

Alcohol Misuse and Juvenile Offending in Adolescence

Running Head: Alcohol Misuse and Juvenile Offending

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Abstract

The associations between alcohol misuse and juvenile offending during the period from 15 to 16 years were studied in a birth cohort of New Zealand adolescents. This analysis showed that young people who misused alcohol had significantly ($p < .001$) higher rates of both violent and property offences. These associations were similar for males and females. Further analysis suggested that a substantial component of the association between alcohol misuse and juvenile offending arose from shared risk factors that were common to both outcomes. These risk factors included measures of family social background, family and parental characteristics, individual characteristics and adolescent peer affiliations. After adjustment for antecedent risk factors there was no significant association between alcohol misuse and odds of property offences. However, young people who abused alcohol had odds of violent offending that were 3.2 times ($p < .001$) the odds of those offences for young people who did not misuse alcohol. It is concluded: a) that a large component of the association between alcohol misuse and juvenile offending arises because of the effects of shared risk factors that are associated with both outcomes; b) nonetheless, the unexplained association between alcohol misuse and violent offending may suggest the presence of a direct cause and effect association in which adolescent alcohol misuse is associated with increased risks of violent offending.

Introduction

It is commonly believed that heavy alcohol consumption by adolescents and young adults leads to increased risks of offending amongst this group. This view is generally supported by evidence that suggests that individuals who engage in heavy, frequent or abusive drinking are at greater risk of offending (1-8). For example, in an analysis of a birth cohort of New Zealand children studied to the age of 15 years, Fergusson et al (4) reported that individuals who engaged in frequent, heavy or abusive drinking had rates of officially recorded offending that were between 2.3 to 4.2 times higher than teenagers who did not engage in such drinking.

The linkages between teenage alcohol consumption and juvenile offending may, however, be explained in a number of ways. First, it may be suggested that the association between alcohol use and offending reflects a direct cause and effect linkage in which alcohol misuse leads to increased risks of juvenile offending (8). This could arise because of the psycho-pharmacological effects of alcohol, including disinhibition, cognitive perceptual distortions and from situational factors which accompany the use of alcohol (9). The view that there may be a direct cause and effect association between alcohol misuse and delinquency is generally supported by the findings of experimental studies which have shown in controlled settings that rates of antisocial (and particularly aggressive) behaviours tend to increase with increasing alcohol consumption (for reviews of this evidence see (10, 11, 12). However, it is by no means self-evident that associations that can be demonstrated in the laboratory necessarily persist in less controlled environments outside the laboratory.

An alternative explanation of the comorbidity of alcohol misuse and offending behaviours is that this association arises because of common causal factors or sources of vulnerability that are associated with both increased risks of alcohol misuse in adolescence and increased risks of juvenile offending. Two lines of evidence support the view that the

associations between alcohol misuse and offending may reflect the presence of common causal factors influencing both outcomes rather than a direct cause and effect association. First, the research literature on both alcohol misuse and offending has identified a large number of risk factors that appear to be similar or to overlap. These factors include measures of family environment and family functioning (13,14), parental characteristics and substance use behaviours (15-18), peer influences (15,19-21), and individual characteristics including intelligence and early behavioural tendencies (22-25).

To the extent that the causal factors associated with the development of alcohol abuse and with the development of offending are correlated or overlap, it seems plausible to assume that some component of the correlation between alcohol misuse and juvenile offending arises because the risk factors and life pathways which predispose young people to alcohol abuse have much in common with the risk factors and life pathways involved in the development of juvenile offending.

