Illegal Drug Consumption and Mis-Reporting: Comparing Australia and Western Australia

A Bankwest-Curtin Economics Centre Briefing Note[1]

Mark Harris, Curtin University, Preety Srivastava, RMIT and Sarah Brown, Sheffield University, UK.[2]

Executive Summary

- This report considers the consumption of illegal drug Australia-wide and specifically in Western Australia (WA). Specifically, we consider participation in marijuana, cocaine and amphetamines ("speed").
- Nationally representative survey data is used, over a sample of years 2001-2010.
- We extend the analysis to allow for the fact that self-reports of drug use are likely to be affected by mis-reporting (due to legal and/or moral concerns).
- We find that participation rates in all drugs are higher in WA than the national average.
- And that estimated mis-reporting levels are also higher in WA.

Background

Illicit drug use is an on going area of concern for public policy stakeholders across Australia. The prevailing economic climate in WA in particular, driven by the resources boom, has fueled new avenues of inquiry in this state. Specifically, this report is concerned with how Australians' consumption of hard drugs, and in particular those in WA, changed in the last decade? More generally, what are the social, economic and demographic factors that affect an individual's decision on participating in the consumption of a particular drug such as marijuana or cocaine?

It is vital that public policy decisions are formed on the basis of accurate and relevant evidence. Given the considerable individual and social costs associated with the consumption of illegal drugs (including increased crime, health issues and difficulties at school or work) it is not surprising that an extensive body of research exists exploring issues related to the addictive nature of drugs as well as the relationship

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[1] http://business.curtin.edu.au/research/centres_institutions/bankwest_curtin_economics_centre/

[2] All views expressed are those of the authors and do not necessarily represent those of Bankwest, or any of its associates. The authors would like to thank the Bankwest-Curtin Economics Centre for their generous funding. The authors would also like to thank both David Hille and Jake Prendergast, for excellent research assistance.

between the consumption of different types of drugs. Surveys are a common mechanism for gathering data related to illicit drug use. However, due to social stigma associated with the consumption of drugs and alcohol, there is often a tendency for respondents to mis-report their true behaviour. This mis-reporting can lead to inaccurate results and conclusions.

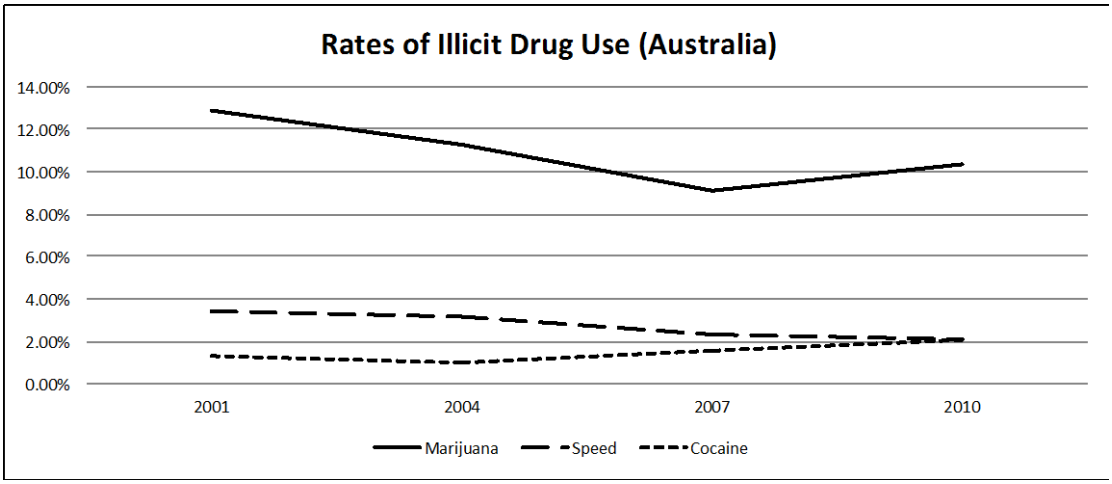
The technical paper introduces statistical techniques for assessing the prevalence of mis-reporting in survey studies. Our analysis is built from a hypothesis that a (potentially significantly large) proportion of participants will actually report themselves as being non-participants, due to both moral and legal concerns about participation. This hypothesis is explored using a *multivariate inflated probit* model. The model recognizes that a survey response is the results of two decisions. First, the individual makes a decision whether to participate in the survey or not; secondly, for survey participants only, there is the decision to mis-report or not. By allowing for this decision mechanism, the results can be adjusted to more accuracy reflect the true state of the population under observation.

