Title
DRUG USE AMONG SYDNEY TEENAGERS IN 1985 AND 1986

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Abstract
To investigate adolescent drug use behaviour, a random community sample of Sydney teenagers aged 14 to 19 years was interviewed at home in 1985 (N=996) and again in 1986 (N=756). Respondents were asked about current use of alcohol, tobacco, marijuana, other illicit drugs, medications and inhalants. Drug use was common: 16 per cent of respondents were heavy drinkers, 28 per cent smoked tobacco, 10 per cent used marijuana and 4 per cent used drugs other than alcohol, tobacco or marijuana. Seventeen per cent were multiple drug users. Drug use was more common among boys than girls, except for tobacco smoking, and increased with age: older males had particularly high prevalences of heavy drinking, tobacco and marijuana use. The prevalence of heavy drinking, tobacco and marijuana use increased by 2-3 per cent over the one year follow-up period. About half of the heavy drinkers and marijuana users, and 80 per cent of tobacco smokers had not changed one year later, which indicates the stability of these behaviours. One-third of eligible teenagers contacted at the first interview declined to participate: it is likely that this study underestimates the prevalence of drug use in the community. Heavy drinking, tobacco smoking and marijuana use remain important target behaviours for adolescent drug use prevention programs.

Introduction
Despite the high level of concern about drug use in the Australian community, there have been few community-based studies of drug use. Estimates of drug use and abuse are usually drawn from diverse sources such as morbidity and mortality statistics, court records, and sales statistics. Most Australian studies of drug use have focussed on teenagers, who form a major target group for drug use prevention programs. Almost all these studies have involved school student populations. Student surveys are often used in drug research because the populations are better defined than community samples, response rates are usually very high, and costs are lower than for community surveys. However, school student populations exclude early school leavers — only 42 per cent of 15 to 19 year olds were still at school in Sydney in 1986 — and older teenagers past school age. As drug users are likely to leave school at an earlier age than non-users, school studies may underestimate the prevalence of drug use in the community. Further, late adolescence to young adulthood is an important period for initiation into illicit drug use.

Most Australian teenage drug use data are cross-sectional. Although repeated cross-sectional data give valuable information on prevalence changes over time, they are unable to describe the patterns of cessation and uptake of drug use. It may be argued that stable drug behaviours are of greater concern than sporadic or short-term use, although the risks of occasional drug use must not be underestimated. Longitudinal data are essential for identifying those at risk of continued and progressive drug use.

To address some of these deficiencies in our knowledge of adolescent drug use, we began a community-based longitudinal study of licit and illicit drug use among a sample of Sydney teenagers in 1985. As a main objective of the study was to provide information for prevention purposes, we have looked at behaviours which may be considered as harmful from a health or societal view: heavy drinking (rather than any alcohol use); tobacco smoking; use of marijuana; use of heroin, cocaine and hallucinogens; non-medical use of tranquilizers and amphetamines; and use of inhalants.

Methods
Sampling procedure
The following procedure was used to select 1000 teenagers living in the Sydney metropolitan area in late 1985. Ten electoral subdivisions were selected at random. Within each subdivision, ten addresses were selected randomly from the electoral rolls, and served as the starting point from which the interviewer proceeded in a clockwise direction around the residential block. The interviewer was instructed to obtain ten interviews, and given an incentive to obtain these from the first ten households. Households were visited on weekends (40% of interviews) and weekday evenings (20% on Monday, the remaining 40% distributed fairly evenly over the other days). Up to four callbacks were made if the occupants were out. For each household contacted, the youngest person between

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the ages of 14 and 19 years was selected for entry into
the study. Choice of sex was made randomly with
balancing within clusters. This procedure has been
shown previously to give a representative sample of
the Sydney population.3

A total of 15,976 households were approached.
There were no eligible occupants in 9,815 houses. In
4,691 (76%) of households with eligible occupants,
the eligible person could not be contacted for
interview. One-third of eligible persons contacted
refused to be interviewed. The response rate was 68
per cent of eligible persons contacted, but only 16 per
cent of total eligibles (contacted and non-contacted)
in all households contacted.