The second line of evidence which suggests that the correlation between alcohol misuse and juvenile offending may reflect common causal factors rather than a direct causal relationship comes from Problem Behaviour Theory (1,5). The essential assumption of this theory is that the correlations and associations between different measures of antisocial or norm violating behaviours, including substance use, early onset sexual activity and juvenile delinquency, arise because these behaviours are specific expressions of a common underlying propensity to problem behaviours that is expressed by different individuals in different ways. Problem Behaviour Theory implies that, once common tendencies to problem behaviours are taken into account, there should be no association between alcohol misuse and offending. This theory has been tested in a number of studies using methods of structural equation modelling with somewhat different results. In particular, while there have been several studies that have replicated the general finding that involvement in a range of antisocial or

norm violating behaviours can be explained by a single underlying vulnerability to problem behaviours (1,3,6,26) there have also been two studies which have failed to replicate these findings (27,28).

A number of recent studies have suggested that antisocial behaviours may lead to alcohol abuse. In particular, in a longitudinal study of the relationships between alcohol use and aggression, White, Brick and Hansell (29) reported that associations between alcohol use and aggression were explained by lagged measures of the individual's tendencies to aggression. On the basis of this evidence they concluded that "early aggression leads to increases in alcohol use, but alcohol use does not lead to increases in aggressive behaviors." (White et al., 1993, pp 73-74).

This research may be interpreted as supporting the general Problem Behaviour Theory to the extent that the results reported by White et al. (29) tend to suggest that individuals who show generalised tendencies to aggressive behaviours in middle childhood have higher risks of alcohol use as adolescents. While it may be the case that the development of alcohol misuse is linked to generalised tendencies to aggressive behaviours, it is less plausible to assume that specific juvenile offending behaviours are a cause of alcohol misuse. Given these considerations, it seems likely that the major pathways which link alcohol misuse to delinquency are likely to involve: a) direct cause and effect associations in which alcohol misuse leads to increased risks of offending or b) common causal factors that are associated with the development of both alcohol use and juvenile offending.

There are a number of methodological issues that arise in the study of alcohol use and offending. First, there is the possibility that some of the association between alcohol use and offending may be semi-tautological to the extent that it is quite clear that alcohol consumption is a necessary but not sufficient condition for certain classes of offending behaviours including: drunk and disorderly behaviours, drinking in a public place and drink driving

offences. The inclusion of measures of alcohol related offending in the general definition of offending is thus likely to lead to somewhat misleading associations and it is clearly desirable that correlations between alcohol use and offending behaviours are estimated on the basis of offending criteria that do not include alcohol consumption as part of the offence definition.

Secondly, it is also possible that the relationships between alcohol use and offending could vary with the types of crime studied so that these associations may vary for crimes of violence and property crimes (23). For these reasons, it is useful to adopt offending definitions which distinguish between crimes of violence and those crimes involving dishonesty.

Finally, gender may play a role in this association to the extent that rates of alcohol consumption and patterns of offending vary in gender specific ways (23,30,31). This gender specificity of alcohol consumption and offending rates could imply that the relationships between alcohol consumption and offending outcomes also vary with gender.

In this paper we address the above issues by reporting on a study of the relationships between alcohol consumption and juvenile offending in a birth cohort of New Zealand children studied to the age of 16 years. The specific aims of this study were to examine the following issues:

i) The extent to which heavy alcohol use was associated with increased risks of violent and property crimes measured on the basis of both parentally and self reported behaviours.

ii) The extent to which associations between heavy alcohol consumption and property and violent crime varied with gender.

iii) The extent to which heavy alcohol consumption was associated with violent and property crime when due allowance was made for a series of prospectively measured risk factors for alcohol abuse and/or offending behaviours. These factors included measures of

peer affiliations, early childhood behavioural tendencies, intelligence, parental substance use behaviours and similar measures.

Method

The data reported here were collected during the course of the Christchurch Health and Development Study. The Christchurch Health and Development Study is a longitudinal study of a birth cohort of 1265 children born in the Christchurch (New Zealand) urban region during mid 1977. These children have been studied at birth, four months, one year and annual intervals to the age of 16 years. An overview of the study design has been given previously (32). The data analyzed in this report were measured in the following ways.