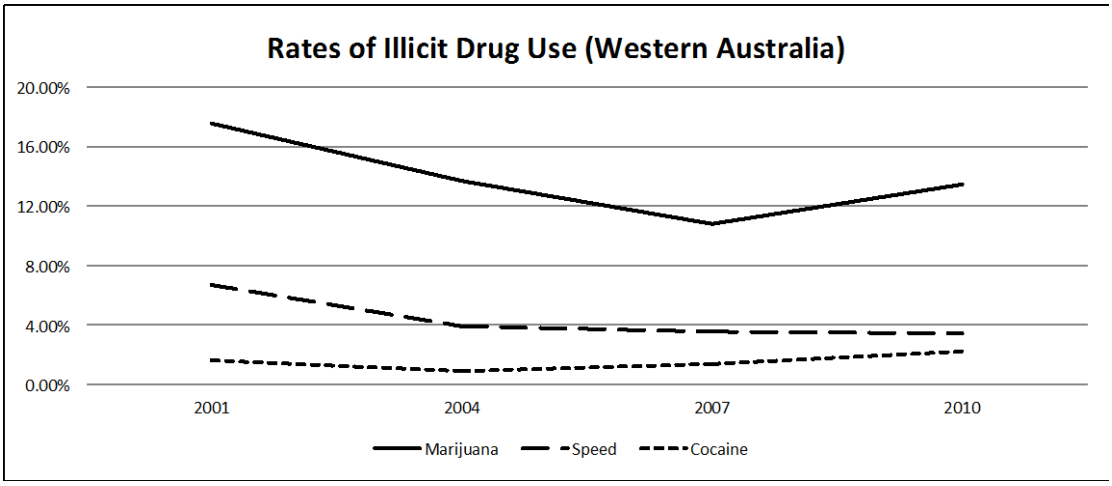
Drug Use in Australia and Western Australia

Using the (observed) data gathered at three year intervals by the National Drug Strategy Household Survey (NDSHS) from 2001 to 2010 we examined the participation rates for the use of marijuana, speed and cocaine. From this we found that of the three illicit drugs, the incidence of marijuana consumption is the most prevalent (with an average of 12%), followed by speed at 3% and then cocaine at 1%.

The charts shown below (Figure 1) compare illicit drug use over the four available survey years in Australia and WA. Across the observed period, the rates of marijuana use in WA (17.5%, 13.7%, 10.8% and 13.4%, respectively) consistently and significantly exceed the national average (12.9%, 11.3%, 9.1% and 10.3%, respectively). Speed use is also higher in WA. Both nationally, and within WA, there was a downward trend in illicit drug use, particular with respect to marijuana, from 2001 to 2007. This trend had reversed by the 2010 survey. It is interesting to note that the rise in the national averages in these incidence rates is primarily driven by WA (and New South Wales).