In mid-1986, letters were sent to all 1000
respondents asking them to take part in a second
interview. Of these, 760 (76%) were interviewed
again in their homes. Of the 240 respondents who
were not reinterviewed in 1986, 30 per cent refused to
participate, 56 per cent had changed address and
could not be found, and 14 per cent could not be
interviewed for other reasons. Four respondents re-
interviewed in 1986 were found to have been outside
the eligible age range of 14 to 19 years in 1985, and
have been excluded from analyses.

_Interview protocol and questionnaire_

Interviews were conducted by trained
interviewers from a commercial survey company
(Roy Morgan Research). A detailed letter was given
to all eligible contacts, and their parents where
relevant, explaining the purpose of the interview, the
confidentiality of the responses, and how the results
would be used. Interviewers requested that no other
persons be present during the interview, which was
the case in 75% of interviews. Privacy was further
ensured by presenting many questions and possible
responses on cards rather than reading aloud.

The measure of alcohol use was based on the
methodology suggested by Gregson and Stacey,6 by
which information is sought on the quantity of
alcohol consumed on specific occasions. This avoids
the need for respondents to classify themselves into
given categories of typical consumption, a difficult
task for persons with irregular drinking patterns.
Respondents were asked about the last two drinking
occasions — when they occurred, the type of
alcoholic beverage and the number of glasses
consumed. Respondents were classified as non-
drinkers, non-heavy drinkers or heavy drinkers.
Heavy drinkers were defined as those who drank five
glasses or more on both occasions or eight glasses or
more on one of last two occasions (giving an average
of five or more glasses for the two occasions in most
cases). The cut-off point for heavy drinking of five
glasses per occasion has been used frequently in
other studies.7 We preferred to define heavy drinking
in this way rather than to calculate the average daily
consumption of alcohol. Given the episodic nature
of teenage drinking, very few teenagers would
exceed the non-harmful limit for average daily
consumption. A measure of average daily
consumption would underestimate the proportion
of teenagers whose drinking patterns carry a high
risk of acute harmful consequences.

The proportions of daily, occasional, ex- and
never smokers are derived from a detailed question
on current levels of tobacco use. To measure current
use of other drugs, respondents were shown a card
listing drug-using behaviours (use of marijuana,
heroin, cocaine, amphetamines, hallucinogens,
inhalants, and excessive use of tranquilizers) and
asked: “Which of these things does anyone you
know now do?”. Respondents were shown another
card listing members of the social network (family,
friends and acquaintances) and including the
category ‘myself’. Current users of illicit drugs,
tranquilizers and inhalants are those respondents
who selected ‘myself’ for those behaviours.

_Results_

_Characteristics of the sample_

Sociodemographic characteristics of the study
sample in 1985 are given in Table 1. Of 996
respondents, 54 per cent were males and 46 per cent
were females. The majority of respondents attended
an educational institution in 1985: 71 per cent were
at high school, 6 per cent at technical institutions,
and 4 per cent at tertiary institutions. About 37 per
cent of respondents were employed: 17 per cent
worked full-time and 20 per cent had part-time
work. Eight per cent were unemployed, that is,
looking for work, whether or not attending an
educational institution. Only 5 per cent of the total
sample were neither working nor studying. Most
(99%) respondents were single.

A comparison with data from the Australian
Bureau of Statistics (ABS) in Table 1 shows that
high school students, full-time students and part-
time workers were over-represented in the study
sample. Although the proportions of unemployed
teenagers were similar, teenagers who were neither
employed nor at high school were under-represented
in the study sample.