1. Alcohol misuse at 15-16 years.

At the age of 16 years, sample members were questioned on a series of measures of the frequency and amounts of alcohol consumed using a questionnaire based on that employed by Casswell and her associates (33,34). In addition, responses were obtained to a modified version of the Rutgers Alcohol Problem Index (35). Using data gathered on frequency of drinking, amounts consumed and alcohol related problems in the last year the sample were classified using techniques of latent class analysis to identify a group of teenagers who engaged in frequent, heavy or problem drinking. The construction of this method of classification has been described previously (21). On the basis of this method of classification 8.3% of the sample were identified as prone to abusive or hazardous drinking at the age of 16 years. The characteristics of those sample members who were classified as misusing alcohol are compared with the characteristics of the other sample members in Table 1. This Table compares the two groups of adolescents on a range of measures of alcohol consumption including: the frequency of alcohol consumption, amounts of alcohol consumed and alcohol related problems. The results in Table 1 show that young people who were classified as

misusing alcohol drank alcohol more frequently, in greater quantities and experienced more alcohol related problems than the remaining sample members.

INSERT TABLE 1. HERE

2. Juvenile offending (15-16 years).

At the age of 16 years sample members and their parents were questioned on a series of items from the Self Report Early Delinquency scale (36) concerning the extent to which the young person had committed a series of offences during the preceding year. Responses to this questioning were used to construct two measures of juvenile offending:

i) Property offending. On the basis of self report or parental report 20.7% of the sample were classified as having committed at least one property offence (i.e, damaging property, breaking into a house, stealing a car, shoplifting or other theft) during the preceding year. However, inspection of the distribution of offending suggested that a substantial number of those classified as having committed property offences had offended on only one occasion and many of these offences were relatively trivial. To construct a measure of property offending that excluded single offences, subjects were classified as property offenders if they were reported as committing two or more offences on the basis of self or parental report. Using this definition 12.8% of the sample were classified as property offenders. The group of individuals classified as property offenders had committed a median of five property offences in the preceding year.

ii) Violent offending. Parallel to the measurement of property offending a measure of violent offending was constructed by classifying young people as violent offenders if they had committed two or more violent offences (ie assault, fighting, cruelty to animals, using physical coercion) during the preceding year on the basis of either self or parental report. Using this definition 7.2% of the sample were classified as violent offenders. The group of violent offenders had committed a median of five violent offences in the last year.

Measures of property and violent offending were strongly associated with the odds ratio between classification of violent and property offences being 9.4 (95% confidence interval = 5.6 - 15.7, $p < .001$). Parental and self reported offending were moderately correlated. The correlation between parental and self reports of property offending was $+ .39$ ($p < .001$) whereas the correlation between parental and self reports of violent crime was $+ .23$ ($p < .001$).

The offence definitions above were used to construct relatively stringent offending criteria but it may be suggested that the use of such criteria may have influenced the analysis. To examine the extent to which results were robust to the choice of offending definitions, a sensitivity analysis was conducted by analysing the relationship between alcohol misuse and offending using offending criteria of different stringency. The definitions used ranged in stringency from those which classified individuals as offenders if any offence was reported to those which required the reporting of multiple (4+) offences. All analyses led to similar conclusions about the linkages between alcohol misuse and offending suggesting that the findings were robust to the choice of method for defining offending.

3. Common social and contextual factors.

To adjust the associations between alcohol misuse and juvenile offending for the effects of common risk factors, a range of prospectively measured social, family, individual and peer factors were included in the analyses. These factors were selected on the basis of reviews of the literature (30,31,37), and the availability of measures within the database.

a) Social background.

