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Contextual profiles of young adult Ecstasy users: a multisite study

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Abstract

These analyses assess contextual profiles of 612 young adult Ecstasy users, 18–30 years of age, from St. Louis (USA), Miami (USA) and Sydney (Australia). Bivariate analyses revealed different contextual factors influencing Ecstasy use. Friends were the most common sources of Ecstasy at all sites and most used with friends. St. Louis and Miami use mostly occurred in residences, whereas in Sydney use was mostly at clubs, bars or restaurants. Ecstasy consumption at public places and in cars, trains or ferries was significantly higher in Miami (89% and 77%) than in St. Louis (67% and 65%) and Sydney (67% and 61%). At all sites, simultaneous use of LSD/mushroom and nitrous oxide with Ecstasy was common; concurrent amphetamines predominated in Sydney and heroin/opiates in St. Louis. Contextual factors influencing Ecstasy use among young adults vary by geographic region. Their inclusion may help tailor effective prevention programs to reduce or ameliorate Ecstasy use.

Keywords

Ecstasy use; contextual profiles; young adults; patterns; epidemiology

1. INTRODUCTION

Club Drugs include ecstasy, LSD, GHB, ketamine and rohypnol in the class of “club drugs” due to their popular use at parties, clubs, raves and concerts (NIDA 2005). The use of these drugs in young adults was highest in late 1970s, dropped in the 1980s, increased in the 1990s with a sharp increase in 2001. Rates since then have been falling slightly. Nevertheless, club drugs continue as a major class of illicit drugs with the potential for public health problems (Banken, 2004).

Among Club drugs, ecstasy (3–4 methylenedioxymethamphetamine, MDMA) is most widely used with the highest prevalence of use among adolescent and young adults across the world (Abraham, 2002; Australian Institute of Health and Welfare, 2002; Beck, 2003; Centre for Addiction and Mental Health, 2003; Degenhardt, Copeland, & Dillon, 2005; National Advisory Committee on Drugs and Drug and Alcohol Information and Research Unit, 2003; Wilkins, 2002). Analysis of the 2007 National Surveys on Drug Use and Health (NSDUH) showed a decline in MDMA use from 1.1 to 0.7 % in 18 to 25 year olds from

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2002 to 2007, while lifetime use increased to 5% (12.4 million) in those over 12 years of age (Substance Abuse and Mental Health Services Administration, 2008). Four point seven percent of non-students and 3.2% of college students from 18–22 had used MDMA in the past year according to NSDUH data for 2005–2006 (Wu, Ringwalt, Patkar, Hubbard & Blazer, 2009). According to the 2007 US Monitoring the Future Survey (MTF), ecstasy was the only drug that showed an increase in its use. Annual prevalence of ecstasy use increased from 2.5% to 3.5% among 10th graders and from 3% to 4.5% among 12th graders, indicating an increase in ecstasy use from 2006 and previous years. This can be explained by the decline in the perceived risk and disapproval than previous years in this population. The continuous rise in the use of ecstasy among youth has raised concerns, especially given the decline in the use of other illicit drugs (Johnston, 2008). An analysis of the prevalence of ecstasy use in adults 18 and over from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC; 2009) revealed that 3.2 million adults in the United States had used ecstasy in their lifetimes; the rate in 18 – 29 year olds was 4.8%. Regardless of the study data analyzed, ecstasy use continues to be a public health problem.

Ecstasy is responsible for many drug-related deaths and emergency visits in recent years (Substance Abuse and Mental Health Services Administration, Office of Applied Studies, 2003; Indig, Copeland, Conigrave & Arcuri, 2010) and causes various long-term physical, psychological and neurotoxic effects over the long term (Maxwell, 2005). In addition, ecstasy dependence and withdrawal symptoms have been demonstrated by Cottler and colleagues among young ecstasy users in St. Louis (Cottler, Womack, Compton, & Ben-Abdallah, 2001). In a more recent study of young ecstasy users at three different sites, Ben Abdallah and colleagues found that around 59% met criteria for lifetime ecstasy dependence (Abdallah, Scheier, Inciardi, Copeland, & Cottler, 2007).