_Drug use in 1985_

The prevalences of drug use among the 996
teenagers interviewed in 1985 are given in Table 2.
About 15 per cent were non-drinkers, 66 per cent
were non-heavy drinkers and 16 per cent were
classified as heavy drinkers. One-fifth smoked
tobacco daily, and 7 per cent smoked occasionally.
One-tenth of the sample used marijuana. A small
proportion (4%) used drugs other than alcohol,
### TABLE 1
Sociodemographic characteristics of the study sample, 996 Sydney teenagers, 1985.

<table>
<thead>
<tr>
<th>Sociodemographic characteristic</th>
<th>Study sample ages 15–19</th>
<th>ABS sample ages 15–19</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>22.2</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>20.3</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>17.6</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>14.4</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>13.8</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>11.8</td>
<td></td>
</tr>
<tr>
<td><strong>Male</strong></td>
<td>53.6</td>
<td></td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td>46.4</td>
<td></td>
</tr>
<tr>
<td><strong>Institution attended in 1985</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>71.2</td>
<td>42.3**</td>
</tr>
<tr>
<td>Technical</td>
<td>5.7</td>
<td>12.2</td>
</tr>
<tr>
<td>Tertiary</td>
<td>4.1</td>
<td>8.2</td>
</tr>
<tr>
<td>Other</td>
<td>0.8</td>
<td>2.6</td>
</tr>
<tr>
<td><strong>Total studying in 1985</strong></td>
<td>81.8</td>
<td>65.3</td>
</tr>
<tr>
<td><strong>Attendance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time</td>
<td>77.8</td>
<td>54.5**</td>
</tr>
<tr>
<td>Part-time</td>
<td>4.0</td>
<td>10.8</td>
</tr>
<tr>
<td><strong>Employment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time</td>
<td>17.2</td>
<td>35.7**</td>
</tr>
<tr>
<td>Part-time</td>
<td>19.6</td>
<td>12.5</td>
</tr>
<tr>
<td>Unemployed</td>
<td>8.0</td>
<td>11.2</td>
</tr>
<tr>
<td>Neither studying nor employed</td>
<td>4.8</td>
<td>9.2*</td>
</tr>
</tbody>
</table>

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

Source: Australian Bureau of Statistics. Transition from education to work, Australia, May 1986. Catalogue No. 6227.0. Australian Bureau of Statistics Labour Force Estimates, November 1985 (GRP100 Table A1, GRP300 Table A3, 16/12/85), December 1985 (GRP100 Table A1, GRP300 Table A3, 24/01/86), January 1986 (GRP100 Table A1, GRP300 Table A3, 14/02/86) for New South Wales Metropolitan population.

Tobacco and marijuana. Heavy drinking and marijuana use were more common among boys than girls. The prevalence of daily and occasional smoking was similar for both sexes, as was the use of drugs other than alcohol, tobacco and marijuana.

Drug use increased with age as shown in Figure 1. The prevalence of heavy drinking increased steadily from 2 per cent at age 14 to 35 per cent at age 19. The prevalence of tobacco smoking (daily and occasional) increased from 9 per cent to 28 per cent between the ages of 14 and 16 years, and continued to rise more slowly thereafter. There was a steep rise in marijuana use from 5 per cent at age 17 to 20 per cent at age 18 and 29 per cent at age 19. The use of drugs other than alcohol, tobacco and marijuana increased from less than 1 per cent in the youngest group to about 10 per cent in the oldest.
### TABLE 2

