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Stimulant use transitions and harm mitigation responses: Analysis of a qualitative dataset

Ellen Leslie
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Stimulant use transitions and harm mitigation responses: Analysis of a qualitative data set

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**Funded by the National Drug Law Enforcement Research Fund,
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Acronyms

AOD	Alcohol and other drug
ATS	Amphetamine-type stimulants (ie ecstasy [MDMA] and methamphetamine)
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders IV
GHB	Gamma hydroxybutyrate
MDA	3,4-Methylenedioxyamphetamine
MDE	3,4-MethylenedioxyNethylamphetamine
MDMA	3,4-Methylenedioxymethamphetamine
MMP	Montana Meth Project
NDC	National Drugs Campaign
NDLERF	National Drug Law Enforcement Research Fund
NHSDU	Natural History Study of Drug Use
WMH-CIDI	World Mental Health Survey Initiative version of the World Health Organisation's Composite International Diagnostic Interview

Executive summary

Introduction

This project aims to develop effective harm-reduction messages and strategies for young adult illicit stimulant users. It focuses on identifying threshold moments in the lives of users of amphetamine-type stimulant (ATS) such as ecstasy [MDMA] and methamphetamine. Data for this project comes from a broader study, the Natural History Study of Drug Use—a longitudinal study that followed a population-based cohort of young adult ATS users for four and a half years. In-depth qualitative interviews were conducted at the start of the study with these users. They were asked about the most recent occasion of ecstasy or methamphetamine use—in particular the social context and setting of use, subjective effects of use, using other drugs (including alcohol) in conjunction with ecstasy or methamphetamine, and recovering from the drug experience.

This project analysed the baseline interview data, as well as that from four follow-up waves over the study's four and a half years. It looks at the natural history of ATS use, in particular:

- initiation of ATS use;
- patterns of ATS use;
- simultaneous and concurrent use of licit and illicit substances with ATS; and
- motivating factors and predictors of desistance from ATS use.

This document compares patterns of ATS and other substance use between well-managed and at-risk ATS users. It also explores harm-reduction practices among ATS users and discusses proposals for effective harm-reduction messages and strategies for young adult ATS users.

Findings

Initiating amphetamine-type stimulant use

This study indicates that ecstasy use is commonly initiated prior to or at the same time as methamphetamine use. On average, ATS users in the sample were first offered ecstasy and methamphetamine at about 17 and 18 years of age, respectively. Three quarters of ATS users were initially offered ATS by a friend, with smaller proportions first offered ATS by a partner (about 9%), acquaintance (about 7%), or family member (about 4%). Only about two percent of ATS users were first offered ATS by a dealer. The most common reasons given for first trying ecstasy and methamphetamine were curiosity (about 44% of ATS users) and influence of social networks (about 45%). While prior illicit substance use was not mentioned as a reason for first trying ecstasy, approximately 11 percent of methamphetamine users volunteered prior substance use as a motivating factor for trying methamphetamine.

The natural history of amphetamine-type stimulant use

This study identified a group of well-managed ATS users, defined as those who were engaged in low or intermediate frequency patterns of ATS use and who had not had any substance-related contact with health services, had not had intensive substance-related contact with police and had never been charged with a drug-related offence. Approximately 28 percent of ATS users met these criteria for well-managed use. A significantly higher proportion of well-managed ATS users were female compared with at-risk users (71%

vs 46%). However, well-managed and at-risk ATS users did not differ significantly in age, sex, education, employment or income.

Well-managed and at-risk ATS users' substance use differed in a number of ways. At-risk users were first offered ecstasy at a significantly younger age than well-managed users. At-risk ATS users also first tried ecstasy, alcohol and cannabis at significantly younger ages than well-managed users. Additionally, they first progressed to regular (ie monthly) use of alcohol at an earlier age than well-managed users. These findings suggest that earlier initiation into substance use, particularly alcohol use, may be associated with risky ATS use.

Examination of ATS use patterns suggests that at-risk ATS users were engaged in longer periods of using ecstasy and may use ecstasy more intensively. They had consumed a greater number of ecstasy pills in their lifetime at baseline (average of 171 pills) compared with well-managed users (average of 92 pills). At-risk users also consumed significantly greater quantities of ecstasy on their most recent occasion of ATS use at baseline compared with well-managed users. This study found a significant difference between well-managed and at-risk ATS users in the number of years of ecstasy use at baseline (well-managed: average 2.7 years; at-risk: average 3.3 years). Similar relationships were not found for methamphetamine use.

Amphetamine-type stimulant use and other licit and illicit substance use

Poly-drug use was prevalent among young adult ATS users in this study, with alcohol, tobacco and cannabis the substances most commonly used simultaneously and concurrently with ATS. The findings suggest that poly-drug use may be more intensive among at-risk ATS users compared with well-managed users. Significantly higher proportions of at-risk ATS users generally used tobacco and cannabis during episodes of ATS use and significantly higher proportions of at-risk users had used cocaine, inhalants and ketamine, compared with well-managed users. At-risk ATS users may also be engaged in more hazardous use of alcohol and tobacco compared with well-managed users. Significantly higher proportions of at-risk ATS users had experienced lifetime alcohol dependence (40% vs 22%), alcohol abuse (76% vs 47%) and nicotine dependence (55% vs 30%), compared with well-managed users, after four and a half years of follow-up. Using a combination of licit and illicit substances with ecstasy and methamphetamine appears to have a number of instrumental functions including increasing positive subjective effects and mitigating negative effects.

Desisting from amphetamine-type stimulant use

Just under half of well-managed (46%) and at-risk ATS users (43%) had desisted from ATS use at the four and a half-year follow-up. Those who were current ATS users mostly used ATS infrequently. However, frequent use (ie monthly or more often) was more common among at-risk ATS users (frequent ecstasy use: 7% vs 2%; frequent methamphetamine use: 7% vs 3%), compared with well-managed users. This suggests that, while there is a general decreasing trend for ATS use from baseline to four and a half years for most users in the sample, some at-risk users may potentially be engaged in more entrenched patterns of frequent use. However, most of these at-risk users who are continuing to use monthly or more often, have already decreased their use to the extent that the health or social impacts may be minimal.

The qualitative data identified a number of motivating factors for reducing or desisting from ATS use, including: negative effects and reduced positive effects, 'growing up', peer and partner influence, and risks and negative consequences. These motivating factors were generally linked to changes in personal circumstances or ATS use interfering with users' 'normal life'. Drawing on this qualitative analysis, quantitative analysis examined potential predictors of desistance from ATS use at the four and a half year follow-up. Having a smaller network of ecstasy-using peers (at baseline and 12 months) and being in a de facto relationship or marriage (at 4½ years) were both significantly associated with desistance from ATS use. These findings appear to suggest that informal social controls may play an important role in desistance from ATS use for young adults.

Harm mitigation messages and strategies for ATS users

While most ATS users engage in recreational use, a sizeable proportion of ATS users develop dependence and experience chronic health issues resulting from their use. However, ATS users are recognised for low rates of participation in health treatment services. This indicates a need to develop harm-reduction messages and strategies that are appropriate for and well accepted by ATS users, and that are accessible outside of mainstream specialist treatment services. Users of ATS engage in a number of behaviours that they perceive to reduce substance use-related harms. However, not all ATS users consistently or correctly engage in harm reduction strategies and users may be likely to neglect these strategies if they interfere with having a good time.

Four key areas of focus for harm reduction among young adult ATS users emerged from the current study:

- combined alcohol and ATS use;
- combined ATS and other stimulant use and high stimulant dosages;
- consumption of unknown substances; and
- high frequency ATS use.

Harm-reduction messages and strategies focusing on these themes for young adult ATS users need to be specifically targeted in order to be effective. Due to the close-knit, social nature of ATS use, particularly among ecstasy users, harm-reduction strategies are likely to emerge and become entrenched within drug-using groups. Drug users, if supplied with accurate and current information, may play an important (but usually informal) role in disseminating harm-reduction messages and strategies within their networks. Messages that are positive and acknowledge the place of pleasure within recreational ATS use may be more likely to resonate with young adult users who do not identify themselves as drug users, but instead view their substance use as a relatively normal part of young adult life. This highlights the importance of involving stimulant users in developing and disseminating harm reduction strategies and messages. While most harm-reduction strategies currently focus on the individual, it may be more effective to focus on ATS-using networks, and target the collective norms within these groups.

Study implications

- This study provides some unique information on patterns of drug use among a population-based sample of young adult ATS users. This could be incorporated in campaigns aimed at discouraging ATS use or encouraging reduced use and safe substance-use behaviours among current users.
- Associations were found between risky ATS use and earlier initiation into using alcohol, cannabis and ecstasy. Earlier progression to regular (ie at least monthly) alcohol use was also associated with risky ATS use. These findings suggest that earlier substance use, particularly alcohol use, may be linked with later patterns of risky ATS use. Strategies and campaigns that focus on delaying initiation into substance use among adolescents may help reduce subsequent risky patterns of ATS use.
- Ecstasy use may increase the likelihood of using methamphetamine. Ecstasy use was most commonly initiated prior to or within the same year as methamphetamine use. A small proportion of ATS users (11%) also reported that prior illicit substance use, including using ecstasy, influenced their decision to first try methamphetamine. This suggests that young adult ecstasy users and those groups likely to use ecstasy may be important target groups for campaigns discouraging methamphetamine use.
- At-risk ATS use may be linked with heavy patterns of using other licit and illicit substances, including alcohol and tobacco. This has important implications for frontline workers. Users with comorbid drug-use disorders are likely to be more difficult to treat and require specific skills and resources. It may be worth reviewing the strategies and resources available to frontline workers for users with comorbid disorders.
- Among both at-risk and well-managed young adult ATS users, almost half had desisted from ATS use by the study's four and a half-year follow up. Motivating factors were often linked to changes in personal

circumstances or ATS use interfering with users' 'normal life'. These findings suggest that informal social controls may play an important role in desistance from drug use for young adult users.

- Campaigns from Australia and the United States that have used graphic, negative imagery to discourage or reduce drug-use have been shown to be generally ineffective. For current drug users, campaigns that focus on positive messages, which reflect users' humour and the motivations and culture surrounding their substance use, may be more effective in reaching these users and having an impact on their subsequent behaviour. It is crucial that these messages are targeted to tap into the particular cultures and cultural practices of different groups of users.

Introduction

Project background

This project was funded by the National Drug Law Enforcement Research Fund (NDLERF) to help policymakers and law enforcement bodies better understand the use of amphetamine-type stimulants (ATS) such as ecstasy [MDMA] and methamphetamine. It aims to aid the development of effective messages and strategies for moderating or stopping ATS use and associated problematic alcohol and other drug (AOD) use. It identifies threshold moments in the life of Australian young adult ATS users and examines different patterns of ATS use among young adults (ie well-managed and at-risk use). It also explores a number of elements of the natural history of ATS use, including:

- initiation of ATS and other substance use;
- patterns of ATS use;
- simultaneous and concurrent use of other licit and illicit substances with ATS; and
- desistance from ATS use.

Harm mitigation messages and strategies for young adult ATS users are also discussed. The project uses data from the Natural History Study of Drug Use (NHSDU). This is a longitudinal study of drug use in a population-based sample of young adult ATS users and non-users in South-East Queensland, Australia. At the time of this project, the young adult cohort of the NHSDU had been followed-up for a period of four and a half years. When recruited in 2009, the study respondents were between 19 and 23 years old. At the most recent follow-up, conducted in 2013–14, study respondents were between around 24 to 27 years old. The collection of data from this cohort at a number of time points, spanning several years, makes it possible to assess important drug-related changes or transitions occurring in early adulthood.

The project aimed to:

- identify the causal precursors of ATS and other drug use;
- map the natural history/life-course of ATS users whose use is well managed to the extent that they successfully avoid coming to the attention of either law enforcement agencies or public health bodies;
- identify the relationship between well-managed ATS use and using other licit and illicit substances;
- identify the causal factors associated with desistance from ATS use; and
- develop nationally relevant harm mitigation messages and strategies that resonate (and are therefore more likely to be effective) with a population of ATS users who do not self-identify as problematic drug users.

Report structure

This report has five main sections, addressing:

- initiating ATS use;
- the natural history of ATS use;
- ATS use and other licit and illicit substance use;
- desisting from ATS use; and
- harm mitigation messages and strategies for ATS users.

Initiating ATS use

This section examines the order in which users are initiated into ecstasy and methamphetamine. Details are then provided regarding first offers of ecstasy and methamphetamine, including age at the time of first offer and who offered these substances. It also examines the reasons for first trying ecstasy and methamphetamine.

Natural history

This section looks further at the natural history of ATS users, comparing well-managed and at-risk ATS users. Differences are examined for sociodemographic characteristics, the progression from first offer to first use to first regular use for ATS and other licit and illicit substances and patterns of ecstasy and methamphetamine use.

Substance use

This section examines the simultaneous and concurrent use of licit and illicit substances with ATS. It looks at ATS users' poly-drug use, focusing on alcohol, tobacco and cannabis use, comparing well-managed and at-risk ATS users. It also examines functions of combined use of alcohol, tobacco and cannabis with ATS.

Desisting from use

This section examines desistance from ATS use. Qualitative data is used to explore what factors motivate young adult ATS users to reduce or desist from ATS use. Details are provided regarding proportions of well-managed and at-risk ATS users who have desisted from ATS use at the four and a half-year follow-up. The themes that emerged from the qualitative data are then explored through quantitative analyses.

Harm mitigation

This section considers harm minimisation strategies for young adult ATS users. It explores harm minimisation strategies that are used by ecstasy and methamphetamine users. Four key areas of concern for harm reduction among young adult ATS users emerged from the literature, analysis of NHSDU data and a focus group with local stakeholders. These are presented and potential harm-reduction messages and strategies are discussed.

Methodology

Background

The NHSDU cohort was originally established as part of an Australian Research Council (ARC) Linkage Study, administered by the University of Queensland and involving Queensland Health and the Crime and Misconduct Commission. The NHSDU was initiated in response to growing concern over high levels of ATS use and a lack of knowledge about patterns and consequences of long-term use. The study was designed to increase understanding of ATS use during early adulthood from a life course or 'natural history' perspective. Four additional waves of data have been collected since the baseline interview in 2009, the last of which occurred in 2013–14.

Participants

A novel form of population screening was used for the NHSDU to develop a probabilistic sampling frame of young adult users and non-users of ATS. The main screening and recruitment phases of the study were in 2009, with a one-page screening questionnaire mailed to about 12,000 young adults living in Brisbane or the Gold Coast, Queensland (recruited from the electoral roll). The screening questionnaire asked questions about lifetime use of alcohol, tobacco, cannabis, ecstasy and methamphetamine. This screening information was used to develop a sampling frame from which an ATS-user group, and a comparison group of non-users, were recruited.

Respondents were eligible to be recruited into the main study group (ie ATS users; n=352) if they had used ecstasy or methamphetamine three or more times within the last 12 months. This inclusion criterion was used to ensure that recurrent ATS users were recruited, rather than young adults who were 'experimenting' with ATS use or using as a one-off. The comparison group (ie ATS non-users; n=204) comprised a random selection of the young adults who had never used ATS at the time of screening. This inclusion criterion did not extend to the non-use of other drugs, as the NHSDU was concerned with differentiating long-term patterns of behaviour on the basis of ATS use. Consequently, some members of the comparison group had used other illicit substances, such as cannabis. The sampling and recruitment method of the NHSDU is described in greater detail elsewhere (Smirnov et al. 2014).

Data collection

To date, five waves of data collection have been conducted with the main study group (ATS users) and four waves with the comparison group (non-users). This was done at baseline (face-to-face interview), six months (internet survey), 12 months (face-to-face interview, ATS users only), 30 months (internet survey) and 54 months (4½ years; face-to-face interview). The data for the current project were primarily collected at the baseline interview, however data from other waves of the study have also been used to examine changes in patterns of drug use over time.

As part of the baseline data collection for the NHSDU, in-depth qualitative interviews were conducted with all ATS users who consented to this component of the research (99.4%). The interview focused on the respondent's most recent occasion of ecstasy or methamphetamine use, particularly the social context and setting of use, subjective effects of use, using other drugs (including alcohol) in conjunction with ecstasy or methamphetamine and recovery from the drug experience. The most recent occasion of use was chosen as the theme for a number of reasons, including: to maximise the accuracy of participant recall, to map the

trajectory of a single occasion of use (ie preparations, drug onset, intoxication, 'comedown' and recovery) and to attend to specific experiences rather than generalisations about each respondent's drug use.

Interviews generally lasted 15–20 minutes. A semi-structured interview guide was provided; however, interviewers were trained in qualitative interviewing techniques and were able to go beyond the provided questions to explore relevant topics and promote open discussion. Interviews were digitally recorded and then subsequently transcribed and the text imported into the qualitative analysis software NVivo 10.

In March 2015, a focus group of relevant stakeholders discussed harm-reduction messages and strategies for young adult ATS users. Participants included representatives from the Queensland Police Service, Queensland Health, and youth drug and alcohol centres and services, including the Queensland University of Technology's Centre for Youth Substance Abuse Research, Dovetail, Lives Lived Well, the Ted Noffs Foundation, Logan YFS, Adolescent Drug and Withdrawal Service, Drug Arm, and Brisbane Youth Service. Along with NHSDU data and the harm-reduction literature, this focus group was used to inform and shape the proposals provided in this report regarding harm-reduction messages and strategies for young adult ATS users.

Natural History Study of Drug Use participant retention

Participant retention rates for the NHSDU are presented in Table 1. The study's rates have been reasonably good. They have varied slightly between face-to-face interviews and internet surveys, due to participant availability and capacity or willingness to attend face-to-face interviews.

Table 1: Recruitment and attrition for established Natural History Study of Drug Use cohort, 2009–14

Year	Activity and response	
2009	Random population screening activity: 12,079 valid screening questionnaires sent to valid addresses, 6,027 complete screeners returned (49.9% response rate)	
	ATS using group	Comparison group (non-users)
2009	Pool of 522 eligible respondents, 67.4% were available and agreed to participate (n=352) Baseline face-to-face interview: n=352	Pool of 4,682 eligible respondents; 320 were randomly selected for the study and of these 63.8% were available and agreed to participate (n=204) Baseline face-to-face interview: n=204
2009–10	6 month follow-up internet survey: n=335 (95.2% participation rate)	6 month follow-up internet survey: n=201 (98.5% participation rate)
2010	12 month face-to-face follow-up interview: n=315 (89.5% participation rate)	No 12 month interview was conducted for the comparison group
2011	30 month follow-up internet survey: n=319 (90.6% participation rate)	30 month follow-up internet survey: n=190 (93.1% participation rate)
2013–2014	54 month (4½ year) follow-up face-to-face interview: n=274 (77.8% participation rate)	54 month (4½ year) follow-up face-to-face interview: n=169 (82.8% participation rate)

Sample profile

As the NHSDU used a population-based sampling approach, this ATS user cohort differs in several ways from other Australian ATS user samples. It represents a greater variety of patterns of ATS use, which reflects the range of behaviour occurring within the population. In this cohort, ATS users did not differ markedly in education and employment from the comparison group of young adult non-users (see Table 2 below). The ATS users had a higher income compared with non-users at baseline, which may reflect a tendency for this group to leave school and other educational institutions at a younger age and enter full-time work earlier (42.4% of ATS users worked full-time at baseline compared with 29% of non-users). At the four and a half year follow-up, similar proportions of ATS users had completed some form of tertiary education qualification

(including trade and TAFE qualifications) and were employed either part- or full-time. At four and a half years income levels did not differ significantly between ATS users and non-users. The ATS users in this cohort comprise a relatively functional group of young adults.

Alcohol and cannabis use differed significantly between ATS users and non-users. Significantly higher proportions of ATS users had engaged in at least one occasion of harmful drinking (>4 standard drinks on a single occasion of use; NHMRC 2009) in the last month at both baseline (ATS users: 90.5%; non-users: 59.2%) and four and a half years (ATS users: 82.1%; non-users: 48%). These binge patterns of alcohol consumption were highly prevalent among ATS users, with approximately 91 percent and 82 percent of ATS users engaging in binge patterns within the last month at baseline and at four and a half years. Significantly higher proportions of ATS users (96.6%) also reported lifetime cannabis use at the study baseline compared with non-users (30.9%).

Table 2: Sample characteristics: ATS user group (n=262) vs comparison group (n=152)

	Sample characteristics		Test statistic
	ATS user group % (n=262)	Comparison group % (n=152)	
Age at baseline			t=0.88
Mean (SD)	20.8 years (1.20)	20.7 years (1.34)	
Range	19–23 years	19–23 years	
Sex			$\chi^2=2.52$
Female	53.8	61.8	
Male	46.2	38.2	
Education at baseline			$\chi^2=0.26$
Completed high school	67.1	71.2	
Tertiary education ^a			$\chi^2=2.05$
Completed tertiary education	55.1	67.3	
Income at baseline^b			$\chi^2=24.01^{***}$
0–\$999	47.7	71.7	
\$1,000–\$1,299	22.1	9.9	
\$1,300–\$1,599	17.6	9.9	
\$1,600–\$1,999	6.9	5.9	
≥\$2,000	5.7	2.6	
Employed at baseline			$\chi^2=7.53^*$
Full-time	42.4	29.0	
Part-time	44.3	55.9	
Income at 4½ years^b			$\chi^2=1.21$
0–\$999	22.9	26.3	
\$1,000–\$1,299	11.1	8.6	
\$1,300–\$1,599	19.5	18.4	
\$1,600–\$1,999	26.0	25.0	
≥\$2,000	20.6	21.7	
Employed at 4½ years			$\chi^2=0.36$
Full-time	63.7	65.1	
Part-time	22.1	19.7	
Alcohol single occasion harmful use at baseline			$\chi^2=56.59^{***}$
Consumed >4 standard drinks on a single occasion in the last month	90.5	59.2	
Alcohol single occasion harmful use at 4½ years			$\chi^2=52.63^{***}$
Consumed >4 standard drinks on a single occasion in the last month	82.1	48.0	
Lifetime cannabis use at baseline			$\chi^2=207.73^{***}$
Ever used cannabis	96.6	30.9	

* p<0.05, *** p<0.001

a: Measured at baseline and 30-month follow-up; tertiary education refers to university, Technical and Further Education (TAFE) or trade qualifications

b: Refers to average fortnightly income (after tax)

Ecstasy use trajectories

Most of the ATS users in the NHDSU cohort had used ecstasy regularly, with a subgroup having also used methamphetamine. This reflects the higher population prevalence of ecstasy, compared with methamphetamine, at the time of recruitment for the study. Different ecstasy-use trajectories (ie 'low-use', 'intermediate-use' and 'high-use') have been identified among this cohort (Smirnov et al. 2013), all of which declined within a 30-month follow-up period. More than a third (35.7%) of ecstasy users were members of the 'low-use' trajectory, which was characterised by stable patterns of very minimal use (ie less than once a month). Most (56.2%) were members of an 'intermediate-use' trajectory, with this group initially using slightly more than once a month and then quickly declining to less than monthly use. Less than one in ten (8.1%) users were involved in a 'high-use' trajectory; these users were initially using one to two times a week, but this peak use rapidly escalated and de-escalated within 12 months. After 30 months, users in the 'high-use' trajectory group tended to be using ecstasy less than twice a month.