i) To measure the extent to which the young person had been exposed to social disadvantage throughout childhood a composite measure, family social position, was used. This was a composite measure of the family's social background based on information about parental education, family occupational status, maternal age, parental ethnicity, and family type (one-parent/two-parent family). The index ranks the sample from children with a highly

advantaged profile (well educated parents, high occupational status, older mother, European parentage, two-parent family) to those with a highly disadvantaged profile (poorly educated parents, low occupational status, younger mother, Maori/Pacific Island parentage, single parent family). This index has been described previously and has been shown to be predictive of a wide range of health, social and behavioral outcomes in this cohort (38).

b) Family characteristics.

i) Family adversity. To assess the extent to which cohort members had been exposed to family and childhood adversity, a general family functioning index was used. The construction of this measure was based on a series of 39 items relating to various aspects of family functioning and child rearing practices including: parental offending and substance use behaviours, mother/child interaction patterns, childrearing practices, measures of childhood experiences, family stability and family conflict. This index has been described previously and has been shown to be strongly predictive of multiple problem behaviours (39) and truancy (40).

ii) Family history of alcohol/drug abuse. When the sample members were aged 15 years their parents were questioned on a series of items concerning the extent to which they, the young person's natural parents or the young person's siblings had a history of alcohol or drug abuse/dependence. On the basis of this questioning 18.4% of the sample were classified as having a family history of alcohol/drug abuse/dependence.

iii) Parental illicit drug use. This was measured when the sample members were 11 years old and assessed the extent to which the young person's parents reported that they used cannabis or other illicit drugs. On the basis of this questioning 24.9% of the sample were classified as having parents who used cannabis or other illicit drugs.

iv) Parental smoking. This was also measured when the sample members were 11 years old and assessed the extent to which the young person's parents reported that they

smoked cigarettes. On the basis of this questioning 37.2% of the sample were classified as having parents who smoked cigarettes.

c) Individual characteristics.

i) Conduct problems (8 years). This was assessed using parental and teacher reports of conduct disordered or oppositional behaviours based on items derived from the Rutter (41) and Conners (42,43) parent and teacher questionnaires. These measures were combined to produce an overall measure of the extent to which the young person was reported to show conduct disordered or oppositional behaviours (44). The reliability of this scale, as measured by coefficient alpha, was .93.

ii) Intelligence (8 years). This was assessed at the age of eight years using the Wechsler Intelligence Scale for Children - Revised (WISC-R 45). The full scale score, which had a mean of 102.54 and standard deviation of 14.88, was used in this analysis and this measure was found to have good reliability ($\alpha = .93$).

iii) Age at first alcohol use. At ages 11, 12 and 13 years the young people were asked to report the age at which they first recalled drinking alcohol. These measures were classified into the following class intervals: a) during the interval 0-5 years; b) during the interval 6-10 years; c) during the interval 11-12 years; d) after the age of 13 years. The estimates of age of first drink were then combined using methods of latent class analysis to produce a composite measure of the age of first drink. A full description of the construction of this measure has been given previously (46).

iv) Juvenile offending (14-15 years). Parents and teenagers were questioned about the young person's offending behaviours in the interval from 14 to 15 years using the Self Report Early Delinquency Scale (36). On the basis of parental and self report data, the number of reported offences occurring during this interval was estimated. Teenagers were classified as recurrent offenders if they, or their parents, reported that the young person had committed five

or more offences during the 12 month period. On the basis of this definition 6.2% of the sample were classified as recurrent offenders at age 15 years.

d) Adolescent peer affiliations.

i) Affiliations with delinquent peers. To measure the extent to which the young person affiliated with delinquent or substance using peers in adolescence, a general index of peer affiliations was constructed. This index was based on self reports of the extent to which the young person's best friend and other friends: used tobacco, alcohol and cannabis, truanted or broke the law. These items were summed to produce a scale measure of the extent to which the young person reported affiliations with delinquent or substance using peers. The resulting scale was of moderate internal consistency ($\alpha = .78$).

