*** p. < 0.001

TABLE 12

SUMMARY OF ANALYSIS OF VARIANCE FOR THE EFFECT OF INTRODUCING SUNDAY ALCOHOL SALES WITHIN 40 MILES OF BRISBANE ON THE TOTAL NUMBER OF CASUALTY ACCIDENTS FROM 12 NOON TO MIDNIGHT IN THE BRISBANE CITY COUNCIL AREA

Source of variation	S.S.	d.f.	Var. est.	F
Day	25157097.8	1	25157097.8	2081.008***
Time	16516.5	1	16516.5	1.366
Day x Time	306.3	1	306.3	0.025
Within	338489.9	28	12088.9	
Total	25512410.5	31		

*** p. < 0.001

TABLE 13

SUMMARY OF ANALYSIS OF VARIANCE FOR THE EFFECT ON INTRODUCING SUNDAY HOTEL SALES IN NEW SOUTH WALES ON THE TOTAL NUMBER OF TRAFFIC ACCIDENT FATALITIES FROM 12 NOON TO MIDNIGHT

Source of variation	S.S.	d.f.	Var. est.	F
Day	773146.1	1	773146.1	426.070***
Time	2211.1	1	2211.1	1.219
Day x Time	5565.1	1	5565.1	3.070
Within	7258.5	4	1814.6	
Total	788180.8	7		

*** p. < 0.001

TABLE 14

SUMMARY OF ANALYSIS OF VARIANCE FOR THE EFFECT OF INTRODUCING SUNDAY HOTEL SALES IN NEW SOUTH WALES ON THE NUMBER OF NON-FATAL CASUALTY ACCIDENTS FROM 12 NOON TO MIDNIGHT

Source of variation	S.S.	d.f.	Var. est.	F
Day	363272535.0	1	363272535.0	1049.338***
Time	7503.0	1	7503.0	0.022
Day x Time	26797.0	1	26797.0	0.774
Within	1384769.0	4	346192.0	
Total	364691604.0	7		

*** p. < 0.001

TABLE 15

NUMBER OF LIQUOR LICENCES IN WESTERN AUSTRALIA AND QUEENSLAND AS AT JUNE 30, 1970 AND JUNE 30, 1982

Type of Liquor Licence	No. of licences in W.A.			No. of licences in Qld.		
	1970	1982	% increase	1970	1982	% increase
Hotel & Tavern	459	574	25%	1086	1049	-3%
Club	259	328	27%	546	732	34%
Restaurant	41	215	424%	87	457	425%
Store	220	336	53%	-	-	-
All other	130	237	82%	473	540	14%
Total	1109	1690	52%	2192	2778	27%

Source: Annual Reports of the Queensland Licensing Commission (1970, 1982) and of the Licensing Court of Western Australia (1970, 1982).

TABLE 16

POTENTIAL REDUCTION IN THE NUMBER OF DRIVERS KILLED WITH LOW ALCOHOL BEER

BAL category of drivers killed (i)	No. of drivers killed (ii)	Less drivers not affected (iii)	AII for midpoint of BAL category in column i (iv)	New BAL (.8 of midpoint of BAL category in column i) (v)	AII for BALs in column v (vi)	Est. no of drivers saved (vii)
0.000	437	-	-	-	-	-
0.001-0.050	63	-	-	-	-	-
0.051-0.079	24	16	18	.052	7	10
0.080-0.099	34	22	59	.072	21	14
0.100-0.149*	101	67	87	.100	85	2
0.150+	366	241	111	.120	82	63
TOTAL	1025	346	-	-	-	89

* Maximum BAL with an Accident Involvement Index (AII)

TABLE 17

MALE CAR DRIVERS ADMITTED TO HOSPITAL IN N.S.W. BEFORE AND AFTER THE INTRODUCTION OF THE 0.05% BLOOD ALCOHOL LEVEL

Age of drivers	1980 - BAL of 0.08%	1981 - BAL of 0.05%	Total
17 - 20 years	761	680	1441
30+ years	1175	1213	2388
Total	1936	1893	3829

$X^2 = 4.53$, d.f. = 1, p. < 0.05

Source: Table 4, Supplements to 1980 and 1981 Statistical Statements, Traffic Accident Research Unit.

FIGURE 1

EXAMPLES OF RECENT ALCOHOL SOCIAL POLICY CHANGES CLASSIFIED ACCORDING TO WHETHER THEY ARE OVERT OR COVERT AND POSITIVE OR NEGATIVE FROM A HEALTH-LEGAL POINT OF VIEW

	Overt	Covert
Positive	Random breath testing 0.08% reduced to 0.05% Hospital blood alcohol tests for traffic accident casualties Restricted or dry areas in the Northern Territory	Statutory maximum number of hotel licenses in Queensland
Negative	Lowering the drinking age Introducing Sunday alcohol sales Early opening hours for some hotels in W.A.	Price of alcohol decreasing relative to inflation Alcohol advertising Increased liquor licenses in W.A.