<table>
<thead>
<tr>
<th>Drug use in 1985</th>
<th>Prevalence</th>
<th>95% confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Alcohol*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-drinkers</td>
<td>15.3</td>
<td>13.1 – 17.5</td>
</tr>
<tr>
<td>Non-heavy drinkers</td>
<td>65.8</td>
<td>62.9 – 68.8</td>
</tr>
<tr>
<td>Heavy drinkers</td>
<td>15.5</td>
<td>13.3 – 17.8</td>
</tr>
<tr>
<td>Tobacco smoking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All smokers</td>
<td>28.4</td>
<td>25.6 – 31.2</td>
</tr>
<tr>
<td>Daily smokers</td>
<td>21.0</td>
<td>18.5 – 23.5</td>
</tr>
<tr>
<td>Occasional smokers</td>
<td>7.4</td>
<td>5.8 – 9.0</td>
</tr>
<tr>
<td>Ex-smokers</td>
<td>31.2</td>
<td>28.3 – 34.1</td>
</tr>
<tr>
<td>Never smoked</td>
<td>39.7</td>
<td>36.7 – 42.7</td>
</tr>
<tr>
<td>Marijuana use</td>
<td>10.1</td>
<td>8.2 – 12.0</td>
</tr>
<tr>
<td>Other drugs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amphetamines</td>
<td>3.6</td>
<td>2.4 – 4.8</td>
</tr>
<tr>
<td>Hallucinogens</td>
<td>2.3</td>
<td>1.4 – 3.2</td>
</tr>
<tr>
<td>Cocaine</td>
<td>1.6</td>
<td>0.8 – 2.4</td>
</tr>
<tr>
<td>Tranquilizers</td>
<td>1.4</td>
<td>0.7 – 2.1</td>
</tr>
<tr>
<td>Heroin</td>
<td>1.0</td>
<td>0.4 – 1.6</td>
</tr>
<tr>
<td>Inhalants</td>
<td>0.6</td>
<td>0.1 – 1.1</td>
</tr>
<tr>
<td></td>
<td>0.5</td>
<td>0.1 – 0.9</td>
</tr>
</tbody>
</table>

* 3.2% of the sample could not be classified due to missing data

Data on multiple drug use are given in Table 3. Almost two-thirds of respondents were not heavy drinkers and did not use tobacco, marijuana or other drugs. Heavy drinkers were very likely to report other drug behaviours: two-thirds also smoked tobacco, and a quarter smoked tobacco and used marijuana. On the other hand, about half the tobacco smokers did not drink heavily or use other drugs. Marijuana use was closely associated with heavy drinking and tobacco smoking. Only 2 per cent of respondents used marijuana exclusively. The most frequent drug combinations were heavy drinking and tobacco smoking (6%), tobacco smoking and marijuana use (2%), and heavy drinking, tobacco smoking and marijuana use (3%).

Respondents who were lost to follow-up were much more likely to be using licit or illicit drugs in 1985, than those reinterviewed in 1986. The differences between the two groups were statistically significant.

**Change in drug use from 1985 to 1986**

The prevalences of heavy drinking, tobacco smoking and marijuana use in the 756 teenagers interviewed in 1985 and 1986 increased 2-3 per cent as shown in Table 4. The change in the use of drugs other than alcohol, tobacco and marijuana was negligible. Only the increase in tobacco smoking was statistically significant (McNemar’s chi-square 6.2, p<.05). When 1986 prevalences were standardised to the 1985 age distribution of the 756 respondents, it appeared that prevalence changes were related to age rather than to temporal changes, as drug use in 14 to 19 year olds did not increase.

The rates of uptake and cessation of drug use in boys and girls are illustrated in Figures 2 and 3. Half the 1985 heavy drinkers remained heavy drinkers in 1986. The rates of uptake of heavy drinking were similar for boys and girls, but girls were more likely to have stopped drinking heavily. Over 80 per cent of the 1985 smokers were still smoking in 1986. Girls were more likely than boys to take up tobacco smoking, but less likely to give up smoking. Over half the 1985 marijuana users had stopped by the second interview, while 6 per cent of non-users had taken up marijuana use. The rate of uptake of marijuana use was twice as high in boys as in girls, and girls were more likely to have stopped. Few of the 1985 users of other drugs (10% of boys and none of the girls) reported use in 1986, and very few had taken up the use of other drugs. The peak age for uptake of heavy drinking was 16 years in boys and 17 years in girls. Uptake of tobacco smoking peaked at age 16, and of marijuana at age 17, in boys and girls alike.