Sample Size

While the study reported here was based on a birth cohort of 1265 children, the analyses reported here were based on a sample of 953 respondents for whom there was complete data for alcohol misuse and juvenile offending at age 16 years. This sample represents 75.3% of the initial cohort of children and 85.8% of the sample alive and resident in New Zealand at the age of 16 years. To examine the effects of sample losses on the representativeness of the sample, comparisons were made of the socio-demographic characteristics of the 953 subjects included in the analysis with the remaining 312 subjects excluded from the analyses. This suggested that losses to follow up during the course of the study were not associated with child ethnicity, gender, maternal age or family size. There were, however, small but statistically detectable tendencies ($p < .01$) for the sample to under-represent children from families in which mothers lacked formal educational qualifications, families of low socioeconomic status and single parent families.

While these results suggest some small non-random loss of subjects, it is unlikely that these losses will materially influence the results in this study since previous studies in which

corrections for non-random sample loss have been applied have suggested that the impact of non-random sample attrition on study estimates was negligible (44).

Results

1. Associations Between Alcohol Misuse and Offending.

Table 2 shows the rates (per 100 sample members) of violent and property offences for the sample divided into those who were classified as misusing alcohol and other sample members. The data are shown separately for male and female members of the cohort. The Table shows that those who were classified as misusing alcohol had significantly ($p < .001$) higher rates of violent and property offences than those who were not classified as misusing alcohol. Specifically:

i) Males who were classified as misusing alcohol had odds of offending that were 5.7 to 5.9 times higher than those of young men who did not misuse alcohol. These associations were statistically significant ($p < .001$) for both comparisons.

ii) Females who were classified as misusing alcohol had odds of offending that were 5.7 to 12.7 times higher than those of young women who did not misuse alcohol. These associations were statistically significant ($p < .001$) for both comparisons.

INSERT TABLE 2. HERE

These results suggest that, for both males and females, alcohol misuse was associated with clear increases in rates of violent and property offences. These relationships appeared to be more marked for property offences amongst females suggesting that the association between alcohol misuse and offending may vary with gender. This would imply the presence of statistical interactions between alcohol misuse, gender and risks of offending.

To examine possible interactions between alcohol misuse, gender and risks of offending, a logistic model which included main effects for alcohol misuse and gender and an interaction effect between alcohol misuse and gender was fitted to the data. The results of this

analysis are shown in Table 3 which gives log likelihood ratio chi-square tests of the main effects and interaction between alcohol misuse, gender and odds of offending. The Table shows that:

i) For both violent offences and property offences, there were significant ($p < .001$) main effects for alcohol misuse, confirming the results in Table 2 which showed increased offending rates amongst those who misused alcohol.

ii) There was a small main effect of gender on violent offending ($p < .01$) indicating that males were more likely to commit violent offences than females. There was, however, no significant ($p > .40$) main effect for gender on rates of property offences.

iii) For both violent and property offences, there were no significant ($p > .10$) interactions between gender and alcohol misuse suggesting that the relationship between alcohol misuse and offending was similar for males and females despite the apparent differences in the odds ratios for property offences shown in Table 2.

INSERT TABLE 3. HERE

2. Associations Between Alcohol Misuse, Offending and Social, Family, Individual and Peer Risk Factors.

While the above analyses indicate an association between alcohol misuse and juvenile offending, it is possible that this association may have been spurious and have arisen from the common effects of a range of social, family, individual and peer risk factors on each of these outcomes. This issue is explored in Table 4 which shows the product moment correlations (point biserial correlations, phi coefficients) between alcohol misuse, measures of offending at age 16 years and a series of social, family, peer and individual factors.

The results in Table 4 lead to the following general conclusions:

1. There were small but statistically significant ($p < .001$) correlations between family social position and rates of both alcohol misuse ($r = .17$) and juvenile offending ($r = .16, .22$)

at age 16 years, indicating that both alcohol misuse and juvenile offending were more common among young people from socially disadvantaged backgrounds.