Given the increasing concern over this drug misuse and dependence, timely interventions and effective prevention programs must be developed. To do so, it is important to understand the reasons, correlates and contexts of ecstasy use among young users. While not providing contextual information on club drug use, national studies have shown polydrug use among ecstasy users (Banta-Green, Goldbaum, Kingston, Golden, Harruff & Logan, 2005; Kelly & Parsons, 2008, Wu et al., 2009). In a latent class analysis of the U.S. NESARC data, Wu and colleagues (2009) found three classes of ecstasy users: those who used ecstasy and marijuana (34%), those who used ecstasy, marijuana and stimulants (29%), and polydrug users, who used many different types of drugs (37%). A study from Australia (Degenhardt, Barker, & Topp, 2004) demonstrated that in the nationally representative population sample, ecstasy was one of the most widely used illicit drugs among individuals aged 14–29 years. Those who used ecstasy also used other drugs; particularly alcohol, amphetamines, cocaine and cannabis, and the relationship between ecstasy use and other drug use were stronger than for any other drug. This finding was consistent with other studies (Degenhardt, Copeland & Dillon, 2005; Strote et al., 2002; Topp, Hando, Dillon, Roche, & Solowij, 1999, Wu et al., 2009), indicating polydrug abuse among the ecstasy users.

Few studies providing contextual factors related to ecstasy use have been conducted in more general populations. In a study of contextual profiles of club drug users in Chicago (Fendrich, Wislar, Johnson, & Hubbell, 2003), it was found that the majority of lifetime club drug users had never attended raves and more commonly used ecstasy at a friend's home. In that study, ecstasy use was often associated with other substances like alcohol, marijuana and crack. Reasons for ecstasy use were also explored; the major reasons for its consumption were 'to get high' and 'to dance more'. Very few linked it to the 'enjoyment of sex'. However, the population of young adults between 18–25 years was underrepresented,

thus limiting the application of results. Nonetheless, this study provided important insights counter to the conventional beliefs about the reasons for ecstasy use and sites of use.

Studies of the contextual factors of club drug use have focused on select populations, including men who have sex with men (Klitzman, Greenberg, Pollack, & Dolezal, 2002; Mansergh et al., 2001), college students (Boyd, McCabe, & d'Arcy, 2003; Strote, Lee, & Wechsler, 2002) and rave attendees (Arria, Yacoubian, Fost, & Wish, 2002; Gross, Barrett, Shestowsky, & Pihl, 2002). While these are clearly important samples to study, their findings are not generalizable to the general population of ecstasy users. For example, in these studies the enhancements of sexual pleasure and increased energy have been found to motivate ecstasy use in the population of rave attendees. But these studies may not apply to other samples of ecstasy users.

In a dance club sample recruited in New York City between 2004 and 2006, 50.6% of ecstasy use was combined with marijuana use, 41.4% with ketamine use, 37.4% with cocaine use, 35.1 % with LSD or Acid use, 34.6% with GHB, 34% with methamphetamine, 26.5% with alcohol, 9.5% with heroin, and 8.8% with psilocybin (Grov, Kelley & Parson, 2009). In contrast with the Chicago study, the most common location of ecstasy use was dance parties and raves; the second most common place ecstasy was used was at a private party.

Members of a sample from Miami, Florida, restricted to Hispanic Men who have sex with men, most commonly used ecstasy with either crystal methamphetamines or GHB. No information was gathered on the location of use or other contextual factors (Fernandez, Bowen, Varga, Collazo, Hernandez, Perrino & Rehbein, 2005). In an Australian sample investigating injection drug use, 23% had injected drugs in their lifetime, 15% in the last six months. Methamphetamine was the most commonly injected drug (White, Day, Degenhardt, Kinner, Fry, Bruno & Johnston, 2006).

The motive for ecstasy use was studied among a party-going population in the Netherlands (Bogt & Engles, 2005). In this study, the party culture did not predict ecstasy use; however, peer pressure did. Even though users reported that their social lives were facilitated by ecstasy use, in this model use for gaining more energy and for feeling euphoric were more important reasons for ecstasy use. In a review of studies on reasons for MDMA use, Peters and Kok (2009) found that ecstasy was reported to be used because it was available and there was an opportunity to use, because of peer pressure and the desire to share the experience, because of ease of administration, to “enhance energy and dancing”, their mood, sex, social interaction, sensory perceptions, and the effect of other substances. Other reported reasons for use included; to stop worrying, for spirituality and for self medication, to experience positive effects and no unpleasant effects, and to help lose weight, concentrate or study, and lose inhibitions.