Measures

1. Initiating amphetamine-type stimulant use

Amphetamine-type stimulant offers

At baseline, participants reported their age when they were first offered ecstasy and methamphetamine and how many times they were offered these substances before first using each of them. At 30 months, participants were asked who first offered them ecstasy and methamphetamine.

Initiation of amphetamine-type stimulants

At baseline, participants reported their age at their first use of ecstasy and methamphetamine. They were then asked their reason(s) for first trying these substances at baseline and were asked again at the 12-month follow-up, using an open-ended question.

2. The natural history of amphetamine-type stimulants

Well-managed amphetamine-type stimulant use

Well-managed ATS users were defined as those with less frequent patterns of ATS use (ie less than weekly at baseline) who had no substance-related health service contact, no intensive substance-related police contact and who had never been charged with a drug-related offence.

Patterns of ATS use

Three patterns of ATS use—low, intermediate and high—were identified by computing trajectory groups for ecstasy and methamphetamine use, using K-means cluster analysis with Euclidean distance as the measure of similarity. Trajectory groups for ecstasy and methamphetamine were based on the number of days of use in the last month at four time points (baseline, 6 months, 12 months and 30 months). The low and intermediate use groups were combined and categorised as less-frequent patterns of ATS use (ie less than weekly use at baseline).

Substance-related health service contact

Substance-related health service contact was measured at baseline, 12 months and four and a half years and refers to visiting a health service (eg general practitioners, hospital emergency departments, alcohol and drug

treatment services, allied health professionals and alternative health practitioners) for help with an alcohol, tobacco or other drug-related issue.

Police contact

Substance-related police contact was measured at the four and a half year interview. Intensive substance-related contact was defined as police contact, initiated by the police or a third party, in response to the participant's own drug or alcohol use, including occasions where the contact involved any of the following: being questioned or detained by police, being searched by police or checked by sniffer dogs, being charged or arrested for a drug- or alcohol-related offence or being tested for drink or drug driving (but only if the participant was found to be over the legal alcohol limit or if drugs were detected). Participants were also asked if they had ever been charged with a drug-related offence.

Substance offers

At baseline, participants reported their age when first offered alcohol, cannabis, ecstasy and methamphetamine.

Age of initiation and first regular use: Alcohol, tobacco and other drugs

At baseline, measurements were taken of participants' ages at their first use of alcohol, tobacco, cannabis and methamphetamine. Participants also reported at what age they first began using each substance regularly, with regular use defined as at least monthly use.

Patterns of amphetamine-type stimulant use

At baseline, participants reported how many ecstasy pills they had consumed in their lifetime. Years of ecstasy and methamphetamine use were computed by subtracting the age at which participants first used each substance from their age at baseline.

Most recent occasion of amphetamine-type stimulant use

Variables were constructed from the baseline qualitative data measuring whether the most recent occasion of ATS use was planned, the amount of ecstasy and methamphetamine consumed and the setting of ATS use.

3. Amphetamine-type stimulant use and other licit and illicit substance use

Alcohol use

At baseline, participants were asked whether they usually consumed alcohol during episodes of ecstasy and methamphetamine use, and the timing of alcohol use. The number of days of alcohol consumption in the last month and the number of standard drinks usually consumed on days of use in the last month were measured at baseline, 12 months, 30 months and four and a half years. Alcohol abuse and dependence were evaluated at the four and a half year follow-up using the World Mental Health Survey Initiative version of the World Health Organisation's Composite International Diagnostic Interview (WMH-CIDI), which applies diagnostic criteria for drug abuse and dependence from the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV).

Tobacco use

At baseline, participants reported whether they usually used tobacco during episodes of ecstasy and methamphetamine use, and the timing of tobacco use. Recency of tobacco use was measured at baseline

and the 12-month, 30-month and four and a half year follow-ups. Nicotine dependence was evaluated at the last follow-up using the WMH-CIDI, which applies diagnostic criteria for drug abuse and dependence from DSM-IV.

Cannabis use

At baseline, participants were asked whether they usually used cannabis during episodes of ecstasy and methamphetamine use and the timing of cannabis use during these episodes. Recency of cannabis use was measured at baseline, 12 months, 30 months and four and a half years.

Other illicit substance use

At baseline, participants reported whether they had ever used a number of illicit substances, including: cocaine, hallucinogens, inhalants, GHB, ketamine and heroin.

Using other substances during most recent occasion of amphetamine-type stimulant use (baseline)

Variables were constructed from the baseline qualitative data measuring the use of other licit and illicit substances (eg alcohol, tobacco, cannabis, cocaine) during the most recent episode of ATS use.

4. Desisting from amphetamine-type stimulant use

Desistance from amphetamine-type stimulant use

This was examined at the four and a half year follow-up interview, with desistance defined as no ecstasy or methamphetamine use within the last 12 months.

Predictors of desistance from amphetamine-type stimulant use

A number of potential predictors of desistance from ATS use were examined. Participants' age was measured at baseline. Lengths of ecstasy and methamphetamine use career were calculated by subtracting their age at first use of ecstasy and methamphetamine, from their age at baseline, with career length grouped into three categories (<4 years, 4–5 years and ≥ 6 years). At the 30-month follow-up, participants were asked, in their opinion, how risky ecstasy use, snorting or swallowing of methamphetamine and injection of methamphetamine, are to a person's mental and physical health (ie without risk, a little risky, moderately risky or very risky). Dichotomous variables were created (very risky vs \leq moderately risky). The number of participants' ecstasy- and methamphetamine-using peers was measured at baseline and 12-months. Dichotomous variables were created based on the median number of peers at baseline (ecstasy-using peers: <40 peers vs ≥ 40 peers; methamphetamine-using peers: <15 peers vs ≥ 15 peers). Relationship and parental status were measured at the four and a half year interview.

Data analysis

Qualitative data

The in-depth qualitative interviews conducted at baseline were digitally recorded and transcribed and the text imported into the qualitative analysis software NVivo 10. Qualitative thematic analysis was used to identify themes and patterns within the interviews. All 350 interviews were read and coded manually using a number

of pre-established codes, with further codes emerging from the data. After coding, the authors returned to the data, reading again through the organised codes to analyse the themes discussed in this report.

Where appropriate, quantitative coding of the qualitative data was also conducted by manually coding variables. Quantitative variables were constructed from the qualitative data relating to: whether the most recent occasion of ATS use was planned, the amount of ecstasy or methamphetamine consumed, use of other substances with ATS during the most recent occasion of ATS use and the setting of the most recent occasion of ATS use.

Quantitative data

Pearson chi-square tests were conducted throughout this report to examine relationships among pairs of categorical variables, generally concerned with patterns of AOD use among well-managed and at-risk ATS users. For discrete or continuous measures, a student's two-sample t-test was used to compare groups. However, where discrete measures in the study comprised a skewed or 'non-normal' distribution, a Wilcoxon Mann-Whitney test was used. Logistic regression was used to conduct bivariate analyses of predictors of desistance from ATS use, reporting unadjusted odds ratios. Quantitative data analysis for this report was conducted using Stata/SE version 12.1.

Initiating amphetamine-type stimulant use

Key points

- Approximately three quarters of ATS users were first offered ecstasy (75.4%) and methamphetamine (74%) by a friend.
- Most ATS users first used ecstasy (60.6%) and methamphetamine (62%) within one to four occasions of it being offered.
- Ecstasy was most commonly first used prior to methamphetamine (41.7%) or within the same year that methamphetamine was first used (32.1%).
- ATS users reported a number of reasons for first trying ecstasy and methamphetamine.
- The most common reasons given for first trying ecstasy and methamphetamine were curiosity (43.6% of ecstasy users; 44.5% of methamphetamine users) and influence of social networks (40.1% of ecstasy users; 49.5% of methamphetamine users).
- While prior illicit substance use was not mentioned as a reason for first trying ecstasy, approximately 11 percent of methamphetamine users volunteered prior substance use as a motivating factor for trying methamphetamine.

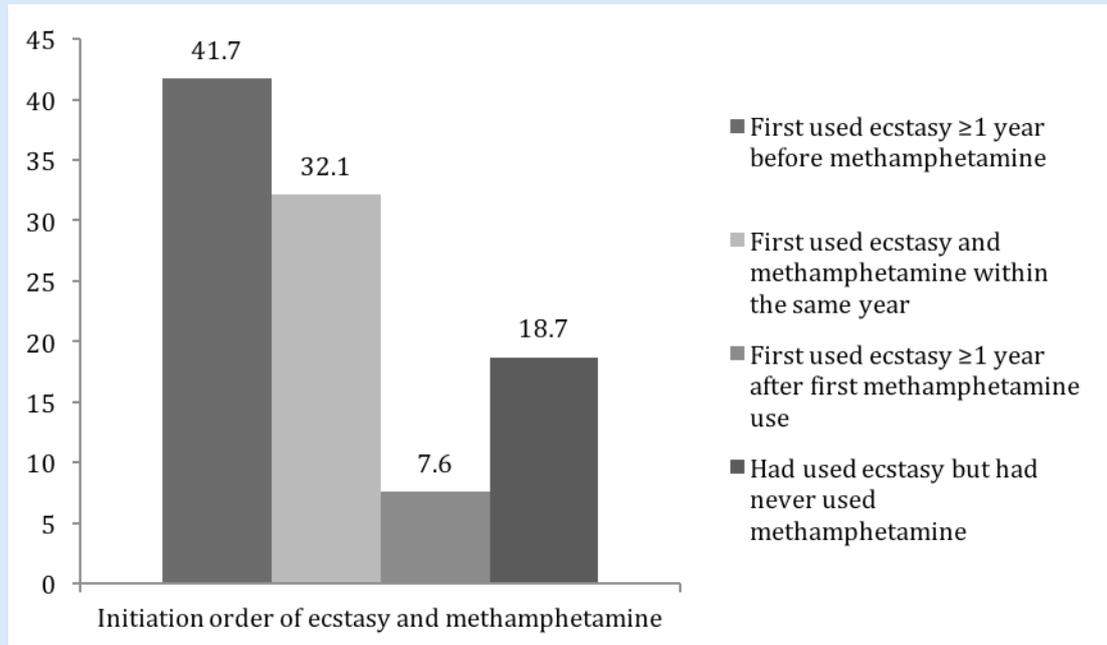
Introduction

Ecstasy and methamphetamine are the second most widely used illicit drugs in Australia, following cannabis (AIHW 2014). The use of ATS is most prevalent among young adults, with 24.2 percent and 14.5 percent of Australians aged 20–29 years having ever used ecstasy and methamphetamine, respectively (AIHW 2011). However, despite the prevalence of ATS use and the fact that the first use of either of these substances is likely to be a consequential life event for individuals, little research has examined the reasons and motivations for first trying ATS (Bowen et al. 2012; Carbone-Lopez, Owens & Miller 2012). While some evidence suggests a link between using ecstasy and other drugs, there is scarce research examining the potential role of ecstasy in the initiation of other drugs, such as methamphetamine (Martins, Ghandour & Chilcoat 2007; Reid, Elifson & Sterk 2007). A clearer understanding of factors relating to initiation of ATS use, such as motivations for first use, is important for identifying the social and environmental situations in which individuals may be most likely to try these substances for the first time. This may be critical to developing interventions that could prevent or delay initiation, by being able to identify critical time periods and risk factors (Brecht, Greenwell & Anglin 2007). This section explores the initiation order and offers of ecstasy and methamphetamine and the motivations and reasons behind the first use of these substances among the sample of young adult ATS users.

Initiation order of amphetamine-type stimulants

Figure 1 shows the initiation order for ecstasy and methamphetamines. Approximately 42 percent of ATS users first used ecstasy at least one year before trying methamphetamine, while about 32 percent first used ecstasy and methamphetamine within the same year. A small proportion (7.6%) of ATS users first used ecstasy at least one year after first using methamphetamine. Close to 20 percent of users had used ecstasy but not methamphetamine at baseline.

Figure 1: Initiation order of ecstasy and methamphetamine (baseline; n=343)



Amphetamine-type stimulant offers

The mean age of first offer of ecstasy and methamphetamine in the sample of ATS users was 17.3 years and 17.9 years, respectively. Figure 2 presents the number of ecstasy and methamphetamine offers ATS users in the study received before first using these substances. As shown, just under two thirds of ATS users first used ecstasy and methamphetamine within one to four offers.

Figure 2: Number of ecstasy (n=343) and methamphetamine (n=303) offers before first use

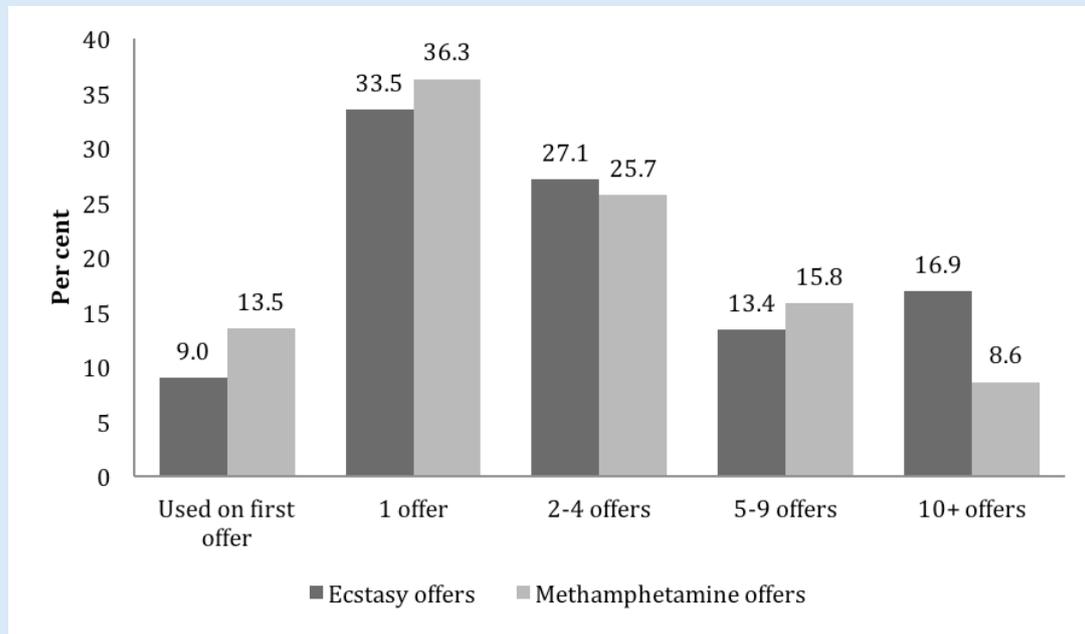
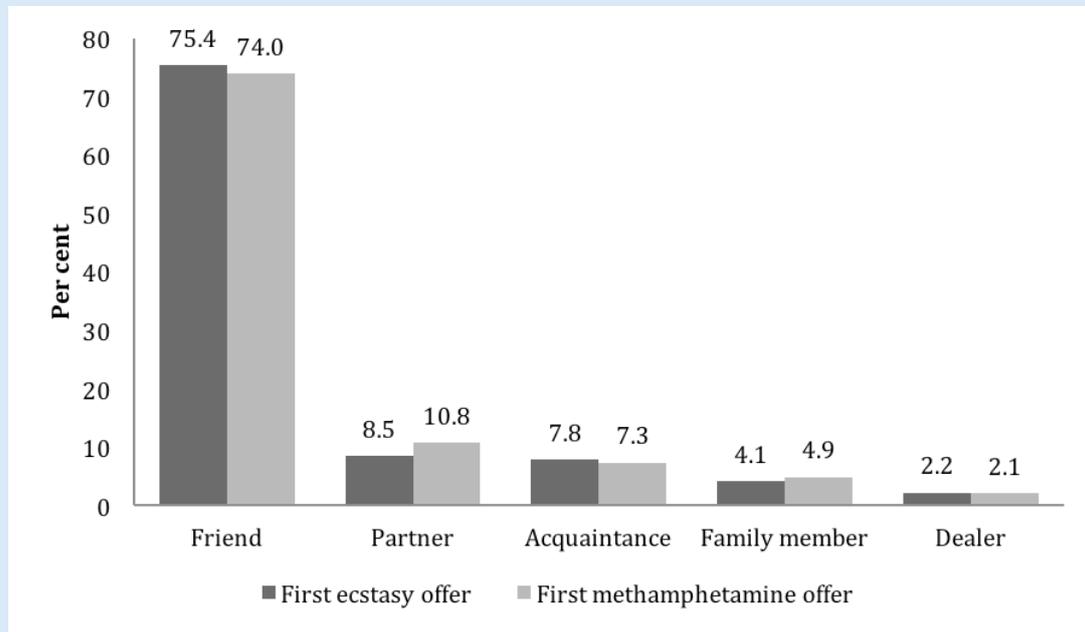


Figure 3 shows who first offered ecstasy and methamphetamine to the ATS users in the sample. Approximately three quarters of ATS users were first offered ecstasy (75.4%) and methamphetamine (74%) by a friend. Smaller proportions of ATS users were first offered ATS by a partner (ecstasy: 8.5%; methamphetamine: 10.8%), acquaintance (ecstasy: 7.8%; methamphetamine: 7.3%) or family member (ecstasy: 4.1%; methamphetamine: 4.9%). Only about two percent of ATS users were first offered ATS by a dealer.

Figure 3: First offer of ecstasy (n=317) and methamphetamine (n=288): Who offered it to you?



Reasons for first trying amphetamine-type stimulants

Tables 3 and 4 present the reasons reported for first trying ecstasy and methamphetamine, respectively. Curiosity (43.6% and 44.5%) and influence of social networks (40.1% and 49.5%) were the most commonly reported reasons for first trying ecstasy and methamphetamine respectively. Other reasons reported for first use of both substances included: wanting a new or different experience, easy access and/or reasonable price, interest in the subjective effects, for fun, influence of the social setting of use, feeling safe to use or perceiving the substance to be safe to use and being intoxicated. Aside from a small number (0.1%) of ATS users who reported being intoxicated on alcohol as their reason for first trying ecstasy, there was no discussion of the influence of prior substance use. Approximately 11 percent of ATS users stated that prior substance use influenced their decision to first try methamphetamine. Further, a number of users indicated that they first used methamphetamine as a substitute for another substance (5.7%), such as ecstasy, or because they were already intoxicated on alcohol or an illicit substance (5.3%).

Table 3: Reasons for first trying ecstasy (n=314)

Reason for first trying ecstasy	n (%)	Examples
Curiosity	137 (43.6)	'Curiosity. I was interested in finding out what it was like' 'I just wanted to know what it would do to me, how I would feel, what kind of high I would get from it'
Influence of social networks	126 (40.1)	'Being around people who were using it made me want to try it' 'Felt like you were missing out because friends were using it' 'Peer pressure. Wanting to be accepted by the group'
A new/different experience	47 (15.0)	'To try something different, was a pretty good kid at high school and so after high school just kind of broke out' 'Because my friends did it and I just wanted to try it. Always wanted to try new things'
Access and price	38 (12.1)	'A lot of my friends were recommending it, saying it was a cheaper alternative to drinking with better results, which turned out to be true' 'It was offered to me and it was free' 'Peer pressure and it just being easily accessible'
Interested in the subjective effects	33 (10.5)	'Done a lot of research and I was interested in the effects. I did a bit of reading and wanted to try it myself' 'The feeling of euphoria and the increase of energy effect' 'To keep awake and keep partying. Other drugs weren't any good for this. Learnt about different drugs through health teacher and police at school'
For fun	29 (9.2)	'I wanted to have more fun' 'Just looked like fun—everyone else was doing it' 'Thought it would be fun'
Influence of social setting of use	25 (8)	'I was 18 and going out clubbing and a lot of people use it clubbing. I thought I would give it a go' 'Wanted to be able to stand up and dance for a whole music festival all day' 'I wasn't a very big drinker when I was younger. I guess I was into music and going out and saw it as an alternative to drinking. Also the scene—raves—so that was a big influence'
Felt safe	14 (4.5)	'I saw other people trying it and they weren't dying, so thought the hype was unwarranted, so I tried it' 'I was curious. I was at a party with my big brother, who made me feel safe, as he said that he'd look after me' 'I was given it and I was with friends and I felt safe to do it'
Intoxicated	3 (0.1%)	'I was drunk' 'I was drunk. Hadn't heard anything bad, although I knew it was bad. Thought: "what's one going to do?"'

Table 4: Reasons for first trying methamphetamine (n=281)

Reason for first trying methamphetamine	n (%)	Examples
Influence of social networks	139 (49.5)	<p>'Being young and wanting to fit in with older people, my boyfriend and his friends were older and they were into it then so I tried it too'</p> <p>'Pretty much it would have to do with the social group that I was in. We got the opportunity and we all decided we would do it'</p> <p>'Because everyone else was ranting and raving about how good it is and I wanted to experiment'</p>
Curiosity	125 (44.5)	<p>'Curiosity. Definitely curiosity, everyone else was doing it. The one thing that gets me to try is seeing the effect it has on other people and wanting to experience it myself. Curiosity'</p> <p>'Curiosity. I'd been around a lot of people who used amphetamines for a while and I wanted to know what it felt like. I asked them if I could try'</p>
Access and price	66 (23.5)	<p>'Curiosity and it was there and it was free'</p> <p>'It was free. Anything cheap is good'</p> <p>'It was there and I wanted to use it'</p>
A new/different experience	55 (19.6)	<p>'Something different, just wanted to'</p> <p>'Wanted to know what it was like—for a new experience. I bought it and then split it between my friends and we went clubbing'</p>
Interested in the subjective effects	44 (15.7)	<p>'I needed an extra boost that night, I was really tired, I knew that amphetamines would give me an extra kick. There was no Red Bull or V in the house to have!'</p> <p>'Knowing what it would do to me, effects sounded attractive. To study'</p>
Influence of social setting of use	31 (11.0)	<p>'A friend had taken it before and she said that it would make me more alert all day and not tired like on ecstasy—was at a festival'</p> <p>'I was at a music event. I used it because it makes the night last longer'</p> <p>'Desire to party longer and not get tired and cranky at a festival'</p>
Influence of previous drug use	30 (10.7)	<p>'Because of ecstasy. Became more open to the idea'</p> <p>'Curiosity—it was a natural progression for me after pot. A mate offered my friend and I to try and I wanted to feel what it was like'</p> <p>'To mix it up a little, I was bored with ecstasy and wanted a harder drug'</p>
Substitute for another substance	16 (5.7)	<p>'I couldn't get any other drugs. I was at a friend's house and they offered it to me'</p> <p>'I was curious. I happened to be with some mates and someone was trying to get pills but we could only get speed'</p> <p>'We couldn't score any ecstasy so we substituted'</p>
Intoxicated	15 (5.3)	<p>'Helped that I was already off my face and rather suggestible'</p> <p>'I was high on ecstasy, I wanted to try speed, my friends were on speed, it was free'</p> <p>'The fact that I was drunk. It was there on the table'</p>
For fun	14 (5)	<p>'Everybody else was and it looked fun. No pressure'</p> <p>'One of the kids at school said you can get really buzzy on it so I did it for fun'</p>
Felt safe	9 (3.2)	<p>'Just to see what it was like and I was with friends who I trusted'</p> <p>'Other people were using it. Seen other people using it and didn't die and looked like they're having a good time. Pssh, try it'</p>

Conclusion

This section explored the initiation of ecstasy and methamphetamine use, examining the initiation order of ecstasy and methamphetamine, ecstasy and methamphetamine offers and the motivations and reasons behind the first use of each substance among young adult ATS users. Overwhelmingly, it was friends who first offered ecstasy (75.4%) and methamphetamine (74%) to ATS users. By contrast, only about two percent of ATS users were first offered ecstasy and methamphetamine by a dealer. This suggests that social supply, which is the supply of substances to friends or acquaintances for little or no monetary profit (Coomber 2010) may be prevalent among young adult ATS users. Research examining social supply among cannabis users suggests it is strongly linked to building connections and social capital within social networks (Coomber & Turnbull 2007; Duffy et al. 2006).