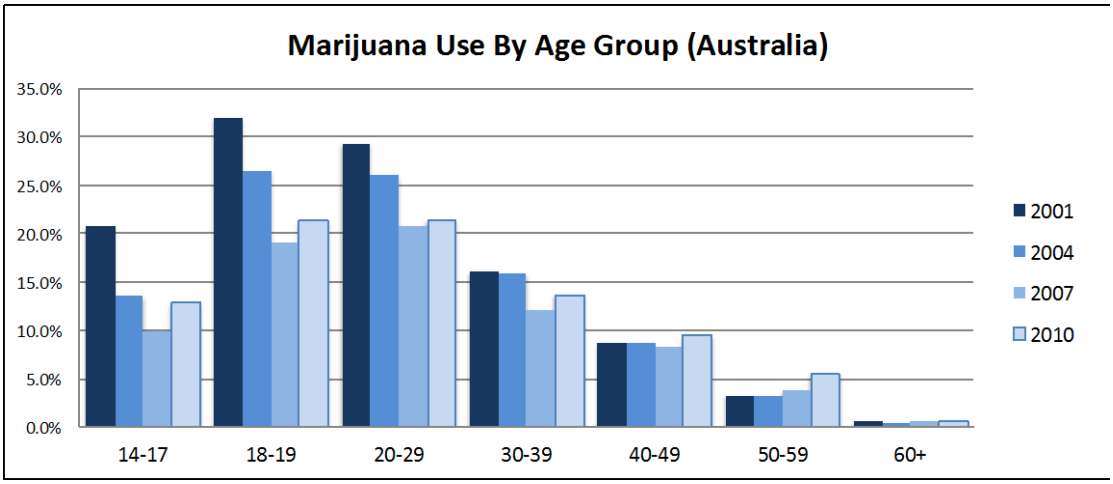
Figure 1: Incidence Rates

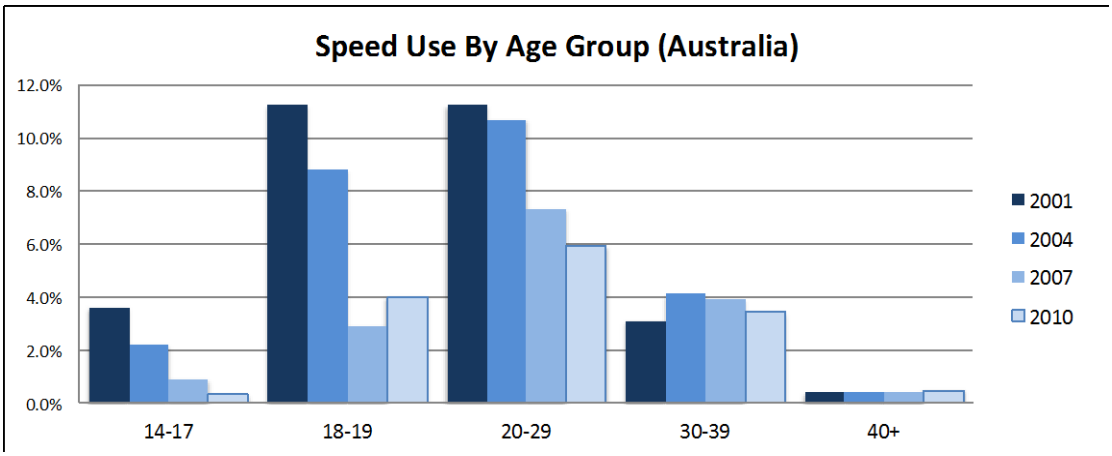


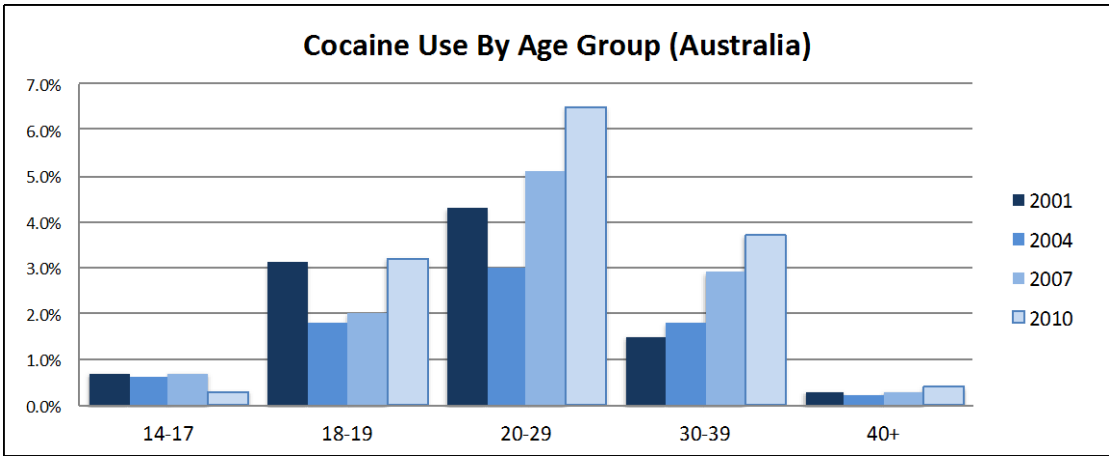


Illicit drug use varies over the life cycle of individuals. The following charts (Figure 2) demonstrate how participation rates vary for marijuana, speed and cocaine, respectively. Peak usage for all three drugs accelerates towards a peak in the 18-19 and 20-29 age groups before declining in older age groups.