2. Secondly, there were small but statistically significant associations ($p < .001$) between family adversity and rates of both alcohol misuse ($r = .15$) and juvenile offending ($r = .19, .24$) at age 16 years, indicating that both alcohol misuse and juvenile offending were more common amongst young people who were exposed to high levels of family adversity throughout childhood. Additionally, there were significant ($p < .005$) associations between a family history of alcohol/drug abuse and rates of both alcohol misuse ($r = .10$) and juvenile offending ($r = .11, .18$), indicating that young people who had a family history of alcohol/drug abuse were more likely both to misuse alcohol and to report juvenile offending. While there were significant ($p < .01$) associations between both parental smoking and parental illicit drug use and rates of juvenile offending ($r = .09 - .11$), there were no significant ($p > .10$) associations between these family risk factors and rates of alcohol misuse ($r = .05$).

3. There were significant associations between a number of individual factors and rates of both alcohol misuse and juvenile offending. In particular, rates of alcohol misuse and juvenile offending were elevated in young people who: a) showed early tendencies to conduct problems ($r = .14 - .26$; $p < .001$); b) reported offending behaviours at age 15 years ($r = .31 - .45$; $p < .001$); and c) reported having drunk alcohol at younger ages ($r = .11 - .19$; $p < .05$). Additionally, there was a significant association ($r = -.09, -.18$; $p < .01$) between intelligence and juvenile offending, indicating that offending was more common among young people with lower IQ's but there was no significant ($r = -.03$; $p > .30$) association between intelligence and rates of alcohol misuse.

4. Finally, there were moderate and statistically significant ($p < .001$) associations between affiliations with delinquent peers at age 15 and rates of both alcohol misuse ($r = .34$) and juvenile offending ($r = .21, .34$) at age 16, indicating that young people who affiliated

with delinquent peers were more likely to engage in later alcohol misuse and juvenile offending.

INSERT TABLE 4. HERE

To the extent that there appeared to be considerable overlap in the risk factors associated with both alcohol misuse and juvenile offending, the results in Table 4 suggest that the associations between alcohol misuse and offending at age 16 years may have been spurious and have arisen from the common influence of a range of antecedent risk factors which were associated with both of these outcomes.

To examine this issue in more detail a series of logistic regression models was fitted to the data. In these analyses the log odds of a young person being classified as a violent offender or a property offender were modelled as a function of alcohol misuse and the social, family, individual and peer factors described above. In these analyses the risk factors described in Table 4 were entered sequentially into the models and only those factors which were found to be statistically significant were retained in the final model. The results of this analysis are shown in Table 5 which shows: a) the adjusted rates (per 100 sample members) of violent offending and property offending for young people who misused alcohol and those who did not misuse alcohol; b) the significance of the adjusted association between alcohol misuse and offending, assessed using the ratio of the logistic regression coefficient to its standard error and c) the social, family, individual and peer factors that were significant in each equation. Table 5 shows:

1. After adjustment for the covariate factors, there was a small but significant ($p < .01$) association between alcohol misuse and violent offending. Young people who misused alcohol had 3.2 (95% CI = 1.4 - 7.6) times the odds of committing violent offences when compared to young people who did not misuse alcohol.

2. However, after adjustment for the covariate factors there was no statistically significant ($p > .40$) association between alcohol misuse and property offences. This result indicates that young people who misused alcohol did not have significantly higher rates of property offences than other young people after the common effects of a range of social, family, peer and individual factors had been taken into account.

3. Rates of both violent and property offending were influenced by a common series of factors which included affiliations with delinquent peers, offending at age 15, early conduct problems, intelligence and age at first alcohol use, parental illicit drug use and gender

INSERT TABLE 5. HERE

Discussion

In this paper we have used data gathered during the course of a 16 year longitudinal study to examine the linkages between alcohol misuse and juvenile offending in a birth cohort of 16 year old New Zealanders. The major findings of this research are reviewed below.