Thus, it has been argued that there is regional variability in the *context* of club drug use (CEWG, 2003; Landry, 2002) that is hidden by national surveys which do not allow for a description of local context which can be used to tailor prevention to specific contexts and risk factors influencing drug related behavior.

Midwestern US young adult club drug use was investigated among a predominantly white and heterosexual sample who only used club drugs in the rave scene, a scene that has since dwindled (McCaughan, Carlson, Falck, Siegal et al., 2005). This qualitative research on subcultures revealed some variability in music, clothing and drug use. However, comorbid drug use was almost universal: marijuana was common across all subcultures (94% past 6 months) psilocybin mushrooms (86%) and lifetime use of LSD (78%). More variation

occurred in the use of other drugs, with 61% having used intranasal ketamine, 22% GHB, 19% OxyContin and 11% heroin (McCaughan et al., 2005).

Another study of subcultures within a population looked at 18 – 29 year olds in a dance club attending population in Manhattan. This sample was much more heterogeneous demographically. Although poly-drug use was common, it was significantly more common among male cocaine users.

Treatment data from Texas shows the spread of club drugs from the club scene into the community (Maxwell & Spense, 2003). While nine of all the admissions to treatment facilities in 1989 were primarily due to ecstasy, in 2003 that number had climbed to 409. Two percent (1,398) of those admitted that year (73,192) reported the lifetime use of ecstasy.

Others have reported the use of ecstasy moving out of the clubs or rave scene and into homes. In a study of ecstasy users in Northern Ireland, the use of ecstasy at home to enhance sex was reported. This sample reported use of marijuana (100%) and amphetamines (93%) in addition to the ecstasy. A study in Hong Kong also found in home use of ecstasy. The in home use was motivated by the high cost of admission and drinks in the clubs there (Laidler, 2005). Reporting on data gathered by the NIDA Community Epidemiology Work Group (EPRG), the Drug Enforcement Administration and the US Monitoring the Future Study, Maxwell noted the spread of ecstasy out of the club drugs and into minority inner-city populations. She also noted that 2001 appeared to have marked the peak of ecstasy use in the USA.

In a review of the literature on ecstasy use across the world, Leung and Cottler (2008) report on a variety of drug-related issues. Four studies had been conducted in Australia; nine in the United States. One was conducted in both, the study discussed in this paper. Of the studies conducted in the US, four were conducted exclusively among men who reported being gay or bisexual. Two only sampled injection drug users. Only one other study in the US, and one in Australia, reported a broad community-based sample of ecstasy users (Durdle et al. 2007; Degenhardt & Dunn, 2007).

We had the opportunity to assess the contextual factors influencing ecstasy use in young adult users from three diverse sites – St. Louis, (USA), Miami (USA) and Sydney (Australia). We hypothesized that the contextual variations among users would be minimal, but, important. We also hypothesized that the places ecstasy was used and the drugs concurrently used would differ depending on local culture and drug use practice. We expected that the *reasons* for ecstasy use would be similar among all sites, if not identical, since similar physical effects are produced by the pharmacological properties of ecstasy at all sites.

2. METHOD

2.1. SAMPLE

The sample for this paper consists of the young adult population of ecstasy users who participated in the NIDA funded Tri-City Study of Ecstasy Abuse and Dependence conducted between 2002 and 2005; in St. Louis, Missouri and Miami, Florida and Sydney, Australia. St. Louis was the coordinating site (L.B. Cottler, PI). The Institutional Review Boards of each site approved the study protocol. Participants were recruited using the IRB approved flyers distributed at sites like community centers, clubs, colleges, beaches and pubs where large numbers of young adults were likely to be present. Those with the history of ecstasy use more than five times lifetime and at least once in the past 12 months were

eligible. Out of 1024 subjects interested, a total of 927 met the eligibility criteria. Trained interviewers administered the instruments for interviews on the subjects. This was a psychometric study of ecstasy use, abuse and dependence which used a test retest and validity protocol. The details of study protocol are published elsewhere (Abdallah et al., 2007). For the purpose of the current study, data from time 1 was used and included only young adults in the age range of 18–30 years (n=686).