While a small proportion of ATS users used ecstasy (9%) and methamphetamine (13.5%) when it was first offered to them, most users first used ecstasy (60.6%) and methamphetamine (62%) within one to four occasions of it being offered. The most common sequences of ATS initiation, for young adults who had used both ecstasy and methamphetamine, were first using ecstasy either before methamphetamine (41.7%) or within the same year as first using methamphetamine (32.1%). This corresponds with previous research, which shows that ecstasy is commonly first used before methamphetamine (Halkitis & Palamar 2008; Reid et al. 2007).

ATS users reported a number of reasons for first trying ecstasy and methamphetamine. Motivations appear to be active, rational decisions, often motivated by the desire to integrate into social networks. Curiosity (42.6% and 44.5%) and influence of social networks (40.1% and 49.5%) were the most commonly reported reasons for first ecstasy and methamphetamine use, respectively.

Of importance is that while some users did report feeling pressure from their peers to try ecstasy or methamphetamine, the influence of social networks operated through a variety of mechanisms. Curiosity to try ATS was often piqued by drug-using peers, through observing their peers' use ('Curiosity. I'd been around a lot of people who used amphetamines for a while and I wanted to know what it felt like. I asked them if I could try', 22 year old female ATS user), hearing stories about peers' experiences ('Curiosity, everyone talks about it being so fun, I guess that was why', 19 year old female ATS user) or being told the potential benefits of use ('A friend had taken it before and she said that it would make me more alert all day and not tired like on ecstasy—was at a festival', 20 year old female ATS user). A number of ATS users also reported feeling safe to use ecstasy or methamphetamine for the first time because they were with friends who they trusted ('Just to see what it was like and I was with friends who I trusted', 21 year old female ATS user) or who they felt were experienced with the drug ('First time was [at a] Daft Punk concert and my friends told me to use it and I trusted them because they've done it a lot', 23 year old male ATS user). The role of social networks in the initiation of ATS use was also evident through the predominance of social supply. Approximately three quarters of ATS users in the sample were first offered ecstasy and methamphetamine by a friend (see Figure 3). These findings highlight the integral role that social networks play in the initiation of ATS use and align with social learning theory (Norman & Ford 2015).

While a very small number of ATS users (0.1%) reported that they first used ecstasy because they were drunk, there was no mention of prior illicit substance use (eg cannabis use) influencing motivations for first trying ecstasy. By contrast, about 11 percent of ATS users discussed the influence of prior substance use, including using ecstasy, in motivating their first use of methamphetamine:

Because of ecstasy. Became more open to the idea (22 year old male ATS user).

All [my] mates were on it. [They] told me what it was like. Got offered it. Already done pills, curious to see the difference. Thought, 'what more harm could it do?' (22 year old male ATS user).

Further, approximately six percent and five percent of ATS users reported that their reason for first trying methamphetamine was as a substitute for another substance or because they were intoxicated, respectively. In some cases, methamphetamine was used as a substitute for ecstasy, as described below:

I was curious. I happened to be with some mates and someone was trying to get pills [ecstasy] but we could only get speed (19 year old male ATS user).

We couldn't score any ecstasy, so we substituted (19 year old male ATS user).

Being intoxicated on other licit and illicit substances also played a role in the first use of methamphetamine for a number of ATS users:

Helped that I was already off my face and rather suggestible (22 year old male ATS user).

Easy, available, free. [I was] on ecstasy so felt extra confident (22 year old male ATS user).

These findings suggest that ecstasy may potentially play a role in the later initiation of methamphetamine use, through a number of possible mechanisms. Reid and colleagues (2007) propose that, as ecstasy is viewed as a relatively low risk drug (compared with harder drugs such as heroin), individuals may be more likely to use ecstasy, which may lead to initiation into a drug-use subculture in which poly-drug use and using harder drugs, such as methamphetamine, are common and normalised. Alternatively, a number of ATS users in the current study reported that their first use of methamphetamine occurred unintentionally when they consumed substances they believed to be ecstasy but were adulterated with methamphetamine:

[I] purchased ecstasy and didn't realise it was laced with speed—so it was accidentally tried (20 year old female ATS user).

The natural history of amphetamine-type stimulant use

Key points

- Just over a quarter (28.3%) of ATS users were engaged in well-managed use.
- A significantly higher proportion of well-managed ATS users were female compared with at-risk users (71% vs 46.3%).
- Compared with well-managed ATS users, at-risk users initiated alcohol, cannabis and ecstasy use at a significantly earlier age.
- At-risk ATS users first progressed to regular alcohol use (ie at least monthly) significantly earlier than well-managed ATS users.
- At baseline, at-risk ATS users had consumed a significantly greater quantity of ecstasy pills over their lifetime and had been using ecstasy for longer than well-managed ATS users.
- On the most recent occasion of use at baseline, at-risk ATS users consumed significantly more ecstasy pills compared with well-managed users.

Introduction

Since the mid-1970s, a wider range of drug-use patterns has been recognised (Nasir, Rosenthal & Moore 2011), such as 'controlled use'—moving away from the singular view of drug-users as addicts. Controlled use has a number of varied definitions in the literature, though it is most commonly used to describe patterns of drug use that do not lead to contact with health services or criminal justice agencies (Dalgarno & Shewan 2005). This section examines the natural history of ATS use among ATS users whose use is well managed to the extent that they successfully avoid coming to the attention of either public health bodies or law enforcement agencies. This section focuses on sociodemographic characteristics, the progression from first offer to first use, to first regular use, of ATS and other substances and patterns of ATS use.

Controlled vs well-managed amphetamine-type stimulant use

One of the key elements of controlled drug use is the proposition that drug users self-regulate their substance-use behaviour by using rules, rituals and sanctions, which are specific to the user (Kolte & Schmidt-Semisch 2002; Zinberg 1984). These rules and rituals are often developed in relation to users' personal substance-use experiences, the experiences of their drug-using peers and wider judgements about social norms regarding reasonable or moderate substance use (Duff et al. 2012). What is considered to be controlled use varies between users. As the NHSDU did not address controlled use and did not collect data relating to participants' perceptions of their control over their substance use or the rituals or sanctions used, it was not possible to categorise users in this study as controlled or non-controlled. Consequently, an alternative categorisation was constructed: well-managed and at-risk ATS use. This measure drew on the broad definition of controlled use noted above, with well-managed ATS users defined as users who had not had substance-related contact with health services or criminal justice agencies (eg police). Contact with criminal justice agencies was measured using two elements: having ever been charged with a drug- or alcohol-related offence, and having experienced intensive substance-related contact. Intensive substance-related contact was defined as police contact, initiated by the police or a third party, in response to the participant's own drug or alcohol use. This included occasions where the contact involved any of the following: being questioned or detained by police, being searched by police or checked by sniffer dogs, being charged or arrested for a drug- or alcohol-related offence or being tested for drink or drug driving (but only if the participant was found to be over the legal alcohol limit or if drugs were detected). Frequency of ATS use was also included in this definition, with well-managed ATS users engaging in low or intermediate frequency ecstasy and methamphetamine use (ie less than weekly). The proportions of well-managed and at-risk ATS users in the study are presented in Table 5.

Table 5: Proportions of well-managed and at-risk amphetamine-type stimulant users (n=226)

Amphetamine-type stimulant use	n (%)
Well-managed users ^a	64 (28.3)
At-risk users	162 (71.7)

a: Refers to amphetamine-type stimulant users engaged in low/intermediate frequency patterns of use who have not had any substance-related contact with health services, have not had intensive substance-related contact with police and have never been charged with a drug-related offence

Limitations of this conceptualisation of well-managed use should be noted. A lack of engagement with health services may reflect barriers to access or inadequate services rather than well-managed use. Also, contact with the police could be a matter of chance with varied reasons for contact. However, in conceptualising well-managed ATS use with these criteria, as well as focusing on trajectories of ecstasy and methamphetamine use, the project aims to capture ATS users engaged in different patterns of use and those users who are largely hidden as they have not come to the attention of health services or law enforcement agencies.

Sociodemographic characteristics

Table 6 compares sociodemographic characteristics between well-managed and at-risk ATS users. A significantly higher proportion of well-managed ATS users were female (71%), compared with at-risk users (46.3%). Well-managed and at-risk ATS users did not differ significantly in age, education, employment or income. This cohort of young adult ATS users appears to consist of reasonably high functioning users, with most having completed tertiary education and engaged in part- or full-time work.

Table 6: Sociodemographic characteristics of well-managed and at-risk ATS users (n=222)

Socio-demographic characteristics			
	Well-managed users % (n=62)	At-risk users % (n=160)	Test statistic
Age at baseline			t=0.88
Mean (Standard Deviation)	20.8 years (1.04)	20.9 years (1.24)	
Range	19–23 years	19–23 years	
Sex			$\chi^2=10.96^{**}$
Female	71.0	46.3	
Male	29.0	53.7	
Education at baseline			$\chi^2=0.00$
Completed high school	71.0	71.3	
Tertiary education ^a			$\chi^2=1.04$
Completed tertiary education	77.4	70.6	
Income ^b at baseline			$\chi^2=8.55\dagger$
0–\$999	61.3	45.0	
\$1,000–\$1,299	11.3	23.1	
\$1,300–\$1,599	19.4	15.0	
\$1,600–\$1,999	4.8	8.8	
≥\$2,000	3.2	8.1	
Employment at baseline			$\chi^2=3.84$
Full-time	56.5	41.9	
Part-time	32.3	43.8	
Income ^b at 4½ years			$\chi^2=4.08$
0–\$999	22.6	21.3	
\$1,000–\$1,299	11.3	11.9	
\$1,300–\$1,599	14.5	20.6	
\$1,600–\$1,999	35.5	23.8	
≥\$2,000	16.1	22.5	
Employment at 4½ years			$\chi^2=0.34$
Full-time	24.2	20.6	
Part-time	61.3	63.8	

† marginal non-significant result, ** p<0.01

a: Measured at baseline and 30-month follow-up; tertiary education refers to university, Technical and Further Education (TAFE) or trade qualifications

b: Average fortnightly income after tax

From first offer to first use: Alcohol, tobacco and other drug use

The age at which ATS users were first offered alcohol, cannabis, ecstasy and methamphetamine was compared between well-managed and at-risk users (see Table 7). At-risk ATS users were first offered ecstasy at a significantly younger age, compared with well-managed users. There was no significant difference in the first age at offer of alcohol, cannabis or methamphetamine for well-managed and at-risk ATS users.

Table 7: Age at first offer of alcohol, cannabis, ecstasy, and methamphetamine, by well-managed and at-risk amphetamine-type stimulant users

	Alcohol (n=221)		Cannabis (n=225)		Ecstasy (n=221)		Methamphetamine (n=204)	
	Mean (95% CI)	z ^a						
ATS users		-1.71		-1.86		-2.90**		-1.66
Well-managed ^b	13.27 (12.66– 13.87)		15.10 (14.66– 15.53)		17.84 (17.49– 18.18)		18.28 (17.82– 18.74)	
At-risk	12.62 (12.20– 13.04)		14.48 (14.15– 14.80)		17.16 (16.94– 17.39)		17.73 (17.43– 18.02)	

* p<0.05

a: Two sample Wilcoxon rank-sum (Mann-Whitney) test reporting z-scores; b Refers to amphetamine-type stimulant users engaged in low/intermediate frequency patterns of use who have not had any substance-related contact with health services, have not had intensive substance-related contact with police and have never been charged with a drug-related offence

By contrast, at-risk ATS users first tried alcohol, cannabis and ecstasy at a significantly earlier age than well-managed users (see Table 8). However, there was not a significant difference for tobacco or methamphetamine.

Table 8: Age of initiation of alcohol, tobacco, cannabis, ecstasy, and methamphetamine, by well-managed and at-risk amphetamine-type stimulant users

	Age first tried alcohol (n=225)		Age first tried tobacco (n=208)		Age first tried cannabis (n=219)		Age first tried ecstasy (n=225)		Age first tried methamphetamine (n=194)	
	Mean (95% CI)	z ^a	Mean (95% CI)	z ^a	Mean (95% CI)	z ^a	Mean (95% CI)	z ^a	Mean (95% CI)	z ^a
ATS users		-2.23*		-1.45		-2.37*		-2.03*		-1.30
Well-managed ^b	14.5 (14.13– 14.95)		14.9 (14.26– 15.53)		15.8 (15.30– 16.23)		18.1 (17.76– 18.46)		18.4 (17.90– 18.91)	
At-risk	13.8 (13.55– 14.12)		14.3 (13.90– 14.75)		15.1 (14.76– 15.43)		17.59 (17.36– 17.83)		18.1 (17.78– 18.32)	

* p<0.05

a: Two sample Wilcoxon rank-sum (Mann-Whitney) test reporting z-scores

b: Refers to amphetamine-type stimulant users engaged in low/intermediate frequency patterns of use who have not had any substance-related contact with health services, have not had intensive substance-related contact with police and have never been charged with a drug-related offence

The time from first offer to first use of alcohol, cannabis, ecstasy and methamphetamine was compared between well-managed and at-risk ATS users. Table 9 presents the proportions of well-managed and at-risk ATS users who first used each substance less than a year after it was first offered to them. There was no significant difference between the proportions of well-managed and at-risk users who progressed to first use in less than a year for alcohol, cannabis, ecstasy or methamphetamine.

Table 9: Time from first offer to first use of alcohol, cannabis, ecstasy and methamphetamine, by well-managed and at-risk amphetamine-type stimulant users

	Time from first offer to first use							
	Alcohol (n=214)		Cannabis (n=214)		Ecstasy (n=220)		Methamphetamine (n=224)	
	Less than a year (%)	²	Less than a year (%)	²	Less than a year (%)	²	Less than a year (%)	²
ATS users		0.11		1.08		1.97		0.11
Well-managed ^a	53.3		60.0		78.7		76.1	
At-risk	55.8		67.5		67.5		78.4	

a: Refers to amphetamine-type stimulant users engaged in low/intermediate frequency patterns of use who have not had any substance-related contact with health services, have not had intensive substance-related contact with police and have never been charged with a drug-related offence

From initiation to regular use: Alcohol, tobacco and other drug use

The age at which users first began regularly (ie at least monthly) using alcohol, tobacco, cannabis, ecstasy and methamphetamine was compared between well-managed and at-risk ATS users. Table 10 shows at-risk users first began regularly using alcohol at a significantly younger age than well-managed users. The age of first regular use differed little between well-managed and at-risk users for tobacco, cannabis, ecstasy or methamphetamine.

Table 10: Age first began regular use of alcohol, tobacco, cannabis, ecstasy and methamphetamine, by well-managed and at-risk amphetamine-type stimulant users

	Alcohol (n=225)		Tobacco (n=155)		Cannabis (n=162)		Ecstasy (n=193)		Methamphetamine (n=87)	
	Mean (95% CI)	^b	Mean (95% CI)	^b	Mean (95% CI)	^b	Mean (95% CI)	^b	Mean (95% CI)	^b
	ATS users		-2.85**		-1.70		-1.43		-0.73	
Well-managed ^b	16.49 (16.04–16.90)		16.8 (15.16–17.40)		17.1 (16.51–17.73)		18.4 (18.06–18.76)		18.4 (17.90–18.91)	
At-risk	15.80 (15.56–16.03)		16.2 (15.79–16.60)		16.56 (16.22–16.91)		18.1 (17.93–18.36)		18.1 (17.78–18.32)	

* p<0.05, ** p<0.01

a: At least monthly use;

b: Two sample Wilcoxon rank-sum (Mann-Whitney) test reporting z-scores;

c: Refers to amphetamine-type stimulant users engaged in low/intermediate frequency patterns of use who have not had any substance-related contact with health services, have not had intensive substance-related contact with police and have never been charged with a drug-related offence

The study compared the time from first use to first regular use of alcohol, tobacco, cannabis, ecstasy and methamphetamine between well-managed and at-risk ATS users. The proportions of well-managed and at-risk users who progressed to first regular use less than a year after their first use for each substance are presented in Table 11. As shown, there was no significant difference in the proportions progressing to regular use in less than a year for any of the substances.

Table 11: Time from first use to first regular use^a of alcohol, tobacco, cannabis, ecstasy and methamphetamine, by well-managed and at-risk amphetamine-type stimulant users

	Time from first use to first regular use									
	Alcohol (n=225)		Tobacco (n=155)		Cannabis (n=162)		Ecstasy (n=193)		Methamphetamine (n=87)	
	<1 year (%)	²	<1 year (%)	²	<1 year (%)	²	<1 year (%)	²	<1 year (%)	²
ATS users		1.21		2.57		0.23		1.23		2.03
Well-managed ^b	9.4		13.9		19.5		61.2		66.7	
At-risk	14.9		26.9		23.1		52.1		47.8	

a: At least monthly use;

b: Refers to amphetamine-type stimulant users engaged in low/intermediate frequency patterns of use who have not had any substance-related contact with health services, have not had intensive substance-related contact with police and have never been charged with a drug-related offence

Amphetamine-type stimulant use patterns

Ecstasy use

Table 12 displays the mean number of ecstasy pills ever consumed by well-managed and at-risk ATS users and the mean years of their ecstasy use, both measured at baseline. Well-managed ATS users differ significantly from at-risk users in both the number of pills ever consumed and the years of ecstasy use, with at-risk users having consumed a greater number of pills (average 171.3 pills vs 92 pills) and having used ecstasy for longer (mean 3.3 years vs 2.7 years).

Table 12: Number of ecstasy pills ever consumed and years of ecstasy use at baseline, by well-managed and at-risk amphetamine-type stimulant users

	Number of pills ever consumed (n=221)		Years of ecstasy use (n=225)	
	Mean (95% CI)	z ^a	Mean (95% CI)	z ^a
ATS users		4.36***		2.40*
Well-managed ^b	92.0 (52.68–131.42)		2.7 (2.32–3.14)	
At-risk	171.3 (139.12–203.51)		3.3 (3.02–3.55)	

* p<0.05, *** p<0.001

a: Two sample Wilcoxon rank-sum (Mann-Whitney) test reporting z-scores;

b: Refers to amphetamine-type stimulant users engaged in low/intermediate frequency patterns of use who have not had any substance-related contact with health services, have not had intensive substance-related contact with police and have never been charged with a drug-related offence

Methamphetamine use

The study compares the number of years of methamphetamine use, measured at baseline, between well-managed and at-risk ATS users. As shown in Table 13 below, there was no significant difference for the number of years of methamphetamine use.

Table 13: Years of methamphetamine use at baseline, by well-managed and at-risk amphetamine-type stimulant users (n=194)

	Years of methamphetamine use	
	Mean (95% CI)	Z ^a
ATS users		1.10
Well-managed ^b	2.5 (1.8–3.08)	
At-risk	2.9 (2.59–3.18)	

a: Two sample Wilcoxon rank-sum (Mann-Whitney) test reporting z-scores

b: Refers to amphetamine-type stimulant users engaged in low/intermediate frequency patterns of use who have not had any substance-related contact with health services, have not had intensive substance-related contact with police and have never been charged with a drug-related offence

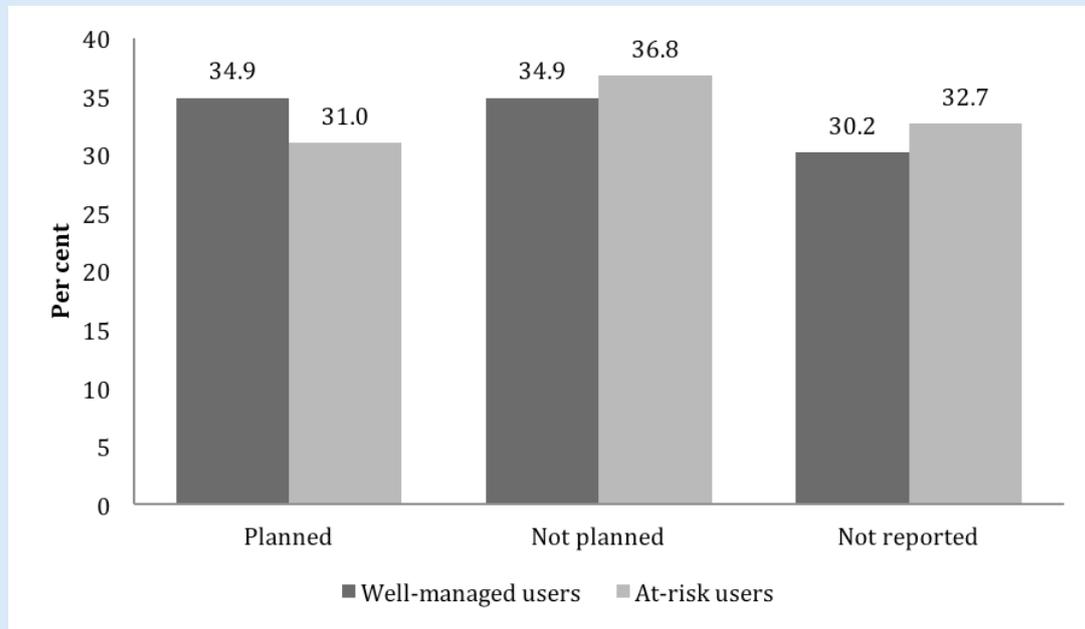
Most recent occasion of amphetamine-type stimulant use (baseline)

The most recent occasion of ATS use was compared between well-managed and at-risk ATS users, focusing on whether use was planned, the amount of ATS consumed and the setting of use.

Planned use

Figure 4 shows the proportions of well-managed and at-risk ATS users who had planned their most recent occasion of ATS use, measured using the baseline qualitative data. Proportions are similar for well-managed and at-risk users.

Figure 4: Planning of amphetamine-type stimulant use on most recent occasion of use at baseline, by well-managed and at-risk amphetamine-type stimulant users (n=218)



Quantity of amphetamine-type stimulants consumed

The quantity of ecstasy and methamphetamine consumed on the most recent occasion of ATS use, measured from the baseline qualitative data, was compared between well-managed and at-risk ATS users (see Table 14). There was a significant difference between well-managed and at-risk ATS users in the quantity of ecstasy consumed, with at-risk users consuming a greater number of pills. By contrast, there was no significant difference between well-managed and at-risk users in the quantity of methamphetamine consumed.