FIGURE 2

PROFILE FOR THE EFFECT ON DRIVERS AND MOTORCYCLISTS KILLED OF THE LOWERING OF THE DRINKING AGE IN SOUTH AUSTRALIA FROM 20 TO 18 YEARS

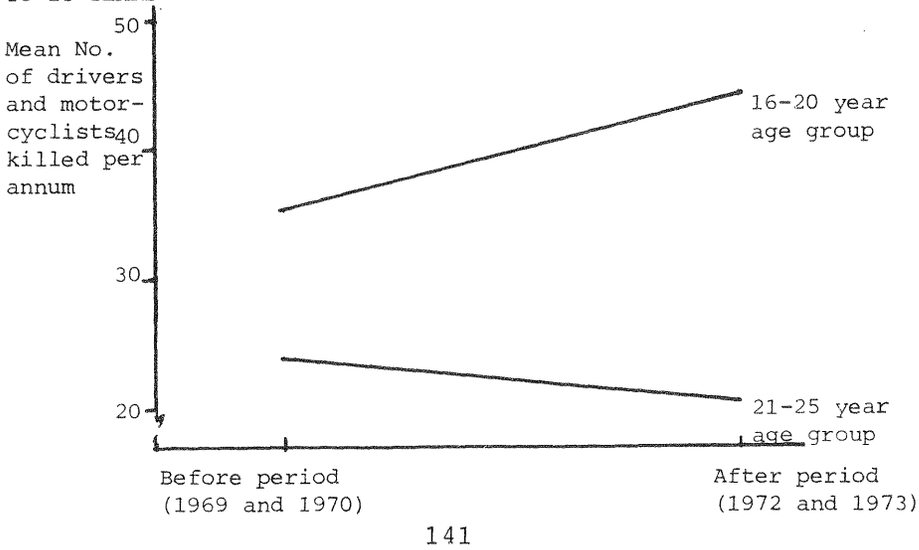

FIGURE 9

PROFILE FOR THE EFFECT OF INTRODUCING SUNDAY ALCOHOL SALES WITHIN 40 MILES OF BRISBANE ON THE TOTAL NUMBER OF CASUALTY ACCIDENTS FROM 12 NOON TO MIDNIGHT IN THE BRISBANE CITY COUNCIL AREA

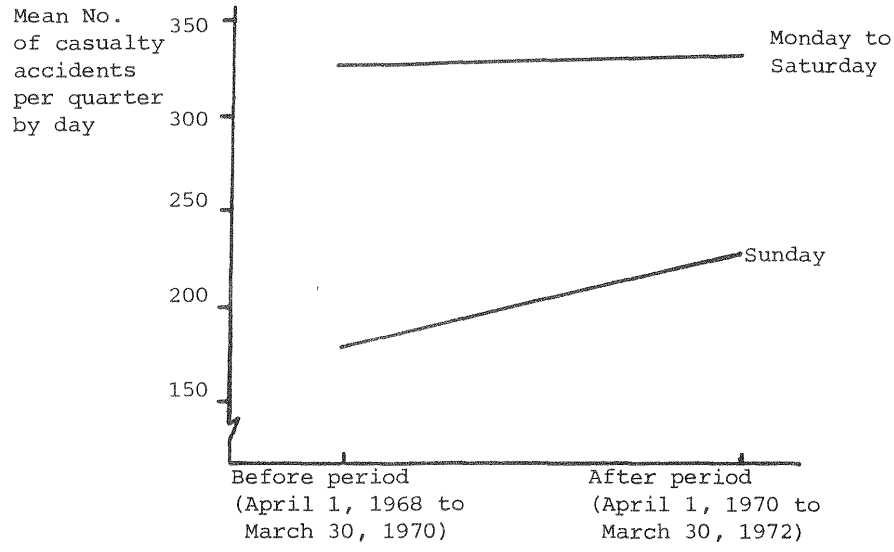

FIGURE 10

PROFILE FOR THE EFFECT OF INTRODUCING SUNDAY HOTEL SALES IN NEW SOUTH WALES ON THE TOTAL NUMBER OF TRAFFIC ACCIDENT FATALITIES FROM 12 NOON TO MIDNIGHT

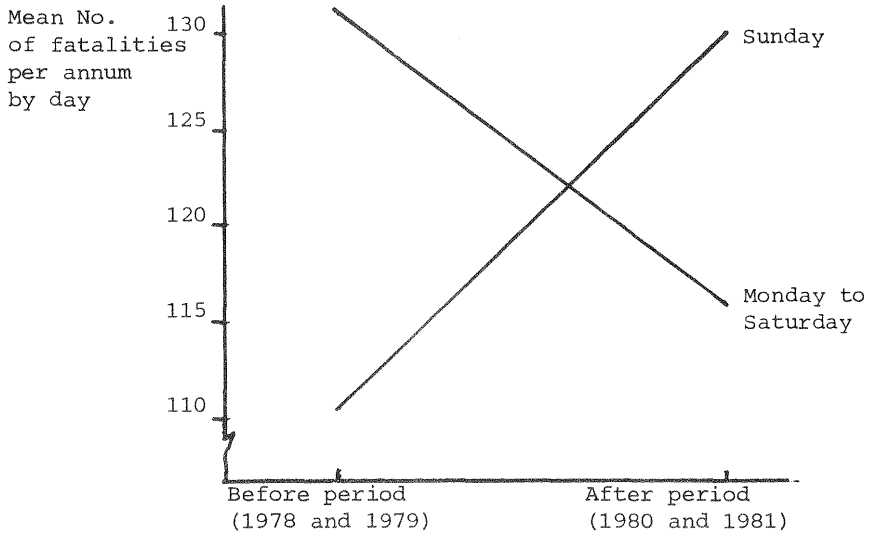

FIGURE 11

PROFILE FOR THE EFFECT OF INTRODUCING SUNDAY HOTEL SALES IN NEW SOUTH WALES ON THE NUMBER OF NON-FATAL CASUALTY ACCIDENTS FROM 12 NOON TO MIDNIGHT