2.2. INSTRUMENTS FOR ASSESSMENTS

For the purpose of current analyses, we used the data collected from two survey instruments, the Washington University –Risk Behavior Assessment – Club Drug Version (WU-RBA-CD) and the Club Drug Substance Abuse Module (CD-SAM). The CD-SAM was a revision of the CIDI - Substance Abuse Module (SAM) (Robins et al., 1988) developed in 1982 for use in cross-cultural studies on substance abuse. In the CD-SAM, the DSM-IV criteria for drug abuse and dependence were adopted for the individual ‘club drugs’ i.e. ecstasy, ketamine, rohypnol and GHB. The CD-SAM thus included additional items representing psychological, physical and withdrawal symptoms characteristic of club drugs in addition to the originally listed items for illicit drugs in the SAM (Cottler et al., 2001). On average, completion of the computerized version of the CD-SAM required about 60 minutes for each participant. Previous studies have shown good test-retest agreement for ecstasy using the CD-SAM (Cottler et al., 2001).

The Washington University Risk Behavior Assessment for Club Drugs (WU-RBA-CD) is a computerized assessment that was adopted from the National Institute on Drug Abuse (NIDA) Risk Behavior Assessment (RBA) which was used for their large scale Cooperative Agreement studies (NIDA 1993). The WU-RBA-CD was revised and updated on the basis of information gathered in focus groups of club drug users to make this version relevant to the population of club drug users. The focus group information led to the creation of several new sections of the RBA-CD: simultaneous use of other drugs, school/work performance, and parental monitoring. Contextual factors of ecstasy use were assessed using the items from WU-RBA-CD. The assessment included questions enquiring the sources of ecstasy, co-users, reasons for Ecstasy use, places of Ecstasy consumption and simultaneous drug use. Several possible answers for each question were provided. For example, for assessment of sources of ecstasy, the options provided were: A. spouse or partner, B. family member, C. room-mate, coworker or friend, D. a stranger, E. a dealer. The responses were recorded dichotomously as ‘Yes’ or ‘No’. Each question also had an option to include answers other than those in the list (“some other? Specify”). These responses were then included in the relevant categories of the original answers when they were the same; if the specified “other” was new, separate categories were created for these answers. On average, participants took about 20 minutes to complete the WU-RBA-CD.

2.3. STATISTICAL ANALYSES

Between group characteristics of the populations at the 3 sites were analyzed using chi-square statistics for all the categorical variables comparing the sites in pairs (St Louis vs. Miami, Miami vs. Sydney and Sydney vs. St Louis). Due to multiple comparisons in the analyses and risk of finding the significance when the difference was only due to chance, the *P*-value for significance was reset to 0.001 or lower. All the analyses were done using SAS for Windows, Version 9.1.

3. RESULTS

As shown in Table 1, the majority of participants studied were men, Caucasians (except for Miami), and never married. Over half reported having less than a high school education and

being currently employed. The mean age of females in the sample was slightly higher than males at all the sites.

CONTEXTUAL FACTORS AMONG YOUNG ADULT ECSTASY USERS

3.1. SOURCES OF ECSTASY—Nearly all ecstasy users at all the sites reported that they obtained ecstasy from roommates or friends (94–96%) followed by dealers (57–78%) (Table 2). However, the proportion of dealers as a source was significantly lower in St. Louis than in Sydney ($X^2 = 17.65$, $P < 0.0001$) and Miami ($X^2 = 8.79$, $P = 0.003$). Interestingly, strangers emerged as a major source of ecstasy (from 60%–69%) at all the sites.

3.2. PLACES OF ECSTASY USE—Some significant differences were seen in the context of places of ecstasy consumption at the three sites (Table 2). Among young adults in St. Louis and Miami, a high proportion reported their own home, apartment or dorm as a venue for using ecstasy; whereas, in Sydney, a bar, club or restaurant was reported most frequently reported. Notably, and as expected due to the geography of the sites, ecstasy consumption reported at public places such as beaches or parks was significantly higher in Miami than in St. Louis ($X^2 = 28.08$, $P < 0.0001$) and Sydney ($X^2 = 22.53$, $P < 0.0001$). Ecstasy users in Miami were also more likely to consume ecstasy during while being transported on a train, ferry or in a car. Very few ecstasy users, regardless of site, reported using ecstasy in hotels or motels. The ecstasy users in Sydney were significantly more likely to use ecstasy at fraternity or private parties than in St. Louis ($X^2 = 15.91$, $P < 0.0001$) and Miami ($X^2 = 15.87$, $P < 0.0001$).