Table 14: Quantity of ecstasy and methamphetamine consumed on most recent occasion of amphetamine-type stimulant use, by well-managed and at-risk amphetamine-type stimulant users (baseline qualitative data)

	Ecstasy (pills) (n=202)		Methamphetamine (grams) (n=43)	
	Mean (95% CI)	z ^a	Mean (95% CI)	z ^a
ATS users		2.35*		0.27
Well-managed ^b	2.0 (1.59–2.45)		0.3 (0.12–0.56)	
At-risk	2.5 (2.23–2.76)		0.8 (0.31–1.27)	

* p<0.01

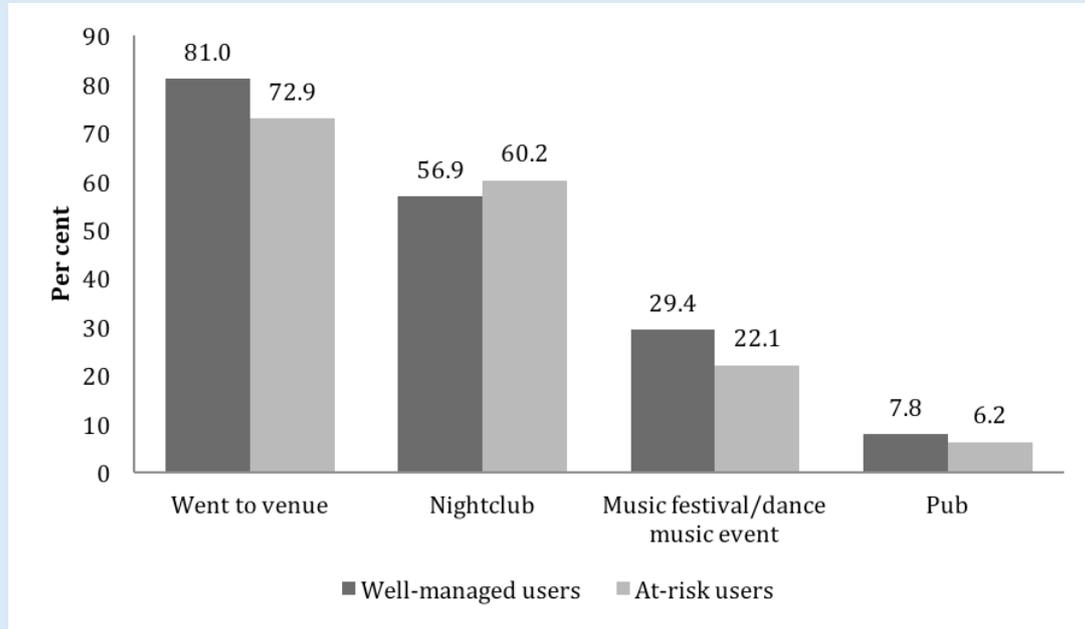
a: Two sample Wilcoxon rank-sum (Mann-Whitney) test reporting z-scores

b: Refers to amphetamine-type stimulant users engaged in low/intermediate frequency patterns of use who have not had any substance-related contact with health services, have not had intensive substance-related contact with police and have never been charged with a drug-related offence

Setting of use

The baseline qualitative data shows that about three quarters of ATS users went out to a venue on their most recent occasion of ATS use. This proportion was slightly higher for well-managed users compared with at-risk users (81% vs 72.9%). The proportions of well-managed and at-risk ATS users who attended nightclubs, music festivals/dance music events and pubs on their most recent occasion of ATS use are shown in Figure 5. Approximately 24 percent of at-risk users used ATS in a private residence (either their own home or the home of someone else) on their most recent occasion of use, compared with approximately 16 percent of well-managed users.

Figure 5: Setting of most recent occasion of amphetamine-type stimulant use, by well-managed and at-risk amphetamine-type stimulant users (baseline qualitative data; n=218)



Conclusion

This section has explored the natural history of ATS use, comparing users engaged in well-managed and risky ATS use. It has focused on sociodemographic characteristics, the progression from first offer to first use, to first regular use, and patterns of ATS use. While the findings showed similarities between the well-managed and at-risk ATS users, they also highlighted some key differences relating to gender, initiation of substance use, and patterns of ATS use.

Comparing sociodemographic characteristics of well-managed and at-risk ATS users in this cohort highlighted that this is a relatively high functioning group of young adult ATS users. About three-quarters of both well-managed and at-risk ATS users had completed some form of tertiary education and just over 80 percent were employed full- or part-time at the four and a half-year follow-up. Well-managed and at-risk ATS users did not differ significantly by age or income. However, a significantly higher proportion of well-managed ATS users were female (71.0% vs 46.3%), compared with at-risk users.

At-risk ATS users were first offered ecstasy at a significantly younger age than well-managed users. By contrast, there was no significant difference in age of first offer for alcohol, cannabis or methamphetamine. Similarly, at-risk users first tried ecstasy at a significantly younger age than well-managed users. At-risk users also first tried alcohol and cannabis at a significantly earlier age than well-managed users, but there was no significant difference for tobacco or methamphetamine. Additionally, at-risk ATS users also progressed to regular (ie at least monthly) use of alcohol at an earlier age than well-managed users. There was no significant difference between age at first regular use for tobacco, cannabis, ecstasy or methamphetamine. These findings suggest earlier initiation into substance use, particularly alcohol use, may be associated with risky patterns of ATS use.

Examining patterns of ATS use showed that at-risk ATS users were engaged in longer periods of ecstasy use and may be using it more intensively. At baseline, the average number of ecstasy pills ever consumed by at-risk ATS users (171.3) was close to double the average for well-managed users (92). At-risk ATS users also consumed significantly more ecstasy pills on their most recent occasion of ATS use at baseline, compared with well-managed users. A significant difference was also found between the numbers of years of ecstasy use. Research suggests that problematic use may be more strongly linked to intensity of substance use rather than its duration (Soar, Turner & Parrott 2006). Similar relationships were not found for methamphetamine use.

Substance use

Key points

- High proportions of ATS users usually consumed alcohol during episodes of ecstasy (well-managed users: 93.7%; at-risk users: 94.4%) and methamphetamine use (well-managed users: 83%; at-risk users: 81.4%).
- A number of functions and motivations for combined alcohol and ATS use were reported, including: reducing anxiety before and during 'coming on', increasing drinking capacity, altering the effects of ATS and helping with the 'comedown'.
- At-risk ATS users were drinking at significantly higher levels than well-managed users for the four and a half year period of the study.
- Significantly higher proportions of at-risk ATS users had experienced alcohol abuse (lifetime and last 12 months) and dependence (lifetime), compared with well-managed users.
- Tobacco use during episodes of ATS use was more prevalent among at-risk ATS users (usually used tobacco with ecstasy: at-risk users: 77%, well-managed users: 57.1%; usually used tobacco with methamphetamine: at-risk users: 71.7%, well-managed users: 51.5%).
- Significantly higher proportions of at-risk ATS users had used tobacco in the last month at baseline (72.7% vs 51.6%), 12 months (69.2% vs 43.8%) and four and a half years (56.5% vs 33.3%), compared with well-managed users.
- Higher proportions of at-risk users experienced nicotine dependence (lifetime and last 12 months), compared with well-managed users.
- A significantly higher proportions of at-risk ATS users usually used cannabis during episodes of ecstasy (at-risk users: 65.8%; well-managed users: 50.8%) and methamphetamine use (at-risk users: 54.9%; well-managed users: 36.2%), compared with well-managed users.

Introduction

Users of ATS are mainly poly-drug users, often using ATS concurrently and simultaneously with other licit and illicit substances (Degenhardt et al. 2009; Gouzoulis-Mayfrank & Daumann 2006; Kirkpatrick et al. 2012). However, few studies have examined patterns of combined use of ATS and other substances or the motivations behind combining ATS with other licit and illicit substances. The evidence suggests that users report a number of functions of combining different substances with ATS, including: to produce pleasurable effects, to extend or prolong the effects of a substance, to enhance or intensify the effects of a substance and to mitigate the negative effects of a substance, for example during the 'comedown' (Hunt, Evans, Moloney & Bailey 2009). The combined use of substances with ATS represents an emerging area of concern; with a growing body of research suggesting that combined use may result in greater harms than the separate use of these substances (Fisk, Murphy, Montgomery & Hadjiefthyvoulou 2011; Hedden et al. 2010). This section examines the simultaneous and concurrent use of licit and illicit substances with ATS, focusing on alcohol, tobacco and cannabis.

Amphetamine-type stimulants and alcohol use

One of the most common substances Australian ATS users report using concurrently or simultaneously with ATS is alcohol (Breen et al. 2006; Kinner et al. 2012; Matthews, Bruno & Nicholls 2013). However, the potential consequences of concurrent and simultaneous ATS and alcohol use are largely unknown (Kirkpatrick

et al. 2012). High rates of risky drinking have been observed among ATS users (Breen et al. 2006; Kinner et al. 2012; Matthews et al. 2013; McKetin et al. 2014). McKetin and colleagues (2014) reported that, in a sample of Australian stimulant users, those who consumed stimulants on a night out drank at excessive levels, consuming a median of 20 standard drinks.

It is possible that ATS use may facilitate binge alcohol consumption. Individuals under the influence of ATS are potentially able to consume alcohol without experiencing its usual sedative effects (Hernández-López et al. 2002), consequently facilitating longer wakefulness and extended drinking episodes. Alternatively, ATS users may use alcohol to mitigate unwanted effects of ATS, such as anxiety, agitation and restlessness (Fisk et al. 2011). Further, ATS and alcohol may be combined to increase the desired subjective effects of either of these substances. Hernández-López and colleagues (2002) note that the combined use of alcohol and ATS may produce a longer-lasting euphoria than the separate use of these substances.

Amphetamine-type stimulants and tobacco use

Traditionally, in Australia there has been a higher prevalence of tobacco use among illicit drug users compared with non-users of the same age (Fraser, Gartner & Hall 2014). These patterns may reflect general sequences of substance use initiation, with young adults who initiate cigarette smoking at an earlier age being more likely to initiate cannabis use and heavier cannabis users subsequently being more likely to use other illicit drugs, such as ecstasy and methamphetamine (Fraser et al. 2014). Alternatively, evidence from preclinical research supports the proposition that co-administration of nicotine and stimulants may interact to produce exaggerated drug responses, which may contribute to the frequent use of tobacco with illicit stimulants (Jutkiewicz et al. 2008).

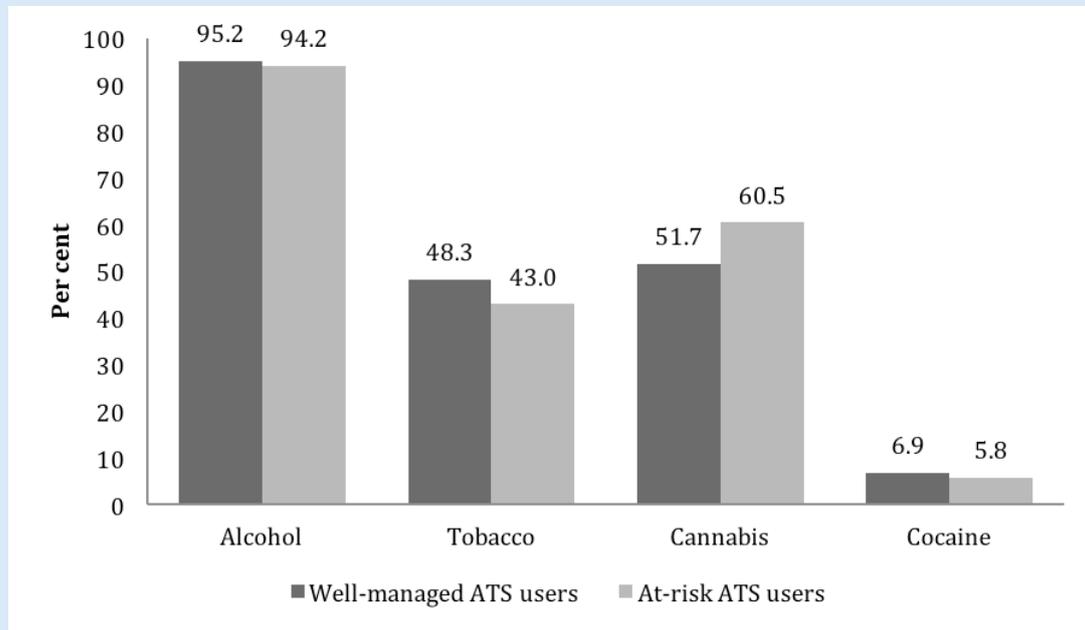
Amphetamine-type stimulants and cannabis use

Cannabis is the illicit substance most commonly used with ATS (Degenhardt, Barker & Topp 2004; Milani et al. 2005). Using cannabis with ATS appears to be particularly common while ‘coming down’ from ATS, with cannabis used to mitigate the negative effects of ‘coming down’ (Hunt et al. 2009). A growing body of literature argues that comorbid use of cannabis and ATS may lead to poorer outcomes than the separate use of ATS, with comorbid cannabis use linked to the development and maintenance of psychopathological symptoms in ecstasy users (Daumann et al. 2004; George et al. 2010; Scott et al. 2012).

Amphetamine-type stimulants and poly-drug use

The baseline qualitative data revealed that ATS users in this sample generally used a number of other substances with ATS on their most recent use. Figure 6 shows the proportions of well-managed and at-risk ATS users who used other substances during their most recent ATS use.

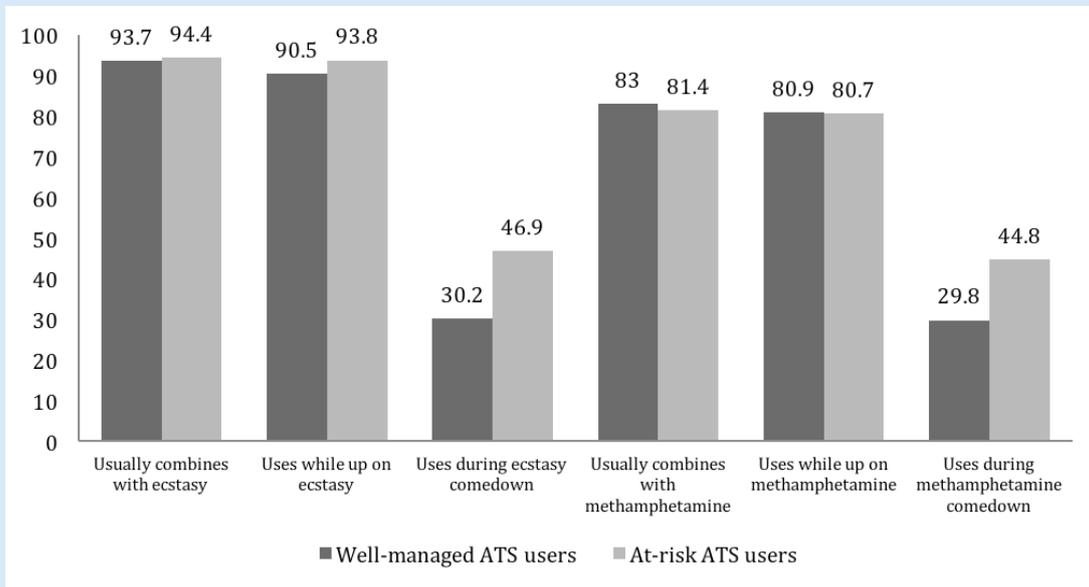
Figure 6: Use of other substances during most recent occasion of amphetamine-type stimulant use, by well-managed and at-risk amphetamine-type stimulant users (baseline qualitative data; n=218)



Amphetamine-type stimulant and alcohol use

Most ATS users reported usually combining alcohol with ecstasy and methamphetamine during episodes of use. Figure 7 shows the proportion of well-managed and at-risk ATS users who usually consumed alcohol during episodes of ecstasy and methamphetamine use and the timing of alcohol use. Similar proportions of well-managed and at-risk ATS users reported usually drinking while on ecstasy and methamphetamine. In contrast, higher proportions of at-risk ATS users reported usually drinking while ‘coming down’ from ecstasy or methamphetamine, compared with well-managed users. ATS users reported a number of functions of combined alcohol and ATS use, including reducing anxiety regarding ‘coming on’, increasing capacity to drink, altering the effects of ATS, and helping with the ‘comedown’.

Figure 7: Consumption of alcohol during episodes of ecstasy (n=244) and methamphetamine use (n=192) at baseline



Functions of combined alcohol and amphetamine-type stimulant use

Reducing anxiety

Some ATS users reported experiencing anxiety while waiting for the effects of ATS to 'come on' or during the initial phase of 'coming on'. In these circumstances, users explained that alcohol served to reduce this anxiety:

Um, the alcohol is probably um, I always like to drink if I'm using ecstasy mainly prior to taking the ecstasy as a, as a method of um sort of taking my mind off the fact that I've taken this thing so I'm not sitting there sort of waiting for it to come on or whatever like that. So just sort of as a distraction but then also just because I like to drink and just have a good time (19 year old male ATS user).

Like, the onset of ecstasy I don't really like because it's...your brain gets really scattered and it's like this sort of rush of speed or whatever's coming on and, yeah, just sort of doesn't make me feel comfortable. [Interviewer: Right?] It's like frantic sort of...your body starts going all over the place and, you know, I think the drinking really just helps you ease into that state (22 year old male ATS user).

Increasing drinking capacity

A number of ATS users highlighted that they experienced an increased capacity to drink during ATS intoxication. For some users, this was a positive effect of combining alcohol and ATS, which allowed them to extend their drinking episodes:

And you're able to drink more without feeling sick. Um, that's how pills usually affect me I could have heaps of shots and not feel sick. So, yeah, can last longer (22 year old female ATS user).

No, I took the night before as well, but I think I just had speed the night before, just to stay awake and keep...stay awake drinking and partying, pretty much. [Interviewer: Okay. So were you taking it for the effects or because you can drink lots when you're on speed and ecstasy?] Yeah, both, both (22 year old male ATS user).

It's more of, like, um, I take it to drink more...So you don't end up asleep in the corner. [Interviewer: Oh, I see, alright]. Not so much for the exactly emotional and physical feelings of it, it's just to...Basically keep, keep you going (22 year old male ATS user).

By contrast, other ATS users viewed this as a negative effect, expressing frustration that they were unable to become completely intoxicated from drinking, which often lead to spending more money on alcohol:

We try and stay away from drinking when we're on speed, because we know we're just gonna waste all our money because it doesn't, doesn't do it...doesn't get you drunk. 'Coz you're too, you know, too much on...you're off your head really (22 year old female ATS user).

But yeah, so you drink more I would say. [Interviewer: Yeah?] I do, yeah. Tend to drink more. [Interviewer: Yeah, yeah, fair enough] Which sucks. Costs too much money (22 year old male ATS user).

Some ATS users reflected on the harms associated with this increased capacity to drink:

So, yeah, we didn't really have any before but the alcohol, it didn't matter if we had any or if we didn't have any at all, all the pills and like the meth and stuff kicking in. It was ... alcohol meant nothing. It played no part at all. [Interviewer: Really?] Yeah, like I said, you could have given us a bottle of Vodka and just said 'Yeah, it's water' and we would have just drunk it and thought it was water. Like, it's terrible like that because alcohol poisoning is, like, right around the corner (20 year old male ATS user).

I know people who do drink and because of the way speed works you've got to drink like four times the amount just to get tipsy and it's just pointless because you're just, you know, punishing your body. It's just horrible (23 year old female ATS user).

Altering the effects of amphetamine-type stimulants

A further motivation for combining alcohol with ATS was to alter the physiological and subjective effects of ATS use. ATS users described using alcohol to bring on the effects of ATS more quickly or to produce a stronger high:

Um I think that if you drink before you take them it, ah, it makes it come on quicker and it makes it a more enjoyable experience because it's um like missing...a drug feeling without being, without getting all messy (22 year old female ATS user).

Um, if you're really drunk it seems like the pill will hit you a lot more and it will...like that's usually the aim, is to get as drunk as you can, then have your pill (21 year old female ATS user).

Um to be honest, it probably, yeah...I'd say it probably would have enhanced the experience. I think basically there is a different feeling that comes with just taking ecstasy and getting drunk and taking ecstasy. I think if you do have alcohol in your system as well, the two can, can probably react and, and make the experience probably more powerful than it otherwise would have been (23 year old male ATS user).

For other users, combining alcohol with ATS resulted in a more mellow high:

It just kind of, yeah, mellows it all out (22 year old female ATS user).

How was it different? Um I'd say it was probably better having a few drinks rather than just getting on the pills. Because I know especially without 'em um really you just sitting there tapping your leg all night, you just want to get up and keep moving and dance or just...really haven't got any control over what you're doing. You're just exploding. Want to go do something. But after a couple of drinks, you know, you're just really amped up to have a good night and you're still socialising and all that sort of stuff. [Interviewer: So it sort of mellows it out for you a little bit?] Yeah. Keeps you feeling good. But, yeah. Keeps you not feeling that you're going to, I don't know, do something stupid or you can't control yourself (20 year old male ATS user).

Alcohol was also used to lengthen the high experienced from ATS:

Um...it definitely helps it last longer. [Interviewer: Yeah?] And then vice versa, if we're taking ecstasy at the same time I'm not as drunk. Like, if I had drank...I mean, 10 doesn't really sound like a lot. But if I had drank 10 drinks then I would have felt much more intoxicated than I was if I wasn't on pills as well. [Interviewer: Okay, okay]. Um but towards the end of the night we were kind of drinking instead of having another pill because it would just make it last a bit longer (23 year old female ATS user).

Yeah. It does, 'coz it kind of prolongs the effect, actually. Because if you're just taking that and not drinking anything you probably come down a little quicker but if you're a little intoxicated like by alcohol as well, you kind of don't feel the comedown for as long. [Interviewer: Yep. Okay, cool, thank you] Keep going a bit longer (23 year old female ATS user).

Helping with the 'comedown'

Users of ATS described a number of motivations for consuming alcohol while 'coming down' from ATS. As described below by one user, alcohol could be used to extend the feeling of being intoxicated while 'coming down':

But very much at the same time you feel when it's [ATS] wearing off you know you're just like there's nothing left. Like I can't...for you, like...and that's when I think a lot more people go out and then they call their friends or they do something to try and get more, because that is the high and it's going away so quickly. But like when you're drinking, it's sort of that little...like again, not like a balance but it's sort of...they're, they're sort of together on that centre line. So, if that one's wearing off you're still sort of drunk and it's not like the world's gonna end. Like you could always grab another scotch or something, have a drink, start like...just jump in a cab home or something (22 year old male ATS user).

Another function of drinking during the 'comedown' highlighted by ATS users was to enable users to sleep:

That alcohol takes a big factor into it. Most people drink water. But, yeah, I get on the piss so I can sleep afterwards (20 year old male ATS user).

