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Specific harm reduction strategies employed by 3,4-methylenedioxymethamphetamine/ ecstasy users in the United States and the United Kingdom

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Abstract

Both recreational and problematic MDMA/ecstasy users could benefit from employing harm reduction interventions intended to preserve health and prevent negative consequences. To evaluate whether use of such interventions varied by country of residence and frequency of ecstasy use, we used web-based surveys to assess how often 104 lower-frequency and higher-frequency American ecstasy users and 80 lower-frequency and higher-frequency British ecstasy users employed each of 19 self-initiated harm reduction strategies when they used ecstasy during a two-month period. Several significant differences notwithstanding, at least 75% of participants had used 11 of the 19 strategies one or more times during the two-month assessment period, regardless of whether they lived in the United States or United Kingdom and whether they were lower-frequency or higher-frequency ecstasy users. When proportions of American and British participants using a strategy differed significantly, it was typically larger proportions of Americans using those strategies. Many of the less frequently employed strategies are not applicable on every occasion of ecstasy use. However, because ecstasy is not a diverted pharmaceutical of known quality/potency, testing for the presence of MDMA, other stimulants, and adulterants is a strategy that everyone should employ, regardless of country of residence or how frequently one consumes ecstasy.

Keywords

MDMA; Ecstasy; Harm Reduction; Drug Checking

Introduction

MDMA (3,4-Methylenedioxymethamphetamine), frequently referred to as “ecstasy” or “molly,” is used by millions of people around the world (United Nations Office on Drugs and Crime, 2014). Among English-speaking countries in the Northern Hemisphere, use of ecstasy is more prevalent among young adults in the United States (3.5% among 18-25 year

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olds; Center for Behavioral Health Statistics and Quality, 2014) and the United Kingdom (4% among 15-34 year olds; European Monitoring Centre for Drugs and Drug Addiction, 2011; 2016) than in Canada (2.6% among 15-24 year olds; Canadian Alcohol and Drug Use Monitoring Survey, 2012) and Republic of Ireland (1% among 15-34 year olds, EMCDDA, 2016).

Use of MDMA is driven by desirable outcomes of consumption, including increased energy, sociability, self-confidence, stress reduction, sexual enhancement, positive mood, and subjective wellbeing (Baylen & Rosenberg, 2006; Carhart-Harris & Nutt, 2010; Hunt & Evans, 2008; Morgan et al., 2013; Singer & Schensul, 2011; ter Bogt & Engels, 2005; White et al., 2006). However, many also report acute and delayed negative effects such as dehydration, hyperthermia, tachycardia, nausea, bruxism, dizziness, muscle aches or tightness, sleeplessness, fatigue, confusion, anxiety, depression and memory and executive function problems (e.g., Amoroso, 2016; Chinet, Stephan, Zobel et al., 2007; Rogers et al., 2009; Singer & Schensul, 2011).

Given the potential biomedical and psychosocial consequences of consuming MDMA, and that multiple substances sold as ecstasy may include adulterants, both recreational and problematic users could benefit from employing self-initiated harm reduction strategies designed to minimize the injurious physiological, psychological, and/or social effects of consumption (Marlatt, Larimer, & Witkiewitz, 2012). Examples of self-initiated strategies that could be employed by ecstasy users include reducing use of other substances when consuming ecstasy, drinking water or other electrolyte-rich beverages to stay hydrated, having a trusted friend to talk to if one experiences negative emotions or cognitions, reducing the amount of ecstasy consumed during a session, using a test-kit or checking an online drug checking database to see if there are other substances in one's ecstasy, and consuming vitamins, antioxidants, or 5-Hydroxytryptophan before or after using ecstasy (pre-loading/post-loading) to attenuate physical or neurological damage associated with consumption (Allot & Redman, 2006; Henry & Rella, 2001; Kelly, 2009; Panagopoulos & Ricciardelli, 2005).

These harm reduction strategies have the potential to reduce ecstasy-related harms, but one factor that could influence the use of such strategies is the frequency with which ecstasy users consume the substance and, therefore, how often they are exposed to potential harms associated with intoxication. For example, those who consume ecstasy less frequently may not see themselves as being at risk for harmful consequences and therefore may employ harm reduction strategies less often compared to those who consume the substance more frequently. In addition, the proportion of users who employ these strategies could vary by country as a result of widespread professional (and perhaps non-professional) acceptance of harm reduction in the United Kingdom (Rosenberg, Melville, & McLean, 2002; 2004) compared to the United States (Rosenberg & Phillips, 2003; Davis & Rosenberg, 2014). Therefore, to evaluate whether frequency of ecstasy consumption (higher or lower) and country of residence (US or UK) were associated with use of ecstasy-specific harm reduction strategies, we compared the proportions of American and British higher-frequency and lower-frequency ecstasy users who had employed each of 19 strategies when they used ecstasy during a two-month period.