3.3. CO-USERS—There were no clear differences among the ecstasy users at the three sites regarding co-users – the people who were using ecstasy with them (Table 2). Nearly all users reported consuming ecstasy with roommates or friends at all three sites. Of note, more than three fourths reported using ecstasy with a spouse or partner. The proportion of ecstasy users that reported consuming ecstasy with family members was highest in Sydney (37%) followed by Miami (28%). In spite of it being labeled a “party drug”, nearly one fourth of ecstasy users, regardless of site, reported using the drug by themselves.

3.4. SIMULTANEOUS DRUG USE—The three sites differed in concurrent use of drugs with ecstasy (Table 3). Specifically, in Sydney, alcohol was the substance most commonly used together with ecstasy (89%), which was higher than that reported in St. Louis (67%) ($X^2 = 24.34$, $P < 0.0001$) and Miami (76%). In contrast, the ecstasy users in St. Louis and Miami most commonly reported concomitant use of marijuana with ecstasy (84% and 87% respectively). Interestingly, concurrent use of amphetamines reported was very high in Sydney (85%) compared to St. Louis (17%) ($X^2 = 179.77$, $P < 0.0001$) and Miami (18%) ($X^2 = 139.38$, $P < 0.0001$). On the other hand, the concurrent use of heroin or other opiates reported in St. Louis (19%) was markedly higher in Sydney (4%) ($X^2 = 16.39$, $P < 0.0001$). A significant proportion of ecstasy users at all three sites also reported simultaneous use of LSD or mushrooms, nitrous oxide; whereas less than 5% of all the ecstasy users at three sites reported use of Viagra® concomitant with ecstasy. Sydney and St. Louis users also reported concomitant use of ecstasy and SSRI (11% at each site). Only about 2–4% of users used ecstasy alone. In St. Louis, about 10% used one other drug, 26% used two other drugs, and 15% used three other drugs. The proportions of multiple drug users in Miami were 11% for one other drug, 22% for two drugs, and 16% for three drugs in addition to ecstasy. In Sydney, about 8% used one other drug, 7% used two other drugs, 18% used three other drugs in addition to ecstasy.

3.5. REASONS FOR ECSTASY USE—There were no major site differences in the reported reasons for ecstasy use (Table 3). Nevertheless, the proportion of some reported

reasons were interesting and different than expected. For instance, most ecstasy users at all three sites reported using ecstasy out of curiosity, with St. Louis users being the most likely to report this reason. Approximately 70% of ecstasy users at all three sites reported using it for no reason and to bond with friends. Notably, only about 15% reported using ecstasy due to peer pressure. Less than 5% reported using ecstasy to get high, for sex or for music and dance.

4. DISCUSSION

The purpose of this paper was to assess the contextual factors influencing ecstasy use in young adult users from three diverse sites. We found that the contexts of ecstasy use are more similar than different in these drug users from two different continents and three different cities, with few but very important variations. Our data indicates that among the study participants, the proportion of male ecstasy users was higher than the proportion of female ecstasy users in Miami and Sydney whereas the sex ratio was approximately equal in Saint Louis. However it is unclear whether this reflects the true site specific gender difference in ecstasy users or is the result of response bias among these sites.

Regarding places of ecstasy use, we demonstrated that in contrast to the traditional belief, the most common place of ecstasy use in St. Louis and Miami was at home, in an apartment or a dorm, whereas in Sydney it was still the club or bar. This finding, similar to other recent studies (Degenhardt et al., 2004; Fendrich et al., 2003; Maxwell, 2005), provides evidence that ecstasy use occurs in a wider range of places than might be expected. Each site may need to tailor their prevention efforts. Sydney, for instance had higher rates of club use, but also higher rates of ecstasy use in fraternity or private parties. Prevention efforts in clubs and universities might reach those who are choosing whether or not to use in these settings. In contrast, in Miami a high proportion of users reported using ecstasy in public places, including in public and private means of transportation and thus unique safety issues are raised that should be confronted through prevention messages to reduce potential accidents. It may also call for more legal interventions to reduce the impaired drivers placing the public at risk; this may occur when police raid parties and send users home, where users must drive under the influence of the drug.