Ah, it means like a, well the, the pill means you have more energy and you want to drink more, so you get more drunk but at the same time the alcohol kind of like deadens the effect of the pill. [Interviewer: Mmm] Like you don't, you don't feel it. And ah, ah it's, I guess it's bad because you don't feel the good things as much but it's good as in you don't feel the bad things as much. You can go to sleep and probably are more relaxed and a bit, yeah (19 year old male ATS user).

Concurrent alcohol and amphetamine-type stimulant use

Concurrent ATS and alcohol use is defined here as use occurring in the same time period, for example, last month (Midanik, Tam & Weisner 2007). Table 15 presents the mean number of standard drinks consumed in the last month at baseline, 12 months, 30 months and four and a half years for well-managed and at-risk ATS users. While the average number of standard drinks consumed was higher for at-risk ATS users at each time point, a significant difference between the two groups was only evident at the 12-month follow-up. A multivariate analysis of variance and covariance (MANOVA) was used to compare the number of standard

drinks consumed by well-managed and at-risk ATS users in the previous month across the four time points, which found a significant difference between the two groups. Compared with well-managed ATS users, at-risk users were drinking at significantly higher levels over the four and a half years of the study.

Table 15 :Quantity x frequency measure of alcohol use in the last month at baseline, 12 months, 30 months and four and a half years, by well-managed and at-risk amphetamine-type stimulant users (n=223)

Mean number of standard drinks in the last month (95% CI)					
	Baseline	12 months	30 months	4½ years	F ^a
ATS users					4.01*
Well-managed ^b	58.14 (43.50–72.79)	50.48 (39.50–61.46)	58.86 (44.13–73.59)	29.25 (23.57–34.92)	
At-risk	78.62 (66.66–90.58)	91.44 (75.80–107.09)	93.2 (68.24–118.16)	53.57 (43.43–63.69)	

* p<0.01

a: Multivariate analysis of variance and covariance (MANOVA) reporting F statistic

b: Refers to amphetamine-type stimulant users engaged in low/intermediate frequency patterns of use who have not had any substance-related contact with health services, have not had intensive substance-related contact with police and have never been charged with a drug-related offence

The proportions of well-managed and at-risk ATS users who usually consumed more than four standard drinks (ie binge drinking) on days of drinking in the last month at baseline, 12 months, 30 months and four and a half years, are presented in Table 3.2. Significantly higher proportions of at-risk ATS users were engaged in binge alcohol consumption at the 12- and 30-month follow-ups. At baseline, 12 months and 30 months, over half of at-risk ATS users generally engaged in patterns of binge drinking on days of drinking within the last month. At the four and a half-year follow-up, a little over a third of well-managed ATS users had usually binged on alcohol on days of drinking in the last month, while about 42 percent of at-risk users were still usually engaging in binge patterns of alcohol use.

Table 16: Binge alcohol consumption in the last month at baseline, 12 months, 30 months and four and a half years, by well-managed and at-risk amphetamine-type stimulant users

Binge alcohol consumption in the last month ^a								
	Baseline (n=225) (%)	χ ²	12 months (n=226) (%)	χ ²	30 months (n=225) (%)	χ ²	4½ years (n=224) (%)	χ ²
ATS users		1.16		23.60**		8.41*		0.49
Well-managed ^b	60.3		46.9		46.9		36.5	
At-risk	67.9		79.6		67.7		41.6	

* p<0.01 ** p<0.001

a: Binge alcohol consumption categorised as usually consuming >4 standard drinks on days of drinking in the last month

b: Refers to amphetamine-type stimulant users engaged in low/intermediate frequency patterns of use who have not had any substance-related contact with health services, have not had intensive substance-related contact with police and have never been charged with a drug-related offence

Table 3.3 presents the proportions of well-managed and at-risk ATS users who had experienced alcohol abuse and dependence in their lifetime (ever) and during the last 12 months, measured at the four and a half year follow-up. As shown, significantly higher proportions of at-risk ATS users had experienced lifetime alcohol abuse and dependence and last 12-month alcohol abuse. However, there was not a significant difference between the proportion of well-managed and at-risk ATS users who were alcohol dependent in the last 12 months at the four and a half-year follow-up.

Table 17: Alcohol abuse and dependence, by well-managed and at-risk amphetamine-type stimulant users (n=212)

Alcohol abuse and dependence ^a								
	Lifetime abuse (%)	χ^2	Last 12-month abuse (%)	χ^2	Lifetime dependence (%)	χ^2	Last 12-month dependence (%)	χ^2
ATS users		17.68**		5.85*		6.40*		2.06
Well-managed ^b	46.9		14.1		21.9		10.9	
At-risk	76.4		29.7		39.9		18.9	

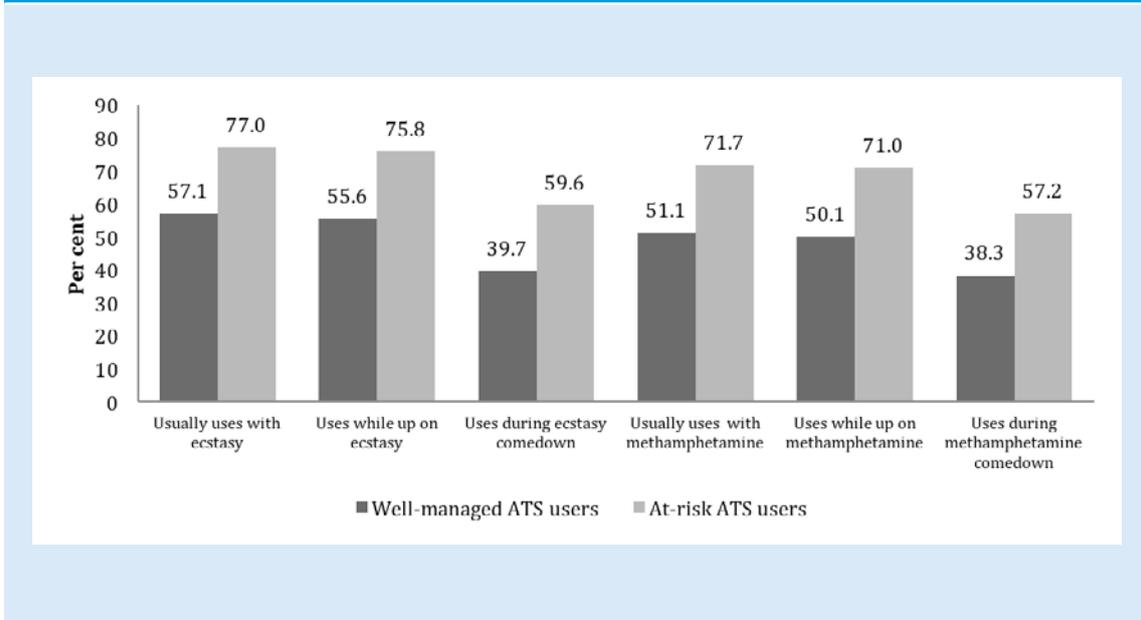
* p<0.05, ** p<0.001

a: Measured at 4½ year follow-up; assessed using the WMH-CIDI 3.0, which applies diagnostic criteria from the DSM-IV; b Refers to amphetamine-type stimulant users engaged in low/intermediate frequency patterns of use who have not had any substance-related contact with health services, have not had intensive substance-related contact with police and have never been charged with a drug-related offence

Amphetamine-type stimulant and tobacco use

More than half of both well-managed and at-risk ATS users usually used tobacco during episodes of ecstasy and methamphetamine use (see Figure 8). However, a significantly higher proportion of at-risk ATS users generally used tobacco with ATS (tobacco use during episodes of ecstasy use: $\chi^2=8.77$, p<0.01; tobacco use during episodes of methamphetamine use: $\chi^2=6.82$, p<0.01). For both groups, higher proportions of ATS users used tobacco while high on ATS compared with during the ‘comedown’.

Figure 8: Tobacco use during episodes of ecstasy (n=224) and methamphetamine use (n=192) at baseline



A number of ATS users discussed an increased urge to smoke tobacco and often smoked greater quantities during episodes of ATS use:

But usually...that’s one thing, when, when you do smoke and you’re a smoker and you’re on ecstasy and I used to, used to smoke a lot. Used to smoke like a packet or something. And that’s what my friends do when they’re on it (23 year old male ATS user).

So I usually try and alternate between going outdoors and talking and when I am on ecstasy, I find a greater need or desire to smoke. When you have a cigarette, it is sort of, like, gives you another little hit, which I don't usually get from smoking (21 year old male ATS user).

Functions of combined tobacco and amphetamine-type stimulant use

ATS users expressed two key motivations for smoking tobacco during episodes of ATS use. Firstly, users felt that smoking was able to bring on the effects of ATS more quickly:

Yeah, you find when it [ecstasy] first starts to hit you, you start smoking, it kind of in a way brings it on a lot more, it brings it on faster. Um and then it just, you can't really taste any smoking, it just, it's just like a nice relaxing, it just feels nice to do it. Um and so then you just keep going especially when you're really pumped, you just keep going and going and going. Yeah (21 year old female ATS user).

Secondly, some ATS users emphasised that combined smoking and ATS use enhanced the feeling of each substance, as described below:

And I think I smoked a cigarette, which I don't normally do but I smoked it because it just seemed to enhance the experience, it seems to make the drug ecstasy strong temporarily (21 year old male ATS user).

I think that night I smoked a lot. I chain smoked cigarette after cigarette. I'm not a big smoker. I probably wouldn't smoke at all if my girlfriend didn't smoke but my girlfriend smokes a lot. So when we're out I just smoke her cigarettes and when I'm on pills I enjoy cigarettes a lot more. [Interviewer: How come?] I couldn't tell you. [Interviewer: What does it do?] I don't know. Maybe...no, I don't know. I just enjoy it. I suppose it feels good. I don't know how or why but I remember that one occasion I definitely, I just could have...once I finished a cigarette put another one in my own mouth and just kept smoking and smoking and smoking (21 year old male ATS user).

[Interviewer: And how do you think, um, it interacted with the ecstasy? Like did it make it any different at all or...] Yeah, it's a little bit different. Um, I don't know, feels better. [Interviewer: Yeah and the ecstasy feels better?] The smoking. [Interviewer: The cigarettes feel better...] Yeah, yep. [Interviewer: When you're taking ecstasy?] Yep. [Interviewer: Okay, how does it make it better, like in what way?] Um, I know it sounds odd, but you can sort of feel, feel it going down. [interviewer: Okay] Yeah, your throat, yeah. [Interviewer: Okay, is it like a...yeah?] It feels cooler (22 year old female ATS user).

Concurrent tobacco and amphetamine-type stimulant use

Table 18 shows that significantly higher proportions of at-risk ATS users have used tobacco in the last month at baseline, 12 months and four and a half years, compared with well-managed users. No significant difference was evident between the proportion of well-managed and at-risk ATS users who had used tobacco in the last month at the 30-month follow-up. More than half of at-risk ATS users reported tobacco use in the previous month at each time point.

Table 18: Tobacco use in the last month at baseline, 12 months, 30 months, and four and a half years, by well-managed and at-risk amphetamine-type stimulant users

	Tobacco use in the last month							
	Baseline (n=225) %	χ^2	12 months (n=226) %	χ^2	30 months (n=226) %	χ^2	4 ½ years (n=224) %	χ^2
ATS users		9.87*		12.54*		5.48		9.76*
Well-managed ^a	51.6		43.8		45.3		33.3	
At-risk	72.7		69.2		62.4		56.5	

* p<0.01

a: Refers to amphetamine-type stimulant users engaged in low/intermediate frequency patterns of use who have not had any substance-related contact with health services, have not had intensive substance-related contact with police and have never been charged with a drug-related offence

Table 19 presents the proportions of well-managed and at-risk ATS users who had experienced nicotine dependence in their lifetime (ever) and the last 12 months, measured at the four and a half-year follow-up. Compared with well-managed ATS users, significantly higher proportions of at-risk users were nicotine dependent in their lifetime and within the last 12 months.

Table 19: Nicotine dependence^a, by well-managed and at-risk amphetamine-type stimulant users (n=212)

	Nicotine dependence			
	Lifetime dependence (%)	χ^2	Last 12-month dependence (%)	χ^2
ATS users		11.24**		4.49*
Well-managed ^b	29.7		18.6	
At-risk	54.7		33.1	

* p<0.05

** p<0.01

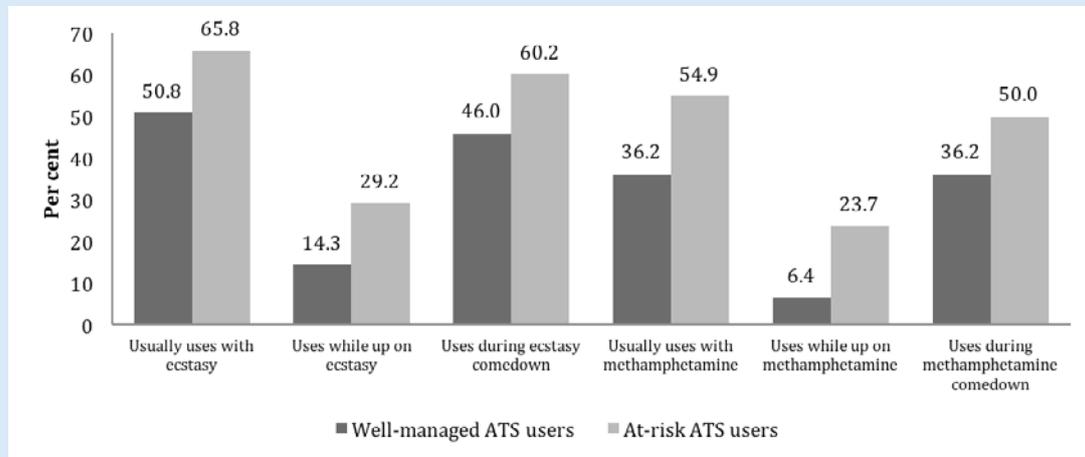
a: Measured at four and a half-year follow-up; Assessed using the WMH-CIDI 3.0, which applies diagnostic criteria from the DSM-IV

b: Refers to amphetamine-type stimulant users engaged in low/intermediate frequency patterns of use who have not had any substance-related contact with health services, have not had intensive substance-related contact with police and have never been charged with a drug-related offence

Amphetamine-type stimulant and cannabis use

A significantly higher proportion of at-risk ATS users reported usually using cannabis during episodes of ATS use, compared with well-managed users (cannabis use during episodes of ecstasy use: $\chi^2=4.33$, p<0.05; cannabis use during episodes of methamphetamine use: $\chi^2=4.95$, p<0.05; see Figure 9). Among both well-managed and at-risk ATS users, cannabis was more commonly used while 'coming down' from ecstasy or methamphetamine, rather than while 'up'.

Figure 9: Cannabis use during episodes of ecstasy (n=224) and methamphetamine use (n=191) at baseline



Functions of combined cannabis and amphetamine-type stimulant use

ATS users discussed two key functions of using cannabis while using ATS. Firstly, smoking cannabis while high on ATS could alter the effects of each substance. Generally, cannabis was used with ATS to produce a more mellow high:

[Interviewer: And so does the weed change the way you're feeling on the pill?] Um, yeah, it does change the way...I wasn't like all amped up, jumping around. I was just standing there, standing there (21 year old male ATS user).

Pot, though, can help, like also especially if um, if it smashes you too much, like the pill. You do need, it comes, it brings you down a bit. So, if it's getting a bit too intense like the weed can bring you down to a more stable level. [Interviewer: Okay]. And also um, yeah, it just sort of relaxes you so you can sort of get the feeling out of it more and also, you know, if you just... 'coz it's a stimulant, you know, if you're just getting too excited, just go...yeah, calms you down, brings you back down to a good level. And then um, yeah, I think it works well. Because then once it sort of wears off, you know, the pill kicks back in, it's all good again. [Interviewer: Okay]. It's just sort of a break (19 year old male ATS user).

Um, and then like the marijuana does enhance the ecstasy in the sense that it removes some of the edginess from what's going on so when you take it like you've got this really speed smacky kind of thing going on where you're really, really worked up and hyper-excited and everything and the weed just kind of goes, just chill. Just chill out so that you can kind of sit down and have a conversation with someone (23 year old female ATS user).

However, a number of ATS users described cannabis use enhancing the effects of ATS:

Um, smoking marijuana obviously intensifies it because it's a different drug and the way that it affects your mind is different to the way that ecstasy does. If you add the two together it's a more prolonged and more full-on effect by adding the two of them together (23 year old male ATS user).

The second key function of cannabis highlighted by ATS users was to aid with 'coming down' from ATS. A number of ATS users described the role of cannabis in mitigating negative effects of 'coming down':

Um, well, you don't really notice it [coming down] because, because of the weed. Which is what helps at the end of the night. It kind of brings you down as well. I don't know, not...you don't get the depressed feeling or anything. Just lazy feeling instead (21 year old male ATS user).

I always, I always used to never, ever smoke pot when I had ecstasy, because I thought it would be wasting a pill. But I'm...since now it's the only way I can kind of just... 'coz if I just have a pill I'll have a very strong distinction between, you know, when I'm coming up and then I'll know when...when the pill's worn off. And from that moment on I get really depressed and like, 'Oh, well, there's no point kind of being out here because I'm just gunna start feeling crapper and crapper and crapper'. [Interviewer: Yep] And the music starts to...everything starts to just fade away. But when you smoke pot throughout the pills you don't have a very clear distinction of when it's coming up or when it's not. You just feel very... it's like that throughout the whole next couple of days and actually smoking pot when you're scattered or when you're coming down actually just makes it fine. You don't feel a thing, yeah. [Interviewer: Yeah?] Your head doesn't hurt or...you don't feel real sick and want to throw up (19 year old male ATS user).

Users of ATS also discussed using cannabis to enable them to sleep more easily after an episode of ATS use:

Yeah, helps you kind of switch off. 'Coz sometimes, depending on what's based in the pill, whether or not it um, you can kind of shut your brain off to concentrate to go to sleep. Where if we have a lot of, what you'd say, pipes after...once you know the pill is wearing off, it kind of definitely calms you down and puts you to sleep a lot easier (23 year old female ATS user).

Um, it was only a little bit just to kind of bring me down to make me a bit drowsy or whatever so I could get to sleep. [Interviewer: Yep. So is that something you usually do, like taking marijuana while you're coming down?] Yeah, I find um, if you don't smoke you won't get any sleep, like your mind stays active. [Interviewer: Mmm] And um, um so when you smoke you get a bit drowsy and then it's a lot easier to sleep and then you don't have as much of a comedown the next day because you're not tired (21 year old male ATS user).

Concurrent cannabis and amphetamine-type stimulant use

Table 20 presents the proportions of well-managed and at-risk ATS users who used cannabis in the last month at baseline, 12 months, 30 months and four and a half years. At 12 and 30 months, significantly higher proportions of at-risk ATS users used cannabis in the last month, compared with well-managed users. No significant difference existed between the groups at baseline or four and a half years.

Table 20: Cannabis use in the last month at baseline, 12 months, 30 months, and four and a half years, by well-managed and at-risk amphetamine-type stimulant users

	Cannabis use in the last month							
	Baseline (n=225) %	χ^2	12 months (n=226) %	χ^2	30 months (n=226) %	χ^2	4½ years (n=211) %	χ^2
ATS users		5.53		8.98*		10.10**		3.38
Well-managed ^a	51.6		31.2		25.0		30.0	
At-risk	72.7		53.1		47.5		43.7	

* p<0.05, ** p<0.01

a: Refers to amphetamine-type stimulant users engaged in low/intermediate frequency patterns of use who have not had any substance-related contact with health services, have not had intensive substance-related contact with police and have never been charged with a drug-related offence

Amphetamine-type stimulant and other drug use

Table 21 presents the proportions of well-managed and at-risk ATS users who had ever used cocaine, hallucinogens, inhalants, gamma hydroxybutyrate (GHB), ketamine and heroin at baseline. Significantly higher proportions of at-risk ATS users had ever used cocaine, inhalants and ketamine, compared with well-managed users. There was no significant difference between the groups for lifetime use of hallucinogens or GHB. Due to the small numbers of well-managed ATS users who had ever used heroin, chi-square analysis could not be reliably conducted.

	Other drug use											
	Cocaine (n=224)		Hallucinogens (n=224)		Inhalants (n=224)		GHB (n=225)		Ketamine (n=225)		Heroin (n=222)	
	Ever used (%)	χ^2	Ever used (%)	χ^2	Ever used (%)	χ^2	Ever used (%)	χ^2	Ever used (%)	χ^2	Ever used (%)	χ^2
ATS users		3.97*		2.66		5.02*		1.76		3.87*		- ^b
Well-managed ^a	50.8		50.0		30.2		7.8		10.9		1.6	
At-risk	65.2		61.9		46.6		14.3		22.4		6.3	

* p<0.05

a: Refers to amphetamine-type stimulant users engaged in low/intermediate frequency patterns of use who have not had any substance-related contact with health services, have not had intensive substance-related contact with police, and have never been charged with a drug-related offence

b: Cell numbers too small for reliable chi-square analysis

Conclusion

This section examined the concurrent and simultaneous use of licit and illicit substances with ATS. Consistent with previous research (Degenhardt et al. 2009; Gouzoulis-Mayfrank & Daumann 2006; Kirkpatrick et al. 2012), poly-drug use was prevalent among young adult ATS users in this study. Alcohol, tobacco and cannabis appear to be the substances most commonly used with ATS. Poly-drug use in the sample appears to be more intensive among at-risk ATS users compared with well-managed users. Significantly higher proportions of at-risk ATS users generally used tobacco and cannabis during episodes of ATS use and had ever used cocaine, inhalants and ketamine, compared with well-managed users. The potential harms associated with combining these substances with ATS are largely unknown, however a growing body of research suggests that the combined use of licit and illicit substances may produce greater harms than their separate use (Fisk et al. 2011; Hedden et al. 2010).

Combined alcohol and ATS use was common among the young adult ATS users in this study. Almost all ATS users usually drank during episodes of ecstasy use (about 94%), with a slightly lower proportion usually drinking during episodes of methamphetamine use (about 82%). The qualitative data highlighted a number of instrumental functions of using a combination of alcohol and ATS, including: reducing anxiety, increasing drinking capacity, altering the effects of ATS and helping with the 'comedown'. While similar proportions of well-managed and at-risk ATS users reported usually drinking during episodes of ATS use, the data suggests that at-risk ATS users may be engaging in more problematic patterns of drinking. Compared with well-managed users, at-risk users drank at significantly higher levels over the study period (baseline to 4½ year follow-up). Further, significantly higher proportions of at-risk ATS users had experienced lifetime alcohol dependence and abuse compared with well-managed users after four and a half years of follow-up. More than a third (39.9%) of at-risk ATS users had experienced lifetime alcohol dependence, compared with less

than a quarter (21.9%) of well-managed ATS users, while more than three quarters (76.4%) of at-risk users had experienced lifetime abuse, compared with less than half (46.9%) of well-managed users.