Discussion
The levels of drug use indicated by the study are worrying, particularly in older males, among whom 50 per cent were tobacco smokers, 40 per cent heavy drinkers, 35 per cent marijuana users and 10 per cent users of other drugs. Multiple drug use is also of concern: the importance of the licit drugs, alcohol and tobacco, is emphasised by the finding that teenagers were most unlikely to be using an illicit drug if they were not using alcohol or tobacco.

Individual drug behaviours changed considerably over one year. It would seem that some teenagers experiment with drugs over a short period of time, and that the behaviour does not become established. However, most tobacco smokers and heavy drinkers, and almost half the marijuana users did not change their behaviour. Although a follow-up period of one year is too short to allow conclusions to be made about the stability of drug behaviours, it would appear that the smoking habit becomes entrenched at an early stage of use.
TABLE 3


<table>
<thead>
<tr>
<th>Drug use combinations</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No drug use(^a)</td>
<td>64.3</td>
</tr>
<tr>
<td>Heavy drinking</td>
<td>4.3</td>
</tr>
<tr>
<td>Tobacco smoking</td>
<td>14.8</td>
</tr>
<tr>
<td>Marijuana</td>
<td>1.5</td>
</tr>
<tr>
<td>Other drugs(^b)</td>
<td>0.3</td>
</tr>
<tr>
<td>Heavy drinking and tobacco</td>
<td>5.7</td>
</tr>
<tr>
<td>Heavy drinking and marijuana</td>
<td>0.6</td>
</tr>
<tr>
<td>Tobacco and marijuana</td>
<td>0.1</td>
</tr>
<tr>
<td>Tobacco and other drugs</td>
<td>0.6</td>
</tr>
<tr>
<td>Marijuana and other drugs</td>
<td>0.6</td>
</tr>
<tr>
<td>Heavy drinking, tobacco and marijuana</td>
<td>2.9</td>
</tr>
<tr>
<td>Heavy drinking, tobacco and other drugs</td>
<td>0.3</td>
</tr>
<tr>
<td>Heavy drinking, tobacco, marijuana &amp; other drugs</td>
<td>1.7</td>
</tr>
<tr>
<td><strong>Total 100.0</strong></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) 'No drug use' includes non-heavy drinking
\(^b\) 'Other drugs' includes amphetamines, cocaine, hallucinogens, heroin, inhalants, too many tranquilizers.

Peak ages for uptake of heavy drinking may indicate that alcohol use in girls but not boys is influenced by the restriction of the minimum legal drinking age of 18 years. Girls have higher uptake and continuation rates for tobacco smoking than boys, although the peak uptake age was 16 years for both sexes. The peak in marijuana uptake one year later suggests the temporal relationship between tobacco smoking and marijuana use noted in other studies.

There were too few users of drugs other than alcohol, tobacco and marijuana to allow patterns of use to be described with validity. The very low prevalence is probably due to the youth of the sample. Other studies have shown that the use of illicit drugs other than marijuana is more common in early adulthood than in adolescence. Further, the use of these drugs usually indicates heavy involvement with drugs, and it is probable that heavy illicit drug users have been missed in this sample.

These estimates of licit and illicit drug use are generally lower than those of previous Australian school-based studies, when the same age groups and school students are compared. Although methodological differences limit greatly the comparability of the various studies, the prevalence of drug use would be expected to be higher in the community than in school populations. This discrepancy brings into question the validity of the measures of drug use and the presence of bias.