We also found that the three sites differed with regard to drugs that are used concurrently. Consistent with previous studies, ecstasy use was accompanied by a variety of drugs at all sites suggesting that consuming ecstasy by itself is a rare phenomenon (Boyd et al., 2003; Degenhardt et al., 2004; Strote et al., 2002; Topp et al., 1999). Similar to the reports by Grov et al. (Grov, Kelley & Parson, 2009), Marijuana emerged as the most commonly used drug in combination of ecstasy. In contrast, alcohol was the next common drug to be used with ecstasy at all the sites of our study with significantly higher rates at Sydney. Comparatively higher rates of alcohol consumption simultaneously with ecstasy in Sydney could be attributed to club, bar and raves and fraternity/private parties as most common sites of use where alcohol is easily accessible.

Regional variability in drug habits should be taken into consideration when planning for prevention and interventions. Amphetamines, for instance, were more commonly used in Sydney with ecstasy while heroin was used most in St. Louis. In Miami, concurrent Marijuana, LSD, and nitrous oxide (laughing gas) use were higher than expected. These regional differences may reflect different availability of other drugs or different drug use cultures. Regardless of the reason for these differences, they need to be reflected in both prevention and treatment efforts. Unique dangers of mixing ecstasy with different drugs should be discussed in prevention efforts; treatment sites need to assess poly-drug and concurrent drug use to help treat abuse and addiction.

The use of Viagra® in all sites with ecstasy (known as trail mix) was relatively lower (<5%), despite the fact that Viagra® has been used frequently with ecstasy to counter its effect in reducing libido and causing a loss of erection in males (Zemishlany, Aizenberg, & Weizman, 2001).

Our finding that nearly all drugs users in St. Louis and Miami used ecstasy out of curiosity may be an indication of decreased perception of risk in consuming this drug in the United States. This finding conforms to the recent reports of NIDA (Johnston, 2008). Conventionally, peer pressure has been attributed as one of the major factors influencing drug related behavior (Boys et al., 1999). However, our results suggest that regardless of site, peer pressure (as indicated by 'pressured by others') is not significant in self-reported reasons for use. Whether this reflects reality, or a lack of insight into reasons for use, is not clear. Similarly, in contrast to the conventional belief, use of ecstasy for music and dance to get high and to have sex was reported by a very small proportion of drug users. These findings suggest several possible interpretations. First, it may reflect a sample comprised of more first time than repeated users. However, our data do not support such an interpretation. One of the requirements for inclusion in the study was use more than five times lifetime. Second, these users may be reporting why they think they used and consider the other reasons they could have chosen, such as to dance, to be more a consequence of use rather than a reason for use. Finally, it is possible that as the contexts of ecstasy use have changed, the reasons for use and types of users have changed.

The results of this study suggest that friends are sources and co users of ecstasy at all sites. However, a significant minority, 1 out of 4, took ecstasy alone, again contradicting the conventional belief that ecstasy is used mainly for social reasons. It is worrisome that high proportions of these young drug users obtain and consume ecstasy with strangers at each site. It is also interesting to note the high proportion of ecstasy users who reported using the drug with their family members. Given the proven role of family in the prevention of drug use in young population (Velleman, Templeton, & Copello, 2005), this finding is disturbing and suggests that the family environment and dynamics should be considered in planning interventions. While many prevention programs are targeted to youth alone, prevention that targets the whole family is especially likely to be more effective in these cases.

In conclusion, our study provides evidence of similarities and differences in the contexts of ecstasy use in young adults in two cities in the United States and in the capital of Australia. These differences reflect the local culture as well as trends in drug use. Additionally, this study may highlight the changing contextual factors of ecstasy use over time, and prevention programs should take these newly emerged factors into account. Peters and Kok (2009) noted that many MDMA studies report similar findings on the nature of, and reasons for, MDMA use. All studies to date have shown that ecstasy users favor polydrug use. They also conclude that there is agreement on reasons for MDMA use, including to "help you to... enjoy the company of friends", "enhance socializing," "and being together with other people" (Table 2, no page number). Peters and Kok further conclude that these findings must be used to develop prevention and treatment interventions. Our findings also support the importance of polydrug use and the social context of that use. Prevention and educational programs must focus on many drugs, not ecstasy alone. Educational and prevention programs must also target the context of use. The fact that a high proportion of ecstasy users consume these drugs while in cars or other means of transport warrants additional attention to preventing drug related fatalities. NIDA has recognized the importance of studying "drugged driving" (i.e. PA-OR-021 "International Research Collaboration on Drug Abuse and Addiction Research") and our research clearly shows that ecstasy use should not be neglected in these studies. We extend the literature showing the importance of reasons for use and context for use in preparing and shaping prevention and

intervention science. The findings on the use of other drugs, common sources for drugs, family environment, and perceived functions of drug use by geographic location are necessary to devise effective prevention and intervention strategies.