Binge patterns of drinking were also common among ATS users. At baseline, 78.5 percent of at-risk ATS users and 67.7 percent of well-managed users were usually engaging in binge alcohol consumption (ie usually consumed >4 standard drinks on days of drinking in the last month). After 12 and 30 months of follow-up, more than half of well-managed and at-risk ATS users were still usually engaging in binge patterns of alcohol use.

Tobacco use was also prevalent among well-managed and at-risk young adult ATS users. The qualitative data highlighted that some ATS users experience an increased urge to smoke tobacco during episodes of ATS use. It indicated that smoking could play a functional role in ATS use as it was perceived to bring on the effects of ATS use more quickly and to enhance the effects of each substance. While rates of tobacco use were high among well-managed and at-risk ATS users, significantly higher proportions of at-risk ATS users usually used tobacco during episodes of ecstasy (75.8% vs 55.6%) and methamphetamine use (71.7% vs 51.1%), compared with well-managed users. Significantly higher proportions of at-risk ATS users also reported tobacco use in the last month at the baseline interview and at the 12 month and four and a half year follow-ups, compared with well-managed users. Further, compared with well-managed users, higher proportions of at-risk ATS users had experienced lifetime (54.7% vs 29.7%) and last 12-month (33.1% vs 18.6%) nicotine dependence at the four and a half year follow-up. As with alcohol use, this suggests that at-risk ATS users may be engaging in more problematic patterns of tobacco use compared with well-managed users.

Lastly, similar patterns were seen regarding cannabis use among well-managed and at-risk ATS users. Significantly higher proportions of at-risk ATS users generally used cannabis during episodes of ecstasy (65.8% vs 50.8%) and methamphetamine use (54.9% vs 36.2%), compared with well-managed users. In both groups, cannabis was more commonly used during the 'comedown' from ATS, rather than while high on ATS. The qualitative data highlighted that cannabis was used to mitigate the negative effects of 'coming down' from ATS, such as feelings of sadness or depression and ATS-related insomnia.

Desisting from use

Key points

- A number of motivating factors for reducing or desisting from ATS use were identified from the qualitative data, including: negative effects and reduced positive effects, 'growing up', peer and partner influence, and risks and negative consequences.
- After four and a half years, just less than half of the well-managed (45.9%) and at-risk (42.9%) ATS users had desisted from ATS use.
- Among those who had used ecstasy or methamphetamine within the last 12 months, infrequent use (ie once or twice in the last 12 months) was most common.
- Higher proportions of at-risk ATS users were using ATS every few months (ecstasy: 14.7% vs 8.5%; methamphetamine: 10% vs 0%), compared with well-managed users.
- Higher proportions of at-risk ATS users were consuming ecstasy (0.6% vs 0%) and methamphetamine (5.7% vs 2.2%) weekly or more frequently, compared with well-managed users.
- Having less ecstasy-using peers (<40) and being in a de facto relationship or marriage were significantly associated with desistance from ATS use after four and a half years.

Introduction

For most users, ecstasy use is arguably a 'transient, "youth-limited" phenomenon' (von Sydow et al. 2002). Research suggests that common reasons for reducing or desisting from ecstasy use are linked to changes in personal circumstances (eg new job or relationship) or the interference of ecstasy with users' 'normal life' (Peters, Kok & Schaalma 2008). The available studies of desistance from ecstasy use are mainly qualitative, with little quantitative examination of potential predictors of desistance (Peters et al. 2008). This section firstly explores motivating factors for reducing or desisting from ATS use that have emerged from the study's qualitative data. Secondly, analysis of the study's quantitative data is conducted to examine potential predictors of desistance from ATS use, with variables constructed to match the motivating factors that emerged from the qualitative data.

Motivating factors for reducing or desisting from amphetamine-type stimulant use

In the baseline qualitative interview, approximately 15 percent of the 350 ATS users who were interviewed discussed having reduced their use or desisted from ATS use. From these interviews, four key motivating factors for reducing or desisting from use were identified:

- negative effects and reduced positive effects;
- 'growing up';
- peer and partner influence; and
- risks and negative consequences.

Negative effects and reduced positive effects

ATS users discussed a variety of negative drug experiences associated with reducing or desisting from ATS use. Negative effects were most commonly related to the 'comedown' from ATS, as described below:

[Interviewer: So how did you feel about the evening overall?] Um. I felt it was a good evening but I sort of felt that that would be...I wouldn't take it again or try not to take it again. [Interviewer: Mmm hmmm. So you mean in the future, ecstasy?] Yeah. [Interviewer: Why is that?] Probably I just had enough feeling bad the next day (22 year old male ATS user).

Whereas I get it [comedown] really strongly, which is one of the reasons why I don't do it anymore. [Interviewer: What do you feel? Can you describe it?] Like, oh, well, for me personally I get like really bad kind of like just...I cry a lot and like I know, I know other people who do that as well. But like most of my friends don't and so like I'll cry a lot but I'll get really depressed as well. Like really, really, really depressed. So I've had a couple of bad occasions now so I, just for me it's kind of like not really worth it. Like my mentality is more important kind of thing than like getting high for one night (20 year old female ATS user).

However, a number of users had also experienced bad highs, which deterred them from further use:

Well, this...the most recent experience was the last time I'd done it. [Interviewer: Yeah] And after that experience um, I decided not to do it again and...[Interviewer: Was that for factors that happened on that night?] Yeah. Yeah. [Interviewer: Do you mind telling me?] Yeah, of course. I was thinking are we going to get to it. Yeah. Well, basically it was all going alright. Um but, yeah, sometimes you always run the risk you don't know what the drugs are mixed with or whether they've got something else added into it or... [Interviewer: Yeah] At first I was fine but then I think it was by the time we were starting to head home, I can't remember exactly what time it was, started to get a really bad reaction. Like I started to see things that weren't there and just went into this state of freaking out and felt really sick. I'd, I'd say probably more sick than I've ever felt, ever. Like wanting to throw up but can't. Couldn't sleep. Weird feeling. It was just basically like the next eight hours of hell. 'Oh my God, I just want to die'. Like lying in bed in like mental and physical agony, like seeing things on the wall and...[Interviewer: Yeah and actually hallucinating?] Yeah. Pretty much, not vibrant colours or anything like that, but it was weird things and shapes and ... oh, it was bizarre and...oh. [Interviewer: Not pleasant?] Not pleasant at all. And I've never had that experience before and it was like oh, I don't want it to ever happen again. [Interviewer: Yeah, you don't want to go through it again?] So I was like I'm gunna stop (20 year old female ATS user).

Um, they [participant's friends] still enjoy it but they, they're feeling the same way, like they're feeling that it's getting the bad is outweighing the good. [Interviewer: Right. Does that, does that mean you cut down or does it mean you move on to something else?] Um, if we were richer we'd probably move on to cocaine, but we're not. So, yeah. So, and, yeah. I've had some bad experiences on speed so...just don't really like to take that as much anymore (19 year old male ATS user).

ATS users also expressed frustration that they were no longer experiencing the same positive effects they had previously from ATS use. For some, they associated this reduction in positive effects to having developed a tolerance to ATS:

Um, I was at [music festival] and I took one, it didn't really do anything, took another one, then did something for about two hours and it just wore off and I was really frustrated and agitated because I think that overuse in the past has affected its act to have the same effect on me. So it wouldn't be as strong as it used to be. Which makes me want to stop doing it... (20 year old female ATS user).

Reduced positive effects were also often linked with reduced quality of available ATS:

Well, the ones, like, as a general consensus from young people, like, taking ecstasy now is very different to taking ecstasy three or four years ago, because, um, back then it was really, like, MDMA based, so you'd get, like, a real sense of euphoria from it, whereas now, whenever I take pills and this is probably the big reason that's contributed to me stopping taking pills, aside from the fact that just socially we just stopped doing it 'coz it's just a phase and you just get over it, um, is that, yeah, you don't really get that sense of euphoria any more which is, kind of, the big draw for me anyway of taking pills (21 year old female ATS user).

‘Growing up’

‘Growing up’ was a common factor ATS users linked to reducing or desisting from ATS use. Some users viewed their ATS use as a phase of adolescence and early adulthood that they were moving on from:

I think it’s just a phase that we all went through. But it’s good that we sort of went through it when we were young rather than when we’re old and it was harder (19 year old female ATS user).

So I haven’t done it since, yeah. And um and I’m really, yeah, really glad that I haven’t done it since, either. I think it kind of just wore out its, just ran its course and um. [Interviewer: Yeah?] Kind of like I just grew out of it really (23 year old male ATS user).

For other users, reducing or stopping their use was associated with new responsibilities, such as work and family:

I just decided to stop using it. It’s just not worth it anymore. [Interviewer: So um, have you, have you seen these guys since...] Nuh. [Interviewer: No, it was just the one off...] Yeah, one off thing. They were either, they didn’t really ah mix with me too well. [Interviewer: You didn’t gel too well?] No. [Interviewer: Could you talk a little bit more about that, like why do you think you didn’t, you didn’t hit it off terribly well?] Well they were, they were too, were just different. Like fair enough I have done the stuff before but there’s a point where I know I’ve got to focus on something else. That’s my work and where I’m going in life. [Interviewer: Uh huh] So in that sort of sense I don’t really want to see them ever again really. [Interviewer: Why, why do you say that? Was there something in particular that happened?] You could just tell they were dropkicks, really. [Interviewer: What do you, what do you mean by that, like...] Well ah, if, if you see someone you can tell they’re a constant user. [Interviewer: Okay, mm] And a few of them deal and I thought like nuh, I don’t want to be around this stuff. [Interviewer: So they were a bit heavier than, than what you were into?] Yeah, that’s right. Yeah, like every now and then, a bit casual I don’t mind doing it. Like pretty much now I just couldn’t be bothered. I’ve got too much of my own stuff going on, I want to buy a house, get a business, get a family going in the next four years or so (22 year old male ATS user).

And um I just remember feeling like the normal euphoric feelings that I get, but... [Interviewer: The following day you felt that?] Yeah, the following day, um, but it wore off really, really quickly than other times so obviously over the years of taking it, like, I’ve noticed there’s a decline like in the feeling that I get from it and I’ve noticed that I gotta take more. But, ah, I always say to myself, you know, just stop taking it and, um, you can get that feeling back and I know that, so, you know, I’m just trying to think. So more recently it’s been cut back obviously ‘coz I have a child now and um money-wise, obviously (19 year old female ATS user).

Peer and partner influence

Peers and partners played an influential role in motivating reduced ATS use or desistance from ATS use. The users highlighted that changes in social groups, such as new friendships or relationships with people who were against drug use or reduced use among friends, were important factors:

Um, I would never do it if none of my friends did it. Like, I’d never take ecstasy alone even if I was out with them and they weren’t taking ecstasy. I’d only ever do it if at least one of them was doing it as well. So, yeah I guess it... [Interviewer: I was just wondering why you wouldn’t?] Why? Um, I don’t know. I guess just like... I don’t know. I just wouldn’t do it. Like, would just be... I think that’s the point where you know you’ve got a real problem, when you start using it by yourself and stuff like that or when you’re using it when other people aren’t using it and stuff like that. It’s really just a social thing with me, so, yeah, if like no-one else is doing it I definitely wouldn’t do it. ‘Coz that’s all it is, a social thing with me. So I wouldn’t use it at all. [Interviewer: By yourself?] Yeah. And like I haven’t done it in a while, either, because my friends aren’t doing it now and I decided myself also I don’t want to do it as much or at all anymore. So, yeah, I haven’t used ecstasy in ages, either. And neither have they, so... yeah, we haven’t done that in a while (19 year old male ATS user).

My one friend is really against it [ATS use]. My new boyfriend is really against it as well. And we had a huge big fight about it that other day. I don't think it is really worth it anymore. Because, you know. And, hmm, and, my social group has really changed since I started doing it. I first started doing it with one of my first serious boyfriends, so. And he, and we broke up. So I've got a new one now. It's a lot different (21 year old female ATS user).

And then, yeah, speed I stopped because a mate of mine said, 'You keep doing that, I'm not going to talk to you any more', because his older brother was addicted to it for ages. So I was like, 'Alright. Sweet. It's obviously messed up his life so I won't touch that' (20 year old male ATS user).

Risk and negative consequences

Risks and negative consequences were a further motivating factor identified by ATS users for reducing or desisting from use. Negative health consequences were the key negative consequence of ATS use highlighted by users, as described below:

Um, yeah, I don't really want to. Very infrequently I will do it, like the last time was probably, you know, the first time in maybe five months or so. [Interviewer: Yeah, yeah?] So, yeah, you really can notice some long-term effects after you do it frequently. Shortened memory...Like, short-term memory loss and that sort of thing. And it is very bad for you. So you want to minimise how much you can do it (21 year old male ATS user).

Well, I haven't done it since then so I guess the whole experience is sort of a negative thing for me, because I don't really want to. [Interviewer: And is that because of anything that happened that night?] No. I...it's...not good for your body. That's pretty much it (22 year old female ATS user).

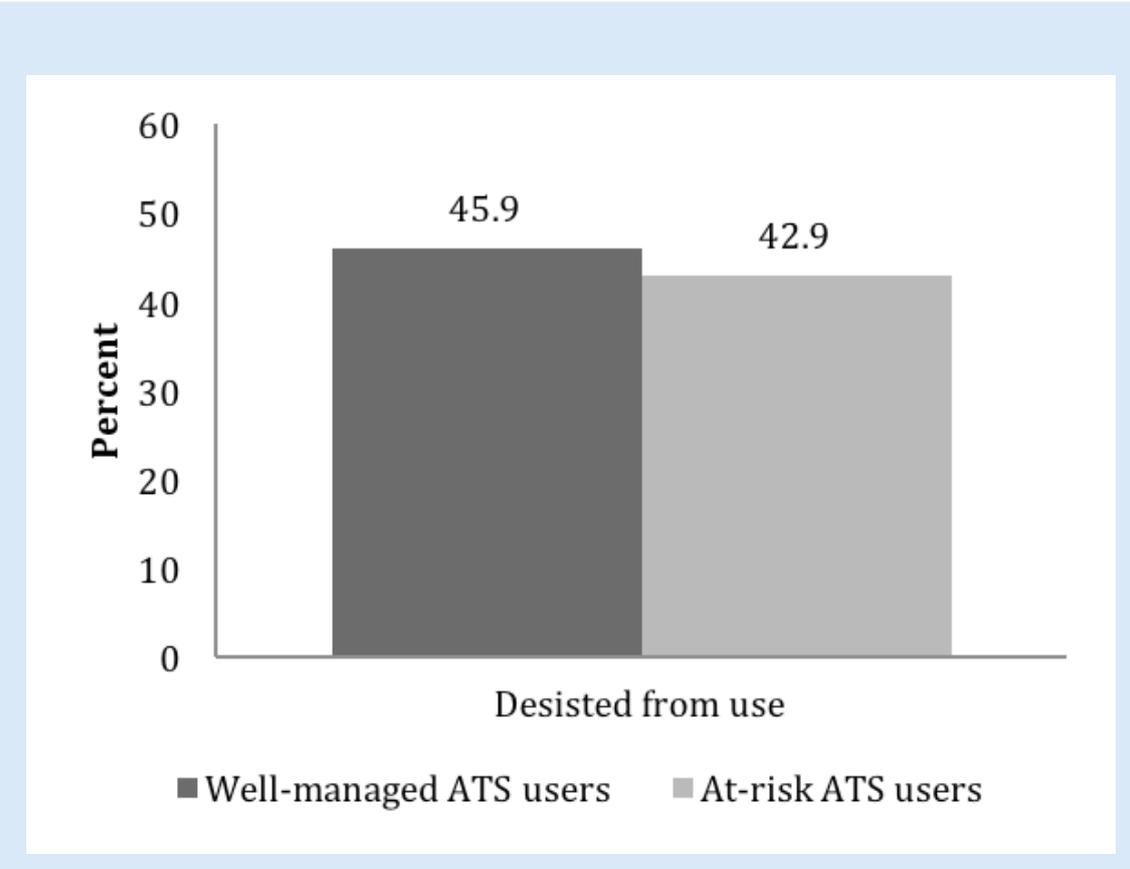
The potential impact of ATS use on users' future plans was also discussed:

I'm paranoid of putting anything like that in my body again, 'coz what if next time I do get charged? I can't get...I've wanted to be a teacher since I was five. I can't get a teaching degree. No-one is going to give a teaching job to someone who's got a drug record (19 year old female ATS user).

Desistance from amphetamine-type stimulant use

Desistance from amphetamine-type stimulant use was measured at the four and a half-year follow-up interview, with desistance defined as no ecstasy or methamphetamine use within the last 12 months. As shown in Figure 10, a similar proportion of well-managed (45.9%) and at-risk (42.9%) ATS users had desisted from use.

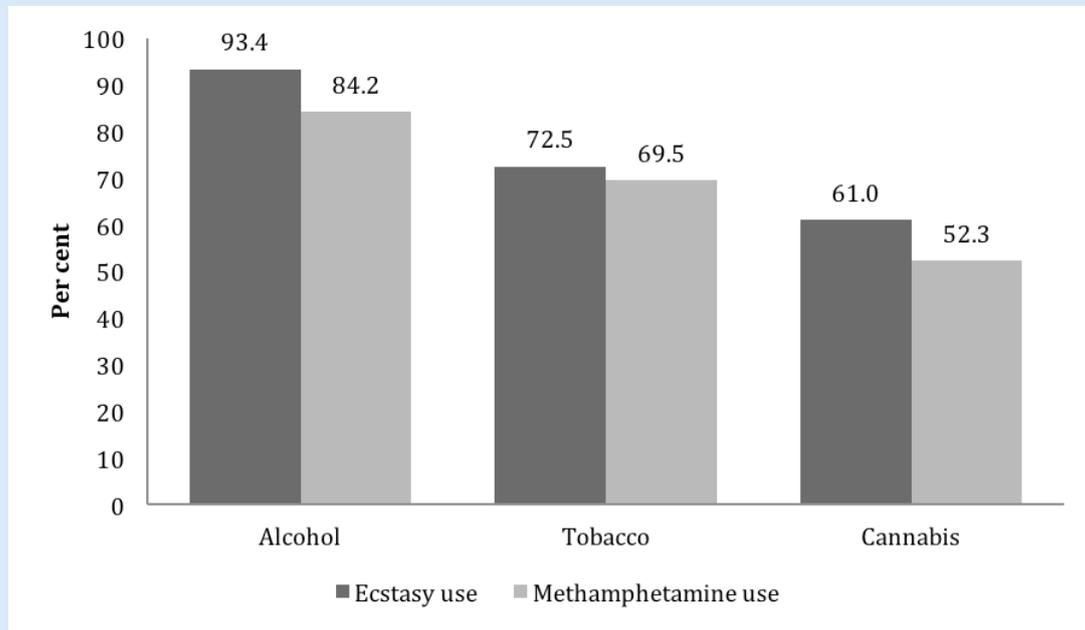
Figure 10: Desistance^a from amphetamine-type stimulant use at the four and a half year follow-up, by well-managed and at-risk amphetamine-type stimulant users (n=222)



a: Desistance from amphetamine-type stimulant use defined as no ecstasy or methamphetamine use in the last 12 months at the 4½ year follow-up

Figure 11 examines the frequency of use of ecstasy and methamphetamine in the last 12 months at the four and a half year follow-up (ie \geq once a week, about once a month, every few months or once or twice in the last 12 months). As shown, infrequent use of ecstasy and methamphetamine was most common among both well-managed and at-risk ATS users, with approximately 37 percent and 29 percent of well-managed and at-risk users using ecstasy only once or twice in the previous 12 months and approximately 18 percent and 16 percent using methamphetamine only once or twice, respectively. However, higher proportions of at-risk ATS users were using ecstasy or methamphetamine every few months (ecstasy: 14.7% vs 8.5%; methamphetamine: 10% vs 0%). Looking at high frequency ATS use (ie about once a month), higher proportions of at-risk ATS users were consuming ecstasy about once a month compared with well-managed users (6.4% vs 1.7%), while proportions for both groups were similar for monthly methamphetamine use (2.1% vs 2.2%). Very high frequency use (ie weekly or more frequent) was more prevalent among at-risk users compared with well-managed users (ecstasy: 0.6% vs 0%; methamphetamine: 5.7% vs 2.2%).

Figure 11: Frequency of ecstasy (n=216) and methamphetamine use (n=185) in the last 12 months at the four and a half year follow-up, by well-managed and at-risk amphetamine-type stimulant users



Drawing on the motivating factors for desistance or reduced ATS use that emerged from the qualitative data, a number of potential predictors of desistance from ATS use were identified and variables were constructed to measure these predictors in the quantitative data, including: age, length of ecstasy and methamphetamine use career, perception of health-related risk associated with ATS use, number of ecstasy- and methamphetamine-using peers, relationship status, and parental status. Bivariate analyses were conducted using logistic regression, reporting unadjusted odds ratios to examine associations between these predictors and desistance from ATS use at the four and a half year follow-up. Results of these analyses are presented in Table 22. No associations were found between desistance from ATS use and age, length of ecstasy or methamphetamine use career, perceived health risks of ATS, number of methamphetamine-using peers or parental status. By contrast, having less than 40 ecstasy-using peers at baseline and 12 months as well as being in a de facto relationship or marriage at the four and a half year interview were significantly associated with desistance from ATS use. Compared with those who were single, ATS users who were in a de facto relationship or marriage were almost three times more likely to have desisted from ATS use.

Table 22: Predictors of desistance from amphetamine-type stimulant use at the four and a half year follow-up, bivariate analyses using logistic regression

	n ^b	Desistance from ATS use ^a
		Unadjusted odds ratio (95% Confidence Interval)
Age ^c		1.11 (0.91–1.36)
Length of ecstasy use career ^d :		
4–5 years	72	0.71 (0.40–1.24)
≥6 years	23	1.08 (0.45–2.58)
Length of methamphetamine use career ^d :		
4–5 years	47	1.42 (0.74–2.75)
≥6 years	18	0.74 (0.26–2.08)
Health risks of ATS use ^e :		
Ecstasy use: very risky	84	1.34 (0.80–2.26)
Methamphetamine use (snorting/swallowing): very risky	117	1.34 (0.82–2.19)
Methamphetamine use (injecting): very risky	227	0.80 (0.39–1.64)
Influence of drug-using peers:		
<40 ecstasy-using peers at baseline	114	2.03 (1.24–3.33)**
<40 ecstasy-using peers at 12 months	147	1.71 (1.03–2.82)*
<15 methamphetamine-using peers at baseline	101	1.10 (0.55–2.21)
<15 methamphetamine-using peers at 12 months	143	1.55 (0.78–3.09)
Relationship status ^f :		
In a relationship	87	0.92 (0.50–1.68)
In a de facto relationship or marriage	84	2.83 (1.55–5.19)**
Parenthood ^g :		
Have children	85	1.30 (0.77–2.18)

* p<0.05, ** p<0.01

a: Desistance from amphetamine-type stimulant use defined as no ecstasy or methamphetamine use in the last 12 months at the four and a half year follow-up

b: Number within each category

c: Entered as a factor variable

d: Reference category is 0–3 years

e: Reference category is without risk, a little risky or moderately risky

f: Measured at the four and a half year follow-up; reference category is single

g: Measured at the four and a half year follow-up

Conclusion

This section has used qualitative and quantitative data to examine desistance from ATS use among young adult ATS users. Four key motivating factors for reducing or resisting from ATS use were identified from the qualitative data:

- negative effects and reduced positive effects;
- growing up;
- peer and partner influence; and
- risks and negative consequences.