Figure 2: National Incidence Rates by Age

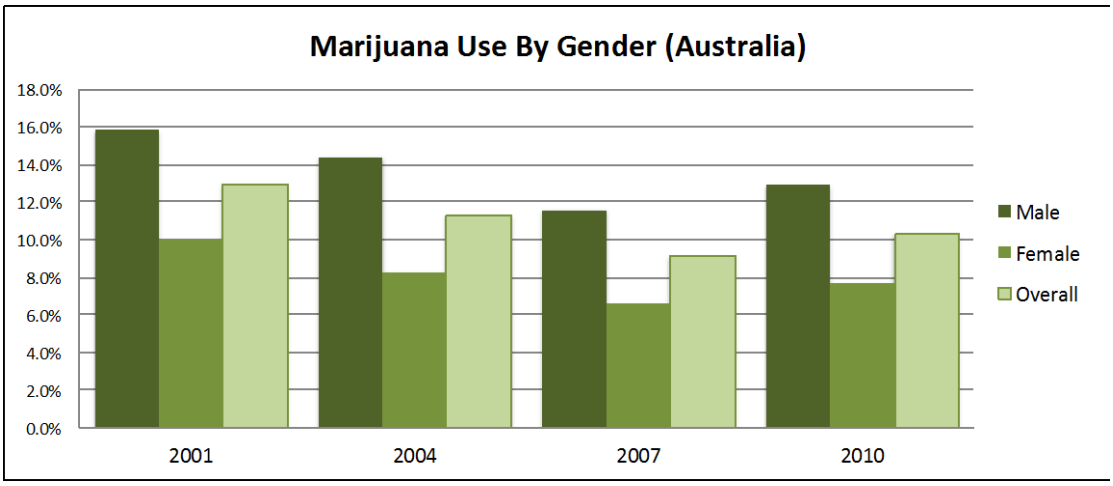


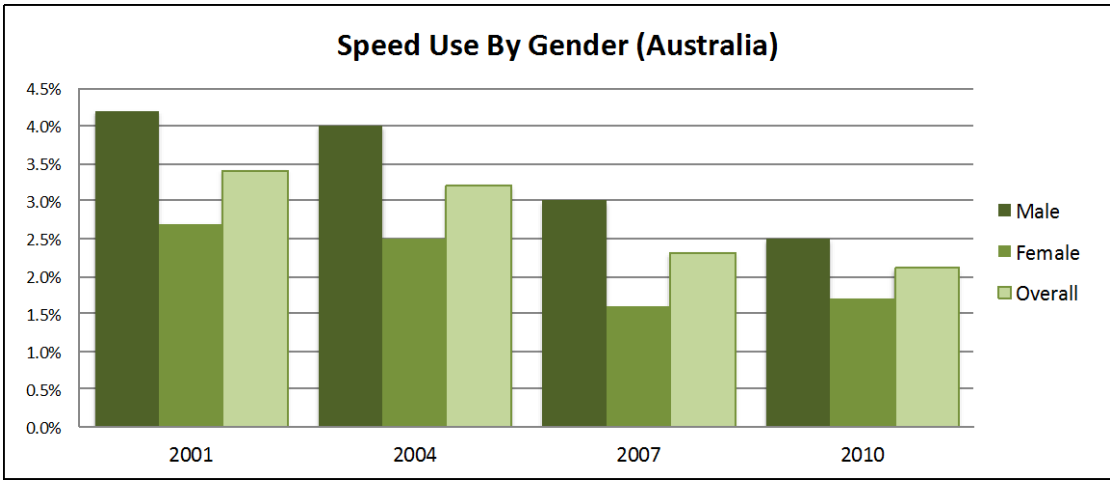


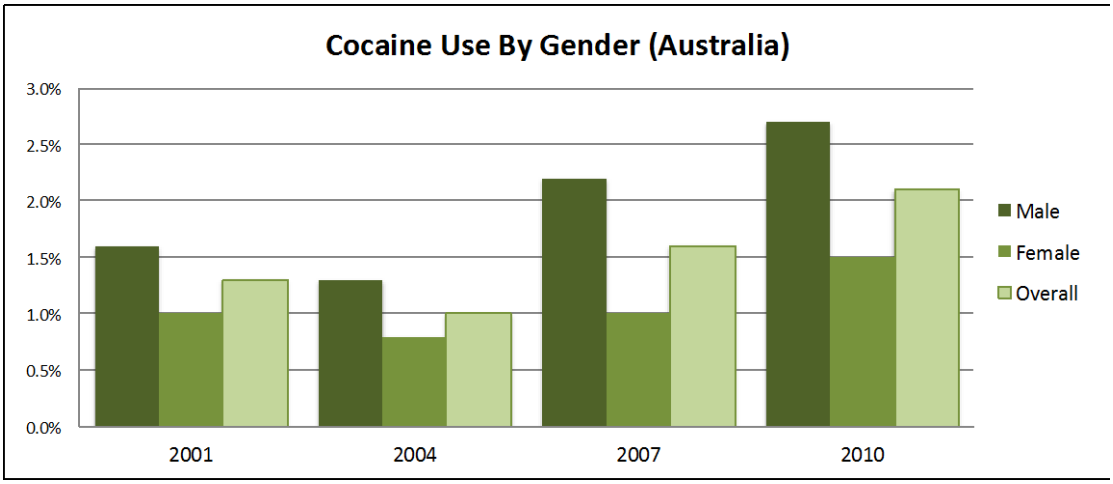


Illicit drug use is also very likely to differ by gender. In Figure 3 below, we report incidence rates across males and females. Across the three illicit drugs analysed, males reported higher participation rates than females. The relationship between gender and drug participation rates is detailed in the following charts.

Figure 3: Incidence Rates by Gender







Predicting Drug Use and Incidents of Mis-Reporting

The model specified in the technical paper allows us to predict both the probability of an individual using illicit drugs and the probability of mis-reporting his/her use of illicit drugs. In order to do this, the model relies on two sets of explanatory variables. One set of variables is used to measure the likelihood that an individual participates in the consumption of illicit drugs; the other is used to determine the probability of misreporting.

It is important to identify factors that influence the mis-reporting decision but not the participation one. Specifically, we control for: if anyone else was present when the respondent was completing the survey questionnaire; if anyone helped the respondent complete the survey questionnaire; and the survey mode. We also include a variable that identifies a respondent's general lack of trust in the survey, which we measure using the percentage of unanswered questions.

The approach used in the technical paper is particularly useful to policy-makers in that it provides both insights into which demographic features influence consumption of illicit drug *and* those which affect mis-reporting probabilities of this drug. That is, although superficially incidence rates may appear to be higher for males, this may simply be a result of males having a higher tendency to mis-report their consumption patterns. It is only using such an approach as developed in the technical paper, that it is possible to disentangle these effects.