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Table 1

Demographic characteristics of young adult Ecstasy users at three diverse sites.

	St. Louis (n=272)	Miami (n=171)	Sydney (n=143)
Gender			
Male	53%	60%	60%
Female	47%	40%	40%
Age (Mean±S.D)			
Male	21.44±2.90	22.14±3.08	21.56±3.11
Female	22.44±2.93	22.75±3.56	22.38±3.09
Ethnicity			
Caucasian	76%	30%	78%
African American	13%	1%	0%
Hispanic	3%	57%	1%
Others	8%	12%	21%
Marital status			
Never married	95%	93%	100%
Ever married	5%	7%	0%
Education			
High school or less	79%	61%	69%
Post high school	21%	39%	31%
Work situation			
Unemployed	16%	16%	11%
Employed	55%	51%	68%
Student	19%	20%	14%
Others	11%	13%	8%

Table 2
Comparison of young adult ecstasy users at three sites for sources, places for ecstasy use and co-users

	St. Louis(a) (n=272)	Miami(b) (n=171)	Sydney(c) (n=172)	(a*b)	p	(b*c)	p	(a*c)	p
Sources of Ecstasy use									
Roommate/Friend	257(94%)	165(96%)	134(94%)	0.93	0.33	0.81	0.36	0.22	0.95
Stranger	164(60%)	102(60%)	98(69%)	0.01	0.89	2.94	0.08	3.05	0.08
Dealer	156(57%)	122(71%)	111(78%)	8.79	0.003	1.89	0.16	17.65	<0.0001
Partner/spouse	127(47%)	100(58%)	77(54%)	5.83	0.15	0.057	0.44	2.1	0.14
Family member	25(9%)	28(16%)	26(18%)	5.14	0.023	0.2	0.65	7.18	0.007
Places of Ecstasy use									
Home/Apt/Dorm	253(93%)	169(99%)	125(88%)	7.86	0.005	15.87	<0.0001	2.92	0.87
Rave/Concerts	209(77%)	139(81%)	125(88%)	1.23	0.26	2.67	0.1	7.49	0.006
Bar/Club/Restaurants	194(71%)	150(88%)	140(99%)	16.26	<0.001	13.46	0.0002	44.49	<0.0001
Public places	181(67%)	152(89%)	95(67%)	28.08	<0.0001	22.53	<0.0001	0.05	0.94
Car/train/air/ferry	176(65%)	132(77%)	87(61%)	7.72	0.005	9.36	0.002	0.47	0.49
work/School	37(14%)	28(16%)	23(16%)	0.64	0.42	0.001	0.96	0.5	0.47
Party (Pvt/Fraternity)	27(10%)	14(8%)	35(25%)	0.37	0.53	15.91	<0.0001	15.87	<0.0001
Hotel/Motel	8(3%)	10(6%)	5(4%)	2.27	0.13	0.92	0.33	0.1	0.74
Other places	4(1%)	5(3%)	4(3%)	1.11	0.29	0.003	0.95	0.89	0.34
Co-users									
Roommate/Friends	269(99%)	170(99%)	139(98%)	0.31	0.57	1.43	0.23	0.66	0.41
Partners/spouse	207(76%)	139(81%)	113(80%)	1.64	0.19	0.14	0.7	0.64	0.42
Stranger	136(50%)	74(43%)	74(52%)	1.9	0.16	2.43	0.11	0.16	0.68
Dealer	76(28%)	40(23%)	53(37%)	1.12	0.28	7.2	0.007	3.82	0.05
Alone	63(23%)	48(28%)	36(25%)	0.3	0.95	0.16	0.68	0.24	0.61
Family member	52(19%)	48(28%)	52(37%)	3.1	0.07	2.6	0.1	11.94	0.0005