As in most studies of drug use, we have relied on self-reports of drug behaviour. The validity of self-reported drug use has not been firmly established, mainly because there are few feasible and valid objective measures of drug use in populations. Self-reports of tobacco smoking in an Australian population which included 14 to 19 year olds have been shown to be valid by saliva cotinine levels. Population surveys of alcohol use are said to underestimate true consumption by at least 20 per cent, but validity studies of teenage alcohol use are lacking. North American studies have shown that, although self-reports tend to underestimate drug use, they are generally reliable, and teenagers do not deliberately misreport their drug use. Further
TABLE 4


<table>
<thead>
<tr>
<th></th>
<th>Prevalence 1986 (age 14-21)%</th>
<th>Change (95% CI)</th>
<th>Prevalence 1986 (age 14-19)%</th>
<th>Change 1985-1986</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy drinking</td>
<td>14.6</td>
<td>+2.4 (-0.2, +4.9)</td>
<td>11.3</td>
<td>-1.0</td>
</tr>
<tr>
<td>Tobacco smoking</td>
<td>27.5</td>
<td>+3.2 (+0.8, +5.6)</td>
<td>23.2</td>
<td>-1.1</td>
</tr>
<tr>
<td>Marijuana use</td>
<td>8.6</td>
<td>+1.6 (-0.6, +3.8)</td>
<td>6.1</td>
<td>-0.9</td>
</tr>
<tr>
<td>Other drug use</td>
<td>1.3</td>
<td>-0.2 (-0.9, +1.4)</td>
<td>0.8</td>
<td>-0.7</td>
</tr>
</tbody>
</table>

* for difference in proportions for paired data

a age-standardised to 1985 population age distribution, N=756

study is needed to find out whether Australian teenagers answer questions about drug use as reliably as North American teenagers.

The setting of the interview, and lack of privacy and anonymity might have affected the validity of our study. A comparison of self-reports from school and community studies in Canada showed that adolescents tended to give more socially acceptable answers at home than at school. The evidence in the literature that lack of privacy or lack of anonymity lead to low estimates is inconclusive. In our study, the presence of adults in the room during the interview did not appear to affect the responses (unpublished observations).

The main source of bias in our study would seem to be non-response, due to both refusals and non-contact. A refusal rate of about one-third at the first contact is high but not unusual in household surveys. The practice of selecting for the study the youngest eligible person in the household should not necessarily bias the sample towards younger teenagers. Rather, the difficulty would seem to lie in the fact that the older teenagers, especially males, are rarely at home to be interviewed. This problem has been encountered by other researchers, and is likely to lead to an underestimation of drug use. If the 240 respondents who were lost to follow-up were more likely to report drug use at the first interview, it might reasonably be assumed that non-respondents to the first interview were also more likely to be using drugs. In that case, this study should be considered to underestimate the prevalence of drug use in the community. With this in mind, the level of drug use among Sydney teenagers becomes even more significant.

Heavy alcohol use and tobacco smoking would appear to be the most important target behaviours for drug use prevention programmes. Although the evidence is inconclusive that heavy drinking in adolescence will lead necessarily to alcohol problems later in life, the teenage heavy drinker is at high risk of accidental injury or death, particularly on the roads. As for tobacco smoking, it would seem that preventive efforts need to be oriented towards girls. Another reason for concentrating on alcohol and tobacco is the place of licit drug use in the progression to use of marijuana and other illicit drugs. Numerous studies have shown that teenagers are most unlikely to use illicit drugs if they have not used alcohol and/or cigarettes. Other analyses of our data show that the uptake of marijuana use is predicted by prior heavy drinking and tobacco use (unpublished observations). Although a causal association between licit and illicit drug use is not inferred, nor is the progression inevitable, the implication is that the prevention of licit drug use may stop the progression towards illicit drug use. Marijuana use also warrants more attention, in light of the increasing body of evidence of its health risks, and its close association with heavy drinking and tobacco smoking.
FIGURE 2

Drug use behaviour

- Boys
- Girls
- Both sexes

FIGURE 3
Cessation of drug use from 1985 to 1986 in 1985 users.

Drug use behaviour

- Boys
- Girls
- Both sexes

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References