The table (Table 1) shown below provides an outline of the (statistically significant) explanatory variables that affect the likelihood of an individual consuming illicit drugs. A "positive" ("negative") effect means that a factor increases (decreases) the probability of an individual consuming the respective illicit drug.

Table 1: Estimated Effects on Incidence Rates

Variable	Marijuana	Cocaine	Speed
Is male	Positive	Positive	Positive
Age	Varying over life cycle (*n*-shaped)	Varying over life cycle (*n*-shaped)	Varying over life cycle (*n*-shaped)
Is married	Negative	Negative	Negative
Is a parent of preschool children	Negative	Negative	Negative
Single parent	None	None	None
Aboriginal and/or Torres Strait Islander	Positive	Negative	Negative
Lives in a capital city	None	Positive	Positive
Lives in a state which has decriminalized marijuana	Positive	None	None
Income	Positive	Positive	Positive
Education	Positive	None	Negative
Has a tattoo and/or body piercing	Positive	Positive	Positive
Price of illicit drug	None	None	Negative
Price of tobacco	None	None	Negative
Price of alcohol	None	Positive	Positive

The following table (Table 2), shown below, lists the explanatory variables that influence the likelihood of an individual mis-reporting their consumption of illicit drugs. Significant here are variables that relate to the nature of the survey, such as the presence of other people and the perceived lack of trust held by the respondent. This is an important consideration for public health researchers. These results indicate that all surveys are not created equally and researchers, through their choice of survey type, could adversely affect the accuracy into their results.