Similarly to previous research, these key factors were generally linked to changes in personal circumstances (eg a new job or greater responsibility at work, a new partner or becoming a parent) or ATS use interfering with users' 'normal life' (Peters et al. 2008). For example, experiencing greater negative effects from ATS use, particularly bad 'comedowns', interfered with users' ability to live their 'normal life'. For some users, risks and consequences were related not only to the short-term impact on users' ability to live a 'normal life', but the potential long-term impact, such as that of substance-related criminal charges on their career.

Quantitative analysis showed that after four and a half years of follow-up, just under half of ATS users (45.9% of well-managed users; 42.9% of at-risk users) had desisted from ATS use, with desistance defined as no ecstasy or methamphetamine use in the previous 12 months. The similarity of rates of desistance between well-managed and at-risk ATS users indicates that, even among intensive users, the using 'career' tends to be of a limited duration. This emphasises the importance of keeping these young adults safe during this short period of life in which they are using regularly.

For most current users at the four and a half-year follow-up, ecstasy and methamphetamine use was infrequent (ie only once or twice within the last 12 months). A small proportion of well-managed and at-risk ATS users were engaging in frequent (ie about once a month) or very frequent (ie once a week or more often) use of ATS at the four and a half-year follow-up. Monthly ecstasy use was more common among at-risk users compared with well-managed users (6.4% vs 1.7%), while similar proportions of at-risk and well-managed ATS users were engaging in monthly methamphetamine use (2.1% vs 2.2%). However, higher proportions of at-risk ATS users were consuming ecstasy (0.6% vs 0%) and methamphetamine (5.7% vs 2.2%) weekly or more frequently, compared with well-managed users. This suggests that, while there is a general decreasing trend in ATS use from baseline to four and a half years for most users in the sample (see also Smirnov et al. 2013), some at-risk users may be engaged in more entrenched patterns of frequent use. However, most of these at-risk users who are continuing to use monthly or more often by the four and a half-year follow-up have already decreased their use to the extent that the health or social impacts may be minimal. This is reflected in research from the NHSDU that found no association between high-use trajectories of ecstasy use and dependence, suggesting that high-use trajectories may be characterised by intermittent binge use rather than dependence (Smirnov et al. 2013).

For the young adult ATS users who had desisted from use at the four and a half year follow-up (about 44%), significant associations were found between desistance from ATS use and having a smaller network of ecstasy-using peers (at baseline and 12-months) and being in a de facto relationship or marriage (at 4½ years). It may be that users who had less ecstasy-using peers earlier in the study were more likely to desist from ATS use as they were less entrenched in a drug-using network. Additionally, it is likely that drug-using networks for at-risk ATS users are also beginning to diminish. Being in a de facto relationship or marriage may be linked with greater financial responsibilities (eg a mortgage), which can act as an informal social control on deviant behaviour.

These findings suggest that ATS use among this cohort of young adult users is managed by informal social controls, largely because motivations for use are mainly social, and use is conducted in social settings. The ATS users appear to cease or reduce their use because they want a 'normal life'. This raises an important point regarding the potential impact of substance-related contact with police for young adult ATS users. Criminal charges for illicit substance use may potentially lead to stigmatisation for young adult ATS users, consequently making achieving a 'normal' life through social integration more difficult.

Harm mitigation

Key points

- Users of ATS are recognised for low rates of participation in health treatment services.
- A need exists to develop novel harm-reduction messages and strategies that are appropriate for and well accepted by ATS users, and that are accessible outside of mainstream specialist treatment services.
- Research shows ATS users engage in a variety of behaviours that they perceive as reducing ATS-related problems, including: moderating use, 'pre-loading' and 'post-loading', using additional licit and illicit substances, purchasing substances through social supply, and pill testing.
- Four key areas of concern for harm reduction among young adult ATS users emerged from the current study: (1) combined alcohol and ATS use; (2) combined ATS and other stimulant use and high stimulant dosages; (3) consumption of unknown substances; and (4) high frequency ATS use.

Introduction

While most ATS users engage in recreational use, a sizeable proportion develop dependence and experience chronic health issues resulting from their use (Sara et al. 2011). However, users of psychostimulants, such as ATS, are recognised for low participation in health treatment services (Smout et al. 2010). In 2012–13, amphetamines were the principal drug of concern in 14 percent of closed treatment episodes at public AOD treatment services in Australia (AIHW 2014). By contrast, ecstasy was the principal drug of concern in less than one percent of closed episodes (AIHW, 2014). This raises a number of concerns about engagement with treatment services among ATS users. Why is there a lack of engagement with treatment services? Are the available services appropriate for ATS users? It is likely that service needs differ between ATS users and individuals seeking treatment for other substance use, such as alcohol. Additionally, ecstasy and methamphetamine users are likely to differ in their service needs. Alternatively, as ecstasy use is largely recreational, there may be less need or motivation for treatment among ecstasy users. There is a need to develop novel harm-reduction messages and strategies that are appropriate for and well accepted by ATS users and that are accessible outside of mainstream specialist treatment services.

Formal treatment interventions for amphetamine-type stimulant users

Drug interventions around the world have typically been modelled on interventions developed for alcohol and opioids (Degenhardt, Mathers et al. 2010). Users of ATS have generally viewed these specialist health treatment services as not addressing their particular needs or providing an appropriate service (Hando, Topp & Hall 1997; Klee & Morris 1994; Smout et al. 2010) with these services often failing to identify and address issues specific to different groups of ATS users (Degenhardt, Bruno & Topp 2010). While some evidence suggests that psychosocial interventions (eg motivational interviewing and cognitive behaviour therapy) may be an effective strategy for reducing amphetamine use (Baker & Dawe 2005), research suggests that ecstasy cessation may be a difficult goal to achieve, as many ecstasy users appear to stop use due to changes in personal circumstances (eg a new job or relationship) or ecstasy's interference with their 'normal life' (Peters, Kok & Schaalma 2008). As there is evidence that most ATS users do not wish to reduce or abstain from all substance use (Baker, Boggs & Lewin 2001), harm reduction strategies may be a more appropriate approach to reach a wide range of ATS users at different stages of their ATS use.

Recent education campaigns for amphetamine-type stimulant use

A number of recent state and nation-wide education campaigns have focused on reducing the uptake or use of ecstasy and methamphetamine by adolescents and young adults in Australia. Campaigns such as the National Drugs Campaign's (NDC) ecstasy and methamphetamine campaigns and the Victorian government's 'What are you doing on ice?' campaign have mainly focused on using graphic imagery to portray the potential negative consequences of ATS use. Evaluation of the NDC's Phase Five, which took place in 2011–12, indicates that this campaign was ineffective in changing behaviour among current users (Stancombe Research & Planning 2012).

Similar findings have been reported regarding the methamphetamine education campaign run in the United States by the Montana Meth Project (MMP). The MMP campaign used graphic advertising portraying methamphetamine users as dangerous, unhygienic, exploitative and untrustworthy (Erceg-Hurn 2008). Evaluations of the MMP campaign found it to be ineffective, with no impact on the rates of methamphetamine use among young people (Anderson 2010) and, further, have reported increases in the acceptability of using methamphetamine and decreases in the perceived dangers of use (Erceg-Hurn 2008). These types of graphic anti-drug campaigns are likely to be ineffective in changing drug use behaviour among current recreational ATS users, particularly among those who are engaged in largely unproblematic use. Users may perceive the imagery and messages to be hyperbolic and largely irrelevant to their, and their peers', experiences of ATS use.

Harm-reduction strategies of amphetamine-type stimulant users

Harm reduction is based on the idea that risky behaviours, such as illicit drug use, persist despite preventative and reactive strategies. Consequently, harm reduction strategies aim to prevent or reduce harms associated with these behaviours rather than preventing the behaviour itself (Murray & Farrington 2010). Research has observed that ATS users engage in a variety of behaviours they perceive as minimising ATS-related problems, including: moderating their ATS use (frequency or quantity), 'pre-loading' and 'post-loading' with pharmaceuticals and natural products, mitigating negative symptoms of the 'comedown' by using other illicit or prescribed substances, attaining substances from peers and acquaintances and pill testing (Allott & Redman 2006; Baggott 2002; Carlson et al. 2004; Kelly 2009; Panagopoulos & Ricciardelli 2005). Some of these practices, such as using illicit substances to manage the 'comedown', may not necessarily achieve the desired outcome of a net reduction in harm.

Moderating amphetamine-type stimulant use

Several studies have reported that some ATS users moderate their use, with changes in usage patterns often associated with negative substance-related experiences (eg bad side effects or bad 'comedowns') and changes in personal circumstances, for example, a new relationship or increased responsibility at work (Baggott 2002). Similar themes emerged in the qualitative data of the current study. Experiencing bad 'comedowns' were associated with reductions in ATS use for some users, as described by the 19 year old male ATS user below, whose 'comedowns' were beginning to interfere with his 'normal life':

Um, comedowns have gotten a lot worse. That's why I've cut down, too. [Interviewer: Oh, I see] Yeah. Like, bad dreams, um, just feeling really crap. Like just, um, you feel like your serotonin is completely gone... [Interviewer: Oh?]. . .like and it's taking longer to feel normal. Like, before I could just go...like, I could do it for two days, a weekend and no sleep, nothing and still be able to go to uni, still be able to do everything, work, anything like that. But now it's just I need like four days to... [Interviewer: Get over it?] Yeah.

Commonly, changes to patterns of use involve decreasing the quantity of ATS used on each occasion or the frequency of use (Allott & Redman 2006; Baggott 2002). Users of ATS may perceive less frequent use to be less risky and, consequently, feel that they have more control over their use:

It's silly to say it's good. It's not good for you at all. But I think it's an experience that, um...you know, if, if taken and controlled properly I think you can have fun in, like, the times...but it's something that should not be done regularly at all. Like, it's a pretty big impact on your body and I just don't like...I think if you took it, like, like I was doing it, maybe once every six months, it's, like, pretty good (19 year old male ATS user).

However, less frequent patterns of ATS use may not necessarily mean users are consuming lower quantities of these substances. For example, the ATS user below had reduced the frequency of his use but was consuming greater quantities of ATS on occasions of use:

Um, just to broadly put it, I'd say we're sort of growing up a bit. I wouldn't say that...not necessarily the volume has decreased now, but more so the frequency. [Interviewer: Yeah?] Frequency of taking it. Um, just for instance, ah, last year at, um, [music festival] had more at that time than I've had at any one time in the past. But not taking it as frequently anymore (22 year old male ATS user).

Pre-loading and post-loading

Pre-loading and post-loading refer to intentional strategies used to mitigate the acute and long-term risks of substance use (Kelly 2009). Particularly among ecstasy users, users report consuming a variety of pharmaceutical (eg 5-hydroxytryptophan [5-HTP], selective serotonin reuptake inhibitors [SSRIs]) and natural products (eg vitamin C, St John's Wort, multivitamins) prior and subsequent to substance use. Users believe that these substances reduce the likelihood of neurotoxicity, impaired cognitive functioning and depression (Allott & Redman 2006; Kelly 2009). Pre-loading, as described below, requires episodes of use to be planned and intentional:

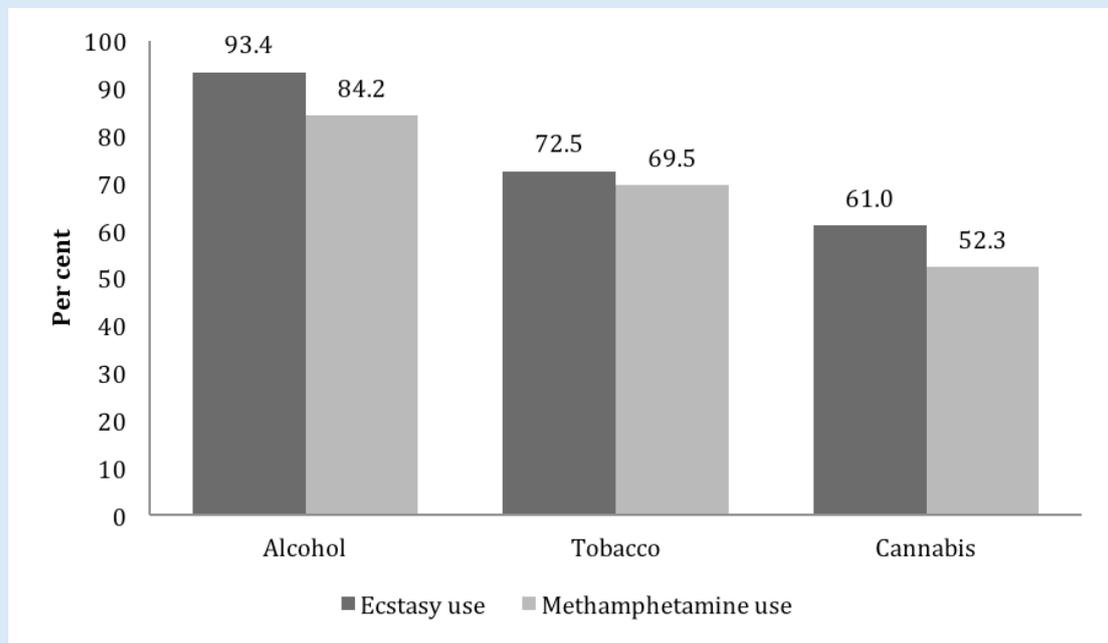
One of my mates who was actually having bad 'comedowns', there's like a...something you can get on the internet, that you take as a prep so it doesn't do any...like as much damage. [Interviewer: For that very purpose?] Basically. [Interviewer: Is that right?] There is um, I can't remember what it was called. But you take a tablet once every day or something and then the day and a half to two days before you actually take it [ecstasy] you start taking two or three every day for those two days. And when you actually take [ecstasy] it doesn't take as much serotonin and all the bad stuff out of your brain. Probably still does a bit of damage but it might not do quite so much. But I don't know if it works as well (20 year old male ATS user).

Some ATS users consume particular foods and food supplements as a form of pre- or post-loading, in order to prepare their bodies for drug use and reduce the likelihood of negative physical reactions, such as nausea (Hunt et al. 2009). As one ATS user from this study suggested, 'Eat bananas; they replenish your serotonin levels' (21 year old male ATS user). While ATS users are engaging in these practices to mitigate harm, some research has raised concerns as to the extent to which these practices, particularly using pharmaceutical products, may be harmful. This is largely unknown (Kelly 2009).

Combining amphetamine-type stimulants with other illicit and licit substances

Users of ATS are mainly poly-drug users, often using ATS concurrently and simultaneously with other licit and illicit substances (Degenhardt et al. 2009; Gouzoulis-Mayfrank & Daumann 2006; Kirkpatrick et al. 2012). Data from this study show that high proportions of ATS users are usually consuming other licit and illicit substances during episodes of ATS use (see Figure 12).

Figure 12: Proportions of young adult amphetamine-type stimulant users who usually consume alcohol, tobacco and cannabis on occasions of ecstasy (n=346) and methamphetamine use (n=279), measured at baseline



Users report a number of functions of combining different substances with ATS, including mitigating negative effects of the ‘comedown’ (Hunt et al. 2009). In particular, cannabis is often used to soften the ‘comedown’ from ATS (Hansen, Maycock & Lower 2001; Hunt et al. 2009) and alcohol consumption is believed to reduce ATS-induced insomnia (Winstock, Wolff & Ramsey 2001). The ATS users in the study discussed both of these functions of combined use:

Sometimes um...well, I always smoke pot at the end of the night on pills or speed. ‘Coz, ‘coz it makes, you know, you’re always going to come down and when you’re coming down it’s easier to come down if you’re stoned. It’s not, um, you can get a little edgy when you’re coming down. Like, you sort of wish it wasn’t coming down. Like, that’s one thing I have noticed. Like, it’s not...I know that some people get really upset about it. Some people can’t handle, like, I don’t know, I think it’s a mind thing. Some people get really upset and then they want to take more and more drugs because they don’t want to come down. I quite like coming down. But I like to maybe have a joint or something to help me there (22 year old female ATS user).

I probably had a couple beers when I woke up. We probably smoked [cannabis] for the rest of the day, rest of the afternoon. ‘Coz it makes you not come down as hard, I suppose (20 year old male ATS user).

Most people drink water. But, yeah, I get on the piss so I can sleep afterwards (20 year old male ATS user).

The combined use of these substances represent an emerging area of concern, with a growing body of research suggesting that combined use may result in greater harms than the separate use of these substances (Fisk et al. 2011; Hedden et al. 2010). One particularly concerning issue is the quantity of alcohol consumed by users during episodes of ATS use. A recent Australian study reported that, in a sample of stimulant users, those who consumed stimulants on a night out drank at excessive levels, consuming a median of 20 standard drinks (McKetin et al. 2014). Individuals under the influence of ATS are potentially

able to consume alcohol without experiencing the usual sedative effects (Hernández-López et al. 2002), thus facilitating longer wakefulness and longer periods of drinking. These two ATS users described the effect of using a combination of ATS and alcohol:

With alcohol you can almost...alcohol it's like a comedown from the ice. When I would be on ice you can just drink nonstop. If you're on gooney [speed], drink nonstop. And it's...you can, you know, you're just drunk beyond belief but you're not going to throw up so you just keep drinking and...so I think with ecstasy I kind of get the same...because I have put myself in this mindset where it's the same thing, where I can drink nonstop or go through, you know, I think that night went through about 15, 15 drinks. [Interviewer: 15 drinks, yeah] in a period of like three, three hours or so (19 year old male ATS user).

So, yeah, we didn't really have any [cannabis] before but the alcohol, it didn't matter if we had any or if we didn't have any at all, all the pills and, like, the meth and stuff kicking in. It was...alcohol meant nothing. It played no part at all. [Interviewer: Really?] Yeah, like I said, you could have given us a bottle of Vodka and just said, 'Yeah, it's water' and we would have just drank it and thought it was water. Like, it's terrible like that because alcohol poisoning is, like, right around the corner (20 year old male ATS user).

Obtaining amphetamine-type stimulants

Another harm-reduction strategy reported by a number of studies is to obtain ATS from a regular, trusted source, such as peers, acquaintances or regular dealers (Carlson et al. 2004; Panagopoulos & Ricciardelli 2005). Creating and maintaining a link with a regular source of ATS is perceived to provide increased reliability in the quality of the substances obtained and reduce the likelihood of purchasing adulterated substances (Panagopoulos & Ricciardelli 2005). A number of ATS users in the current study emphasised the importance of having a reliable source of ATS, as described below:

So I hate, you know, it's very hard to get clean drugs. I don't know...I know it's bad. I don't even want to know what the...I know a lot of stuff that they [people producing drugs] do. But we always try and get it off the one same person who...[Interviewer: And they're pretty reliable?] Well, they've always tested it themselves first. [Interviewer: Oh, is that right?] Yep. And they won't sell it to us if they're shit. They'll say it's a waste. Don't...or if it's a bad pill, like, you know, you won't even feel anything (22 year old female ATS user).

Additionally, ATS user networks, particularly ecstasy user networks, often have unique, close relationships between sellers and buyers, which allow for information about these substances to be shared (Jacinto et al. 2008). Evidence suggests that friends rank highly as an important source of information regarding drugs and the information provided by friends is perceived to be accurate and credible (Falck et al. 2004).

Pill testing

Pill testing is a harm-reduction strategy that aims to identify the contents of a pill and provide this information to users. This strategy is controversial in some countries. It has been suggested that pill-testing programs may be seen as promoting or condoning drug use; however, there is no empirical evidence to support this claim (Johnston et al. 2006). In Australia, as well as in the United Kingdom and the United States, pill testing conflicts with legislation relating to the possession and supply of controlled substance. As a result, pill testing in these countries is generally only accessible through volunteer harm-reduction agencies and individual testing kits, which are often purchased online (Johnston et al. 2006). The 'do-it-yourself' testing kits available to individuals based on colour reactions have a number of limitations. Firstly, pills sold as ecstasy potentially contain multiple substances; however, reagent-testing kits (eg Marquis and Mandelin kits) are only able to indicate the most prominent substance contained in a pill (Johnston et al. 2006). Secondly, these testing kits are not able to indicate the quantity of a substance within a pill (Johnston et al. 2006). Thirdly, the interpretation of testing kit results is subjective, which may lead to inaccurate conclusions (Johnston et al. 2006). Lastly, reagent testing, while able to identify the presence of MDMA-type substances, cannot differentiate between substances such as MDMA, MDA and MDE (Johnston et al. 2006).

Qualitative data from the current study suggests that testing kits bought online are being used by a number of young adult ATS users. Generally, these appear to be used within networks or groups of users on batches of pills that have been bought for the group. A 21 year old male ATS user described this process among his group of friends:

We, he, we got a testing kit online a while ago, so...[Interviewer: Right] Yeah, we, you know, never, we can't take chances, um, in this day and age. You know, you don't want to basically die. [Interviewer: Sure. So do, do you test every pill that you get?] Yeah, we do. [Interviewer: And, just out of curiosity, what sort of spread do you find you get, the results?] Um the, most [of] them are MDMA based. Um, these days, they used to be very, um, ah, they used to have a lot of, well, basically what's classified as bad things like 2CB, which are really, um, a trippy drug, sort of, bad hallucinogen sort of drugs and that's sort of been phased out a lot now because the availability of testing kits...You can really, um, yeah, they're cheap and it's not worth the risk any more.

Among this ATS user's drug-use network, ecstasy pills were purchased in bulk and tested before consumption, with batches of pills that gave bad results disposed of:

Um but and yeah, we, we always say get ten [ecstasy pills] and then test one and then the rest, you know, if they're all good, they're all good. If not, they're straight in the bin. We, we don't try and pass them on or anything like that. I know it's, it sounds weird but it's trying to be as responsible as possible.

While ATS users appear to be generally aware of harm-reduction strategies and may apply these strategies, not all users engage in harm-reduction strategies consistently or correctly (Baggott 2002; Peters et al. 2008; Shewan, Dalgarno & Reith 2000). Further, research suggests that many ATS users are likely to neglect harm reduction strategies if they interfere with the main aim of having a good time (Peters et al. 2008; Shewan et al. 2000). Conversely, harm-reduction strategies may have better prospects if congruent with having a good time.

Developing harm-reduction messages and strategies for young adult, recreational amphetamine-type stimulant users

Tait and colleagues (2012) propose that, in order to reduce harms among ATS users, a two-pronged approach is needed, focusing on developing effective management strategies for ATS use and improving treatment accessibility for users. Appropriately targeted harm-reduction messages and strategies may be an effective approach for reaching a group of substance users who are recognised for their lack of engagement with traditional specialist treatment services (Smout et al. 2010). The problem of engagement with this group is not adequately acknowledged in policy or program development, including development of health campaigns. A number of key areas of concern for harm-reduction messages for young adult ATS users emerged from the current study, including:

- combined alcohol and ATS use;
- combined ATS and other stimulant use and high dosage use;
- consumption of unknown substances; and
- high-frequency ATS use.