1. Linkages between alcohol misuse and juvenile offending.

In confirmation of previous studies (1-8) the present study found that young people who engaged in heavy, frequent or problematic drinking as 16 year olds were at increased risks of both violent and property offences. These relationships appeared to be similar for both males and females although there was some (statistically non-significant) suggestion that alcohol misuse in females was associated with larger increases in odds of property offences than for males. The relationships between alcohol misuse and violent offences were similar for males and females.

2. The effects of antecedent factors on the associations between alcohol misuse and juvenile offending.

While the present study indicated that young people who misused alcohol were at significantly increased risks of violent and property offences, subsequent analysis suggested

that, to a large extent, these associations were non causal. In particular, both alcohol misuse and juvenile offending at age 16 years were symptomatic of young people who had family and childhood histories that were associated with both high risks of alcohol misuse and high risks of offending. These common factors included intelligence, parental substance use behaviours, conduct problems in middle childhood, juvenile offending by the age of 15 years and affiliations with delinquent peers. When these antecedent risk factors were taken into account, the associations between alcohol misuse and juvenile offending were substantially reduced.

For property offences there was no statistically significant association between the misuse of alcohol and juvenile offending when due allowance was made for antecedent risk factors. This result clearly suggests that the association between alcohol misuse and property offences was non causal and arose largely because the risk factors and life pathways that encouraged property offending at age 16 years had much in common with the risk factors and life pathways that led to alcohol misuse at this age.

The findings for violent offences suggested that, to a substantial extent, linkages between alcohol misuse and violent offending arose by a similar route. However, even after adjustment for potentially confounding risk factors, alcohol misuse and violent offending remained associated. This result may suggest that there is a direct cause and effect association between alcohol misuse and risk of violent offending independently of the effects of common risk factors and life pathways on both outcomes. This conclusion is generally consistent with the findings of laboratory studies that have shown under controlled conditions that increased alcohol consumption is associated with increasing tendencies to aggressive behaviours (see 10,11,12).

There are two important caveats that we would like to place on these results. First, the analysis has examined linkages between alcohol misuse and risks of offending only up to the

age of 16 years and the findings suggest that much of the statistical association between these measures does not reflect a direct cause and effect relationship. However, it does not follow that similar findings will inevitably apply for older individuals since it is possible that heavy alcohol consumption may lead to a life style and set of behaviours that imply that, in the long run, those who engage in heavy drinking have markedly elevated rates of antisocial behaviours. Since the present study examines the earlier stages of this process, it is possible that it has underestimated the contribution of alcohol misuse to offending behaviours in older populations. This issue will be examined in further studies of this cohort.

The second caveat is somewhat more subtle. In this paper we have examined statistical linkages between alcohol misuse and offending and thus the paper examines whether, overall, alcohol misuse is associated with increased risks of offending when due allowance is made for confounding factors. This approach leads to estimates of the extent to which alcohol misuse makes independent contributions to risks of offending within a population. However, this statistical analysis of causation is not synonymous with an individual level analysis of causation. Specifically, it is possible that in a small minority of individuals, alcohol misuse markedly increases their predisposition to offending but these individuals do not occur with sufficient frequency for general associations between alcohol misuse and offending to be detected statistically. Thus, while the results suggest that, on average, alcohol misuse makes relatively little or no contribution to rates of property offences and only moderate contributions to risks of violent offences in 16 year olds, this finding does not preclude the possibility that in specific individuals the misuse of alcohol may make a major contribution to their offending behaviours.