In terms of the variables employed to capture the likelihood of mis-reporting, 29% of the sample were interviewed with another individual present, 23% of the sample indicated that they were given help to complete the questionnaire, 18% were interviewed using the CATI or face-to-face method and on average 4% of compulsory questions were left unanswered in the survey.

Table 2: Estimated Effects on Mis-Reporting Rates

Explanatory Variable	Effect on mis-reporting of marijuana use	Effect on mis-reporting of cocaine use	Effect on mis-reporting of speed use
Is male	Negative		Positive
Age	None	None	None
Is unemployed	None	Positive	None
Education	Positive	None	None
Is a new migrant	None	Positive	Positive
Lives in a state which has decriminalized marijuana	Positive	Positive	None
Another individual was present during survey	Positive	Positive	Positive
The respondent sought help to fill in survey	Positive	None	None
Survey type	Positive	Positive	Positive
A perceived lack of trust was identified	Positive	Positive	Positive

Summary of Results and their Implications for Corrected Participation Rates

Based on the survey responses alone, one would estimate the average participation rates across the relevant survey years in marijuana, speed and cocaine, respectively, to be 11.8, 3.0 and 1.3%. However, we estimate, once mis-reporting has been taken into account, that these are significantly higher at 16.7, 3.6 and 2.3%, respectively. Technically, we can be very confident of these estimates.

For cocaine we found a staggering 36% chance of mis-reporting. For cannabis, the chance is still quite large, at 18%, although much less than with the harder drug of cocaine (as would be expected due to increased adverse relative perception of the two drugs). Somewhat surprising, is the relatively small conditional probability of mis-reporting for speed, at 5%. However, for technical reasons, we are less confident on this estimate.

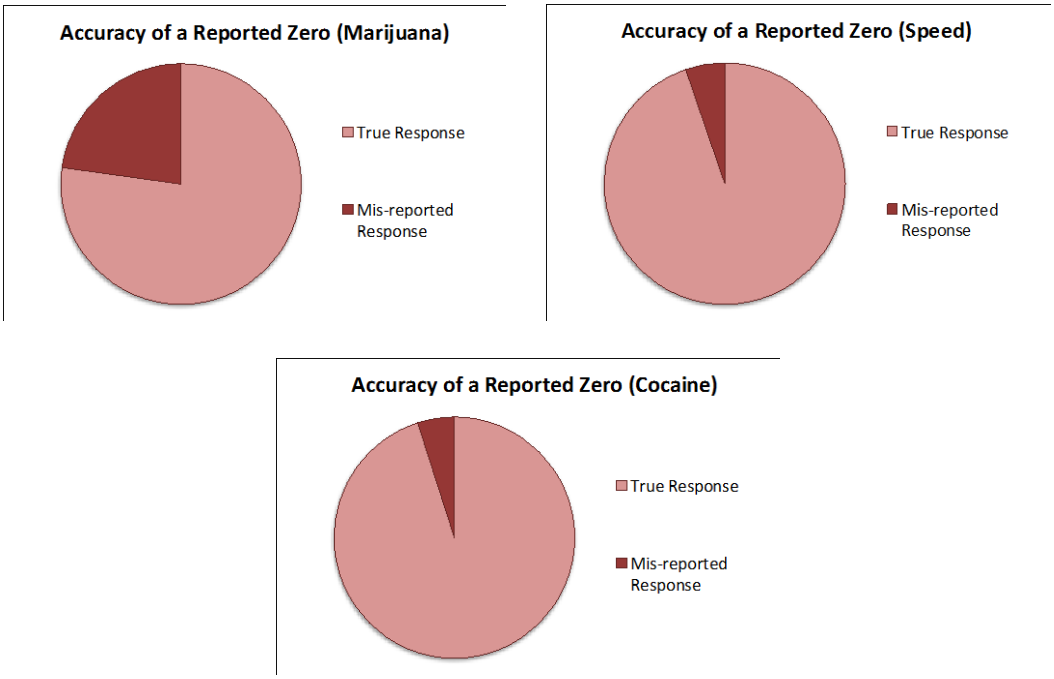
We can calculate participation and mis-reporting probabilities that apply to a randomly selected individual from the population, about whom we know nothing except for their characteristics. For instance, an overall predicted probability of 86.7% of zero consumption in the case of marijuana is made up of the respective probability of, non-participation (83.3%), and mis-reporting (3.6%). For speed, of the total probability of a recorded zero of 97%, some 0.73 percentage points can be attributed to mis-reporting; and finally for cocaine, of the overall 99%, some 0.80 percentage points can be attributed to mis-reporting. In view of the low rates of participation, the mis-reporting components here may appear to be small. However, when translated to the Australian population aged 14 and above, they represent nearly 600 000, 130 000