The authors presented these themes and potential messages for discussion at a focus group in Brisbane in 2015 with local stakeholders from Queensland Health, Queensland Police Service and youth drug and alcohol centres and services, including the Queensland University of Technology's Centre for Youth Substance Abuse Research, Dovetail, Lives Lived Well, Ted Noffs Foundation, Logan YFS, Adolescent Drug and Withdrawal Service, Drug Arm, and Brisbane Youth Service. This focus group informed the harm-reduction messages presented in this report.

Theme 1: Combining alcohol and amphetamine-type stimulants

Alcohol and pills sort of go hand in hand, don't they? (20 year old male ATS user).

The current study suggests that alcohol use is ubiquitous among ATS users, with 93.4 percent and 84.2 percent of ATS users reporting that they typically drink during episodes of ecstasy and methamphetamine use, respectively (see Figure 12 above). While there was a stigma around alcohol and ecstasy use in the rave scene of the '90s (Hunt et al. 2009), alcohol is now a pervasive element of the contemporary social-environmental settings in which young adults use ATS, as described below:

...I think a big thing, well, particularly for me, anyway, is that it is very social to have a drink as well...So, yeah, that sort of comes part and parcel with the experience [of taking ATS] as well...Because it's always in a social setting. So, you know, everyone enjoys having a drink as well (23 year old male ATS user).

Because I have never gone out and just had an ecstasy [pill]. If I am going to go out and go out nightclubbing or partying or whatever, I will have a few drinks, I will be drinking and then I will take it (22 year old male ATS user).

In fact, alcohol in these environments is generally so commonplace that ATS users, in some cases, may drink to avoid suspicion:

Yeah, it was just to have a drink. Just literally to have a drink in your hand so you don't look like a weirdo standing in a pub with nothing in your hand (21 year old male ATS user).

Combined alcohol and ATS use is concerning as it may result in greater harms than the separate use of these substances (Fisk et al. 2011; Hedden et al. 2010). The ATS-intoxicated individuals are potentially able to consume greater quantities of alcohol without experiencing its usual sedative effects (Hernández-López et al. 2002), consequently facilitating longer wakefulness and longer periods of drinking. This may lead to the excessive levels of drinking that have been observed among ATS users in Australia, with ecstasy-intoxicated individuals consuming a median of 20 standard drinks on a night out (McKetin et al. 2014). Qualitative data from the study suggests that, for some ATS users, a key function of ATS is to extend periods of drinking, as described below:

...I think I just had speed the night before, just to stay awake and keep...stay awake drinking and partying, pretty much. [Interviewer: Okay. So were you taking it for the effects or because you can drink lots when you're on speed and ecstasy?] Yeah, both, both (22 year old male ATS user).

It's more of, like, um, I take it to drink more...So you don't end up asleep in the corner. [Interviewer: Oh, I see, alright]. Not so much for the exactly emotional and physical feelings of it, it's just to...Basically keep, keep you going (22 year old male ATS user).

Stimulants mask the sedative effect of alcohol (Hernández-López et al. 2002); consequently, users may not recognise how intoxicated they are when combining ATS with alcohol, which could lead to increased engagement in risky behaviours, such as drink/drug driving. As described below, intoxicated users may feel more capable or in control than they are:

You still feel good, but you feel...like, you're not drunk. Like, you feel like you could...if it...to put it into perspective, you feel like you could operate a motorcar, like, completely fine. But if you probably blew a breatho you'd probably, like, blow 0.2 or something (19 year old male ATS user).

Research suggests that focusing on commonly experienced, short-term consequences of substance use may be the best approach for getting harm-reduction messages across to recreational users (Allott & Redman 2006; Baggott 2002). The ATS users who combine ATS and alcohol may experience more severe hangovers. These types of hangovers seem to creep up suddenly on the user after the other substances they have consumed wear off, with users likely to experience both the 'comedown' from ATS and being hung-over from drinking. As discussed above, negative drug use experiences, specifically having bad 'comedowns', were highlighted by ATS users in the study as reasons for reducing or desisting from ATS use. Harm-reduction messages that focus on this 'hangover with a difference' may be effective for reducing drinking during episodes of ecstasy and methamphetamine use.

Discussion of theme one in the workshop raised a number of important issues and considerations. Firstly, as alcohol education campaigns for young adults in Australia have often focused on the concept of 'binge' drinking (consumption of >4 standard drinks on a single occasion; NHMRC 2009), young adults may not be aware of the increased levels of risk that are experienced with greater quantities of alcohol beyond the minimum threshold of more than four drinks for binge drinking. Further, adolescents and young adults may not be aware of how many standard drinks are in the drinks they are consuming, particularly when mixing or pouring their own drinks or drinking cocktails, which are likely to contain multiple types of alcohol. Messages are needed to illustrate how risk increases as alcohol consumption increases. However, these messages need to be positively rather than negatively focused.

Another important point raised during the workshop was the notion of control. While some users may purposefully engage in hedonistic patterns of ATS and alcohol use, specifically to be out of control, being in control may be important for recreational users who do not consider themselves to be, and do not want to be, classed as drug users. Harm-reduction messages that focus on control may resonate with well-managed recreational ATS users.

Workshop participants emphasised that the locations where messages are targeted are a critical element of effective harm reduction. The social-environmental settings in which drinking and ATS use commonly occur, such as nightclubs and music festivals, were identified as important locations to target with these messages, as alcohol is often heavily marketed in these venues in the quest for profit. Participants raised the issue that a lack of genuine information in these settings, particularly music festivals, limits users' ability to make informed choices.

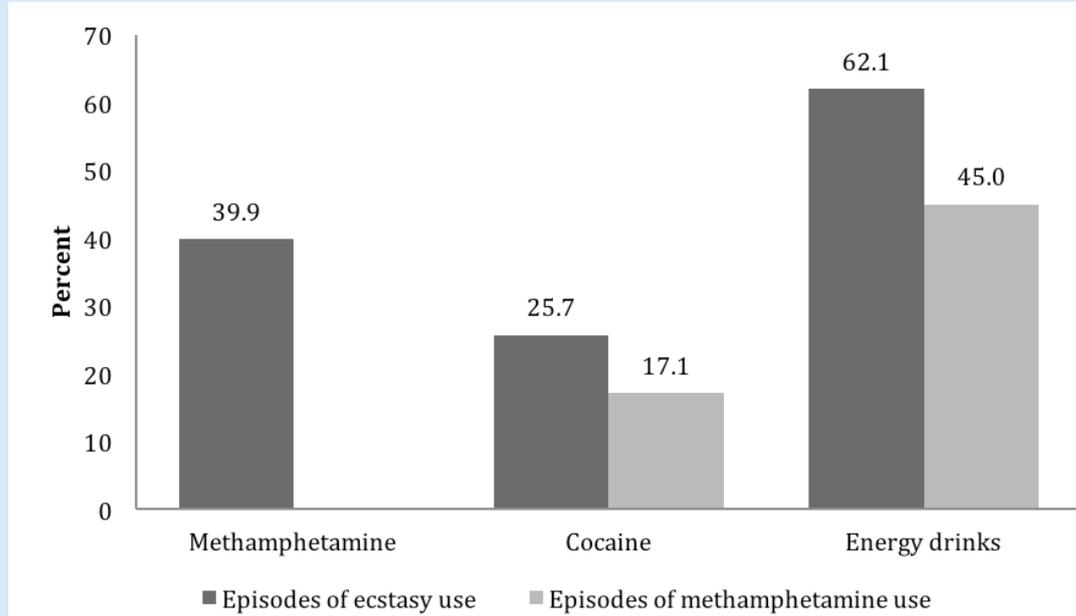
Drink/drug driving was another key concern highlighted in the workshop. More information and education is needed regarding the separate and comorbid effects of ATS and alcohol (and other substance use) on driving. While there are recognised guidelines for driving after drinking, currently no clear guidelines explain when it is safe to drive after using illicit substances. This is a complex issue, which requires taking into account the impact of sleep deprivation. Further research is needed.

An anti-drink driving campaign from New Zealand ('Bloody Legend'; <https://www.youtube.com/watch?v=CtWirGxV7Q8>) was raised by a workshop participant as a clever campaign targeted at young adults that is positively focused. The campaign puts forward the idea that by stopping a friend from drink driving, an individual becomes a 'bloody legend'. In effect, this campaign puts some of the onus of reducing drink driving onto friends and peers but highlights the friend as playing a positive role to be a hero and help to keep everyone safe. Importantly, this campaign is very targeted at a particular audience and uses humour relevant to this target group to communicate its message. Further, the decision not to drive while under the influence and instead stay at the party was presented as allowing the fun and socialisation to continue rather than having a negative impact.

Theme 2: Combining amphetamine-type stimulants with other stimulants and high dosages

Combining ecstasy and methamphetamine and combining other stimulants with ecstasy and methamphetamine, was relatively common among ATS users in the current study (see Figure 13). Using multiple stimulants together (eg ecstasy, methamphetamine, cocaine and energy drinks) may produce greater harms than their separate use (Clemens et al. 2007; Darke et al. 2008). Combined use of ATS with other stimulants may also result in higher dosages of stimulants being consumed at times of use, increasing the risk of stimulant overdose. The prevalence of poly-drug use among young adult ATS users may indicate an evolution of the culture of drug taking, with poly-drug use more socially accepted.

Figure 13: Proportions of amphetamine-type stimulant users usually consuming methamphetamine, cocaine and energy drinks during episodes of ecstasy (n=346) and methamphetamine (n=280) use, at baseline



Among ATS users in the study, high dosages of stimulants were often associated with a lack of control, as described below:

So, um, I only ever take pills in halves, um, because I don't like the feeling of being out of control on drugs. Um, I guess that's, kind of, part of the reason why I take them is because, um, I don't like being really wasted and forgetting my night, so I like the feeling of being in control and still being able to make conscious decisions that I won't regret later (21 year old female ATS user).

I prefer to be someone in control of the situation. So I'd never go more than what I think I should. So sometimes not even a whole one, just a half and see how I go (22 year old male ATS user).

For those users who placed an emphasis on control, overdosing was perceived as the greatest loss of control:

Oh, we did see a girl put on a stretcher. I think she was OD-ing. That was pretty disgusting, so, that was a negative part...I just think that I know how much I can have...I know that would never happen to me, like...I know when enough is enough and when I'm able to have more (22 year old female ATS user).

Harm-reduction messages are needed that highlight the potential negative consequences of combining stimulants (eg 'Drugs don't mix—separate use, better effects'). Workshop participants noted that this message also needs to extend to combining batches of the same drug (eg ecstasy), which are likely to contain different substances and quantities of substances. In focusing on the role of pleasure and having a good time, which are key motivations for substance use among young adults, this message may be more likely to resonate with users' experiences of substance use than messages that only focus on negative outcomes.

The issue of young adults using multiple stimulants produced further discussion regarding the use of ATS with a variety of other substances. Workshop participants expressed the view that poly-drug use was very

prevalent among young adult drug users and that there appears to be an evolution of the culture of drug taking, with poly-drug use more socially accepted among adolescent and young adult users. Increasingly, adolescent and young adult drug users do not necessarily have a drug of choice, rather their substance use is influenced by what they are able to obtain. Currently, there is little reliable information available to drug users or frontline workers regarding drug interactions. As highlighted in the workshop discussion, information regarding drug interactions needs to not only cover the use of multiple illicit stimulants but also the interactions of illicit stimulants with prescribed (eg anti-depressants) or alternative medications (eg St John's Wort). Anecdotal evidence suggests that some users who are taking antidepressants may risk skipping their medication for certain periods due to the belief that their antidepressants may inhibit their experiences of ecstasy.

The use of ATS, particularly ecstasy, is mostly a social activity engaged in by close-knit drug-use networks (Jacinto et al. 2008; Panagopoulos & Ricciardelli 2005). This study highlights that decisions regarding ATS-use, from sourcing of substances and deciding whether or not to use, down to the quantities consumed, are often decided within the drug-use network, rather than by the individual. Similar patterns have been reported by other studies (Jenkinson, Jolley & Dietze 2014). This social element is a key component of the identity of a recreational user:

Um, I would never do [ecstasy] if none of my friends did it. Like, I'd never take ecstasy alone even if I was out with them and they weren't taking ecstasy. I'd only ever do it if at least one of them was doing it as well. So, yeah, I guess it...I don't know. I just wouldn't do it. Like...I think that's the point where you know you've got a real problem, when you start using it by yourself and stuff like that or when you're using it when other people aren't using it and stuff like that. It's really just a social thing with me, so, yeah, if, like, no one else is doing it I definitely wouldn't do it. 'Coz that's all it is, a social thing with me. I use socially (19 year old male ATS user).

The ATS users in this study expressed the importance of being 'on the same level' as their friends during episodes of drug use:

Like, if [my friend] wasn't going to take it I wouldn't. But because she kind of wanted to I was like, 'Oh, yeah, fine'...So that we're on the same level, like, when we go out. So, like, you know, if she's taken it she'll want to stay out dancing till who knows when and if I haven't then I'll get tired 'coz I want to spend more money on drinking. So just...same level to have more fun (21 year old female ATS user).

It's a lot more enjoyable when everyone's on the same level (19 year old male ATS user).

If an individual's peers are using at moderate levels, messages such as 'Don't get ahead of the field' may be an effective strategy for promoting moderate use within drug-use networks and consequently reducing the risk of binge use. However, as highlighted in the workshop, users may be unaware of what constitutes binge use. While guidelines exist regarding binge drinking, there is no equivalent for binge stimulant use. Users also may be unaware of the symptoms of stimulant overdose and, consequently, may not be aware that they are overdosing on stimulants until it is quite severe. Education regarding these issues is needed.

Theme 3: Consuming unknown substances

The actual substance MDMA cannot kill you in, like, regular doses. But it's the fact that when you take ecstasy as it's made, because it's such a commercial drug, so much other stuff is put in it and that's what's dangerous for your body. I know that that's the part that is negative before it's even set in, you put it in your mouth...and it's dangerous before it even starts (21 year old female ATS user).

Purchasing and consuming unknown or adulterated substances can put users at risk for a number of reasons. Firstly, the purchased drug (eg ecstasy) may contain a more harmful substance (eg para-methoxyamphetamine [PMA]). Secondly, if a user takes a substance they believe to be ecstasy or methamphetamine but do not experience the expected subjective effects, they may believe the substance is weak and consequently consume greater quantities, as described below:

...I bought 15 pills and they were all shit. And I gave them to all my friends as well and so everyone was having a shit time. So...and I ended up taking three, which is way more than I would ever normally take, which was really stupid but I just really wanted to have a good time so I thought if I just keep taking them maybe they'll work (23 year old female ATS user).

Thirdly, consuming unknown or adulterated substances can be a very negative and frightening experience for users:

...You always run the risk—you don't know what the drugs are mixed with or whether they've got something else added into it or...At first I was fine, but then I think it was by the time we were starting to head home, I can't remember exactly what time it was, started to get a really bad reaction. Like, I started to see things that weren't there and just went into this state of freaking out and felt really sick. I'd, I'd say probably more sick than I've ever felt, ever. Like, wanting to throw up but can't. Couldn't sleep. Weird feeling. It was just basically like the next eight hours of hell. 'Oh my God, I just want to die'. Like, lying in bed in, like, mental agony and physical agony...(20 year old female ATS user).

The most common method of obtaining substances among ATS users is social supply, obtaining substances from peers and acquaintances (Hickey, McIlwraith & Alati 2013), which is also a common harm-reduction strategy employed by users (Carlson et al. 2004; Panagopoulos & Ricciardelli 2005). Users perceive that by creating and maintaining a link with a regular, trusted source of ATS they will receive good quality, unadulterated substances (Panagopoulos & Ricciardelli 2005), as described below:

...We always try and get it off the one same person who...Well, they've always tested it themselves first... Yep. And they won't sell it to us if they're shit. They'll say it's a waste...or it's a bad pill (22 year old female ATS user).

As users are likely to be concerned about the safety of the substances they provide to their drug-using peers, messages that focus on their role in keeping their friends safe (eg 'What are you giving your friends? Keep them safe') may be an effective strategy for reducing harm among ATS users. Rather than taking a negative focus, these messages are able to present a positive spin by highlighting the important role that users can play in looking out for their drug-using peers. Jacinto and colleagues' (2008) research highlighted that sharing harm-reduction messages between sellers and buyers in ecstasy networks is a common practice, with users taking pride in being 'lay experts' and guiding their peers' ecstasy-use experiences. However, it is important that these 'lay expert' users have access to current and accurate information in order to be effective peer educators. The workshop participants highlighted that developing and providing information and messages to established online resources that are already used by drug users, such as *Bluelight* (an international, online harm-reduction community for drug users), may be an effective way of disseminating this information.

Sourcing illicit substances from the internet is a further area of concern for harm reduction. Some Darknet sites such as the *Silk Road* provide information on the apparent quality of vendors and their substances through user ratings and feedback, much like eBay (Martin 2013). However, users may place themselves at greater risk of receiving adulterated substances when obtaining illicit products online from unknown sources.

Workshop participants also raised the issue of pill testing. While pill testing is available at music festivals in a number of European countries, this is not the case in Australia. The information and resources available to users within social environments has a clear impact on their ability to make informed choices about their substance use.

Theme 4: Frequent amphetamine-type stimulant use

Frequent and habitual patterns of ATS use may be associated with poorer outcomes, compared with patterns that are less frequent (Soar et al. 2006). Those who use ecstasy frequently may experience increased tolerance and, consequently, reduced subjective effects (Levy et al. 2005; Parrott 2005; Scholey et al. 2004), as highlighted by a 19 year old female ATS user in this study:

...But it [ecstasy] wore off really, really quickly [more than] other times, so, obviously, over the years of taking it, like, I've noticed there's a decline, like, in the feeling that I get from it and I've notice[d] that I gotta take more. But, ah, I always say to myself, you know, just stop taking it and, um, you can get that feeling back...

For some users, tolerance and reduced subjective effects may lead to individuals consuming greater quantities of ecstasy in attempt to combat these effects:

We had a conversation before about the strength of them and how it has been dwindling and we found some good ones this week and they were decent but, yeah. As I say, my tolerance had just basically made me immune unless I take a ridiculous amount of them, if you know what I mean (23 year old male ATS user).

Rather than focusing solely on negative subacute effects of ATS, harm-reduction messages that focus on tolerance and reduced subjective effects have the potential to include an understanding of pleasure in harm-reduction. These messages are also likely to resonate with ATS users, as this is a common experience that they may have had themselves or witnessed or heard about among their drug-using peers. Messages should also emphasise that taking a break to 'clear your head' not only reduces the risk of drug-related harms but also allows users to create space for and provide the opportunity to focus on other activities:

I just didn't feel like taking it anymore, like, the next day you would always just need to sleep the whole day and you couldn't do things and sometimes depending on the quality of the pill you have really bad downs and you'd get depressed and it's just something that I didn't want to do anymore I didn't, like... it was summer, I wanted to go down to the coast on Sunday, like, I would go out but I would want to go down the coast...I'd want to do other things and...not that, you know, like, taking pills would stop me doing that, but I would just want to sleep all day (20 year old female ATS user).

Effectively targeting harm-reduction messages at young adult recreational amphetamine-type stimulant users

These messages must be effectively targeted at and communicated to young adult recreational ATS users. In Australia and the United States, campaigns that have focused on graphic, negative imagery relating to ecstasy and methamphetamine use have been shown to be ineffective in changing substance use behaviour among current users (eg NDC campaign, see Stancome Research & Planning 2012) and reducing rates of use (eg MMP campaign, see Anderson 2010; Erceg-Hurn 2008). For young adult recreational users who have experienced few negative consequences of their ATS use, these types of campaigns may be perceived to be hyperbolic and misaligned with their experiences of ATS use and the observed experiences of their peers. Discussion in the harm-reduction workshop emphasised that positive messages, which reflect users' humour and the motivations and culture surrounding their substance use, may be more effective in reaching them and having an impact on their subsequent behaviour. It is crucial that these messages are effectively targeted and tap into the particular cultures and cultural practices of different groups of users. In order to produce messages that resonate with these users, it is also important to recognise that they require different messages than either more problematic, entrenched users or non-using young adults. It is not a case of one-size-fits-all for harm reduction among drug users. Different groups of drug users are likely to have different motivations and resources for implementing harm-reduction strategies and also different resources available to them to enable them to do this.

Considering the role of the user and the role of policy in harm reduction

The workshop also highlighted the current focus on drug users to take on the burden of responsibility for managing the risks and harms of their substance use. The legal and social environment in which people use drugs has the potential to extend or limit an individual's capacity to address the risks of their use. Policymakers need to develop realistic strategies around illicit drug use. Currently, public policy does not discriminate between ecstasy and methamphetamine. Further, while ecstasy and methamphetamine are

commonly grouped together under the umbrella of amphetamine-type stimulants, it is important that policies and harm-reduction messages and strategies differentiate between these two substances. Ecstasy and methamphetamine differ not only in their pharmacology but also in the cultural practices and the groups using these substances, as well as their social and health-related impacts.

Conclusion

This section has explored harm-reduction strategies for young adult ATS users and puts forward four focus areas for strategies targeted at well-managed recreational users:

- combined alcohol and ATS use;
- combined ATS and other stimulant use and high dosage use;
- consumption of unknown substances; and
- frequent ATS use.

These proposals are specifically targeted at well-managed, recreational young adult ATS users. Different approaches will be needed for different groups, such as heavy users. A one-size-fits-all approach to harm reduction among drug users is inappropriate and does not consider the different patterns and characteristics of users.

The role of drug users in disseminating and implementing harm-reduction strategies has been highlighted. Due to the close-knit, social nature of ATS use, particularly among ecstasy users, harm-reduction strategies are likely to emerge and become entrenched within drug-using groups (Kelly 2009; Panagopoulos & Ricciardelli 2005). The best harm-reduction messages are likely to be those that acknowledge and are embedded in the particular cultural practices of groups of users. Drug users, if supplied with accurate and current information, may play an important role in disseminating harm-reduction messages and strategies with their networks. Users may also offer an important perspective on harm-reduction strategies through incorporating understandings of pleasure (Jacinto et al. 2008), which are integral to motivations for ATS use. Messages that are positive and acknowledge the place of pleasure within recreational ATS use may be more likely to resonate with young adult users who do not identify themselves as drug users, but instead view their substance use as a relatively normal part of young adult life. This highlights the importance of involving drug users in the development and dissemination of harm-reduction strategies and messages. While most strategies currently focus on the individual, it may be more effective to focus on ATS-using networks and target the collective norms within these groups (Panagopoulos & Ricciardelli 2005). However, users need to be provided with accurate and current information in order to be effective peer educators. This information could be available to users through already established online resources that are accessed by users, such as Bluelight.

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