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Table 1: Comparison of frequency of alcohol consumption, amounts consumed and alcohol related problems among sample members classified as misusing alcohol and remaining sample members

Alcohol Use	Alcohol Misusers %	Remaining Sample Members %
<u>Frequency of Alcohol Consumption</u>		
Drinks alcohol at least once per week	46.8	3.6
Drinks at least once per month	92.4	36.6
<u>Typical Amount Consumed Per Occasion</u>		
At least 90 mls pure alcohol	70.9	4.4
At least 30 mls pure alcohol	93.7	40.2
<u>Largest Amount Consumed on a Single Occasion</u>		
At least 180 mls pure alcohol	84.8	3.1
At least 90 mls pure alcohol	100.0	20.3
<u>No. Of Alcohol Related Problems</u>		
At least 5 problems	57.0	2.6
At least 3 problems	72.2	12.1
At least 1 problem	91.1	31.8
n	79	874

Table 2: Comparison of rates (per 100) of violent and property offending amongst males and females who reported alcohol misuse and remaining sample members

	MALES			FEMALES		
	Alcohol Misuse	No Alcohol Misuse	Odds Ratio (95% C.I.)	Alcohol Misuse	No Alcohol Misuse	Odds Ratio (95% C.I.)
Violent Offences	32.1	7.6	5.7 (2.9-11.3)	15.4	3.1	5.7 (1.7-18.8)
Property Offences	45.3	12.4	5.9 (3.2-10.9)	50.0	7.3	12.7 (5.5-29.7)
n	53	421		26	453	

All associations are statistically significant ($p < .001$)

Table 3: Logistic regression analysis of relationships between juvenile offending, alcohol misuse and gender

Analysis	Log Likelihood Ratio Chi-Square	d.f.	p
a) Violent Offences			
Alcohol Misuse	24.9	1	<.001
Gender	7.4	1	<.01
Alcohol Misuse/Gender Interaction	0.0	1	>.90
b) Property Offences			
Alcohol Misuse	65.4	1	<.001
Gender	0.6	1	>.40
Alcohol Misuse/Gender Interaction	2.1	1	>.10

Table 4: Correlations between alcohol misuse, juvenile offending and antecedent social, family, individual and peer factors.

	Alcohol Misuse	Violent Offending	Property Offending
<u>Social Background</u>			
Family Social Position ²	0.17 (p<.001)	0.22 (p<.001)	0.16 (p<.001)
<u>Parental and Family Characteristics</u>			
Family adversity ¹	0.15 (p<.001)	0.24 (p<.001)	0.19 (p<.001)
Family history of alcohol/drug abuse ²	0.10 (p<.005)	0.18 (p<.001)	0.11 (p<.001)
Parental Smoking ²	0.05 (p>.10)	0.10 (p<.005)	0.09 (p<.01)
Parental illicit drug use ²	0.05 (p>.10)	0.10 (p<.005)	0.10 (p<.005)
<u>Individual Factors</u>			
Conduct problems (8 years) ¹	0.14 (p<.001)	0.26 (p<.001)	0.23 (p<.001)
Juvenile offending (15 years) ²	0.31 (p<.001)	0.31 (p<.001)	0.45 (p<.001)
IQ (WISC-R; 8 years) ¹	-0.03 (p>.30)	-0.18 (p<.001)	-0.09 (p<.01)
Age of first alcohol use ²	0.11 (p<.05)	0.13 (p<.01)	0.19 (p<.001)
<u>Peer Factors</u>			
Affiliations with delinquent peers (15 years) ¹	0.34 (p<.001)	0.21 (p<.001)	0.34 (p<.001)

¹ Point biserial correlation

² Phi coefficient

Table 5: Adjusted rates (per 100 sample members) of violent and property offending for young people who misused alcohol and remaining sample members

	ALCOHOL MISUSE		Adjusted Odds Ratio (95% C.I.)	p	Significant Covariates
	Yes	No			
Violent Offences	13.6	5.7	3.2 (1.4-7.6)	<.01	1-4
Property Offences	15.0	12.0	1.4 (0.6-3.3)	>.40	1,2,5-7

Covariates: 1 = affiliations with delinquent peers; 2 = offending (15 years); 3 = conduct problems (8 years); 4 = intelligence (WISC-R; 8 years); 5 = age of first alcohol use; 6 = parental illicit drug use; 7 = gender.