and 145 000 cases of unreported cases of marijuana, speed and cocaine use, respectively. This scale of under reporting can have important implications for drug policies.

To provide further insights into the extent of mis-reporting, it is possible to calculate probabilities that are conditional on knowing what response the individual chose. This attempts to answer the question, given that an individual recorded a zero, what is the probability that they are a true non-participant versus a mis-reporting participant (given their observed characteristics)?

We find that just over 77% of the reported zeros (*i.e.*, non-participation) for marijuana are estimated to come from genuine non-participation while almost 23% come from those who have mis-reported their participation. For speed and cocaine, about 95% of the zero participation is accounted by non-participation while about 5% comes from mis-reporting. These are illustrated graphically in Figure 3 below.

Figure 3: Incidence Rates by Gender



How does misreporting behavior in Western Australia compare to national levels?

Not only are drug participation rates higher in WA relative to the national average, we also find higher mis-reporting rates relative to national levels. For instance the likelihood of mis-reporting cannabis use Australia-wide for an average person randomly from the population is close to around 18% as compared to 20% in WA. Mis-reporting speed and cocaine use is also slightly higher in WA (around 5.8%) in comparison to national levels (5.3%). We also find a few demographic differences in mis-reporting relative to national levels. Males are more likely to mis-report any drug use in WA; married individuals are less likely to mis-report use of marijuana Australia-wide but more likely to do so in WA. Individuals of aboriginal status have a

higher rate of mis-reporting marijuana use but lower probability of mis-reporting use of speed and cocaine Australia-wide than in WA. Recent migrants are more likely to mis-report any drug use in WA.

Conclusion

Overall, we find that mis-reporting has a significant effect on observed participation rates such that, across all three drugs, the predicted marginal probabilities of participation are substantially higher than that in the sample rate of participation as indicated by the raw survey data. This is caused by some quite high propensities to mis-report. We also find a slightly higher propensity to misreport in WA as compared to national levels. Interestingly, our findings suggest that the extent of mis-reporting is influenced by how the survey was administered as well as factors such as the presence of other individuals when the survey was completed. Such findings suggest that the conditions under which survey data is collected impact the accuracy of the information obtained. Our findings suggest that accounting for mis-reporting is important when drawing conclusions from survey data related to sensitive activities, especially where such data is used to inform public policy.

Future Work

Future work is likely to consider:

- The incidence of the use of pharmaceuticals for non-medical purposes (painkillers, tranquillisers and steroids, for example). This is an area of growing concern worldwide, nationally and within WA.
- Whether incidence rates of legal and illegal drugs are affected by the industry and occupational choices of an individual. We will pay particular attention to those individuals employed in the mining sector.
- Finally, the project is likely to consider the interaction of any mis-reporting and industry/occupational effects on observed drug-taking behaviour. Again, interest here will focus on those industries particularly pertinent to WA. Take the mining sector: there is plenty of anecdotal evidence that employees in this sector (in WA) are often subject to long periods away, a stressful work environment and regular drug (and alcohol) testing, however, they also enjoy relatively high incomes. It is unclear, and indeed unknown, how the interaction of these influences will affect both drug (legal, illegal and prescription) consumption, and also self-reports of these. This part of the research will therefore be able to answer questions such as: *is drug-taking more pronounced in the mining sector (everything else equal)*? And *is mis-reporting of drug-taking behaviour more prevalent in the mining sector (everything else equal)*?