$\chi^2(a*b)$ – Chi-squared test between St. Louis and Miami

$\chi^2(b*c)$ – Chi-squared test between Miami and Sydney

$\chi^2(a*c)$ – Chi-squared test between St. Louis and Sydney

Table 3

Comparison of young adult ecstasy users at three sites for reasons for ecstasy use and simultaneous drug use

	St. Louis(a)	Miami(b)	Sydney(c)	X2(a* b)	p	(b* c)	p	(a* c)	p
Simultaneous drug use									
Marijuana	228(84%)	148(87%)	109(77%)	0.6	0.43	5.06	0.02	3.07	0.07
Alcohol	183(67%)	130(76%)	127(89%)	3.87	0.04	9.5	0.002	24.34	<0.0001
LSD*/Mushroom	130(48%)	74(43%)	48(34%)	0.86	0.35	2.92	0.08	7.45	0.006
Ketamine	83(31%)	54(32%)	55(39%)	0.05	0.81	1.74	0.18	2.83	0.09
Cocaine	75(28%)	53(31%)	53(37%)	0.59	0.43	1.38	0.23	4.15	0.04
NO*	71(26%)	42(25%)	31(22%)	0.13	0.71	0.28	0.59	0.84	0.35
Heroin/Opium	51(19%)	15(9%)	6(4%)	8.24	0.004	2.51	0.11	16.39	<0.0001
Amphetamine	45(17%)	30(18%)	120(85%)	0.07	0.78	139.38	0.0001	179.77	<0.001
Sedatives	44(16%)	39(23%)	25(18%)	3.03	0.08	1.29	0.25	0.13	0.71
GHB*	33(12%)	27(16%)	27(19%)	1.19	0.27	0.56	0.45	3.56	0.05
SSRI*	31(11%)	11(6%)	15(11%)	3.01	0.08	1.73	0.18	0.06	0.79
Rx stimulant	21(8%)	11(6%)	10(7%)	0.25	0.61	0.04	0.83	0.06	0.8
DXM*	15(6%)	12(7%)	2(1%)	0.41	0.51	5.71	0.01	3.99	0.04
Viagra	8(3%)	9(5%)	6(4%)	0.91	0.34	0.03	0.84	0.47	0.49
Rohypnol	4(2%)	8(5%)	4(3%)	4.09	0.04	0.72	0.39	0.89	0.34
Reasons for Ecstasy use									
Out of curiosity	263 (97%)	157(91%)	120(85%)	6.03	0.01	3.43	0.06	19.99	0.0001
No reasons	196 (72%)	124(73%)	89(63%)	0.01	0.91	3.45	0.06	3.82	0.05
Bond with friends	187 (69%)	121(71%)	94(66%)	0.2	0.65	0.75	0.38	0.28	0.59
Get more in touch with self	101 (37%)	75(44%)	44(31%)	1.98	0.15	5.45	0.01	1.54	0.21
Numb mind/forget problems	92 (34%)	80(47%)	59(41%)	7.42	0.006	0.86	0.35	2.4	0.12
Spiritual experience	87 (32%)	64(37%)	30(21%)	1.38	0.23	9.8	0.001	5.42	0.01
Relieve Stress	82 (30%)	58(34%)	48(34%)	0.69	0.4	0	0.98	0.57	0.44
For fun/party	56(21%)	31(18%)	28(20%)	0.4	0.52	0.12	0.72	0.04	0.83
Pressured by others	36 (13%)	27(16%)	23(16%)	0.56	0.45	0	0.92	0.67	0.41
Get high	12(4%)	2(1%)	9(6%)	3.6	0.057	6.11	0.01	0.71	0.39
Music/dance	10(4%)	7(4%)	5(4%)	0.04	0.82	0.06	0.79	0.006	0.93

	St. Louis(a)	Miami(b)	Sydney(c)	X2(a* b)	p	(b* c)	p	(a* c)	p
Some other reason	8 (3%)	5(3%)	7(5%)	0.001	0.99	0.84	0.35	1.05	0.3
For sex	7(3%)	8(5%)	2(1%)	1.42	0.23	2.68	0.1	0.1	0.44

* Legends – same as Table 2.

NO* – Nitric oxide

SSRI* – Selective serotonin reuptake inhibitors (antidepressants)

GHB* - Gamma hydroxybutyrate

DXM* – *Dextromethorphan*

LSD*-Lysergic acid diethylamide