Method

Procedure and Participant Recruitment

As part of a prospective study evaluating psychological characteristics associated with later use of two ecstasy-specific harm reduction strategies (Davis & Rosenberg, 2016), we recruited two separate samples of ecstasy users (October-November, 2013 and May-June, 2014). For both waves of data collection, announcements describing the study and directing potential participants to the web-based study materials were distributed using targeted advertisements on Facebook and postings on other websites, such as reddit.com, pillreports.com, bluelight.ru, and dancesafe.org. Once at the study site, hosted by Survey Gizmo, participants were presented with an informed consent document approved by our institutional review board and a series of questionnaires to assess their attitudes regarding use of ecstasy-related harm reduction strategies. Approximately two months later, we contacted participants by email to evaluate how many times they had consumed ecstasy since baseline and the proportion of times they had employed each of 19 harm reduction strategies when they consumed ecstasy during the study.

As incentives to participate, we informed potential participants in the first wave that we would donate \$5.00 per participant, up to a maximum of \$250, to bluelight.org (a forum for drug users that is committed to reducing harm associated with substance use), and we offered a \$10.00 Starbucks card to the first 160 participants who completed the follow-up assessment in the second wave. Of the 729 ecstasy users who completed baseline assessment, 236 (32%) responded to the follow-up invitation, consumed ecstasy during the previous two months, and completed the assessment measures. However, 52 of these individuals were from countries other than the US or UK, and thus were excluded from the final sample of 184 participants retained for the present analysis.

Baseline Measures

Ecstasy and Substance Use History Questionnaire—We created a questionnaire to assess both ecstasy and other drug use history variables. Specifically, we asked participants the frequency of their MDMA/ecstasy use, how many times they had used MDMA/ecstasy in the previous three months, the number of times they had used in their lifetime, where they typically consumed MDMA/ecstasy, and the last time they used. We also asked participants to indicate whether they had or had not consumed other drugs (e.g., alcohol, nicotine, cannabis/marijuana, synthetic cannabinoids) at least once during the three months prior to baseline.

Demographic Questionnaire—We created this questionnaire to assess participants' country of residence, gender, age, sexual orientation, ethnicity, education level, and relationship status.

Follow-up Measures

Ecstasy Harm Reduction Strategies Questionnaire—Based on previously published research regarding specific harm reduction interventions employed by users of ecstasy (Allot & Redman, 2006; Henry & Rella, 2001; Panagopoulos & Ricciardelli, 2005), we devised

this questionnaire to assess the proportion of occasions participants had used each of 19 ecstasy-specific harm reduction strategies (see Table 2 for list) when they consumed MDMA/ecstasy since baseline. Because over 80% of participants had used ecstasy 4 or fewer times in the two-month follow-up period, we dichotomized responses as indicating *use* or *no use* of each of the 19 strategies to calculate how many participants had employed each strategy at least once during the two-month assessment period.

Ecstasy Use During Two-month Follow-up—We administered a single question asking participants how many times they had consumed MDMA/ecstasy since baseline.

Data Analysis Plan

First, we conducted chi-square and Fisher's exact analyses to compare participants residing in each country (US versus UK) on demographic, ecstasy use, and other substance use history variables. Next, we calculated the proportion of American and British lower-frequency users (defined as consuming ecstasy 1-2 times since baseline) and proportion of higher-frequency users (defined as consuming ecstasy 3-or-more times since baseline) who had used each strategy at least once during the two-month follow-up period. For each of the 19 strategies, we calculated four two-proportion z-tests to evaluate whether (a) American lower-frequency users differed from American higher-frequency users; (b) British lower-frequency users differed from British higher-frequency users; (c) American lower-frequency users differed from British lower-frequency users; and (d) American higher-frequency users differed from British higher-frequency users. Given the limitations of employing a Bonferroni-corrected alpha (e.g., the testing of an irrelevant null hypothesis [study-wide error rate], interpretation of findings that depends on the number of other tests performed as opposed to theory/hypotheses, and increasing the likelihood of Type II error; Perniger 1998), we used an alpha level of .05 to determine whether statistical tests were significant.

Results

Participant Characteristics

Examination of Table 1 reveals that both subsamples were comprised primarily of Caucasians (US = 78%; UK = 89%), males (US = 72%; UK = 85%), and 18-to-24 year olds (US = 71%; UK = 71%). Approximately one-half of both subsamples consumed ecstasy once per month or more prior to baseline, and a little over one-half had consumed ecstasy 20 or more occasions throughout their lifetime. Large proportions of both subsamples reported that they also had consumed alcohol (US = 93%; UK = 96%) and cannabis (US = 84%; UK = 80%) in the three months prior to baseline assessment. There were no statistically significant differences between levels of demographic or ecstasy use history characteristics and country of residence, with the exception of gender (i.e., larger proportion of males in the UK sample).

Proportions employing strategies by country and frequency of ecstasy consumption

As examination of Table 2 reveals, 11 of the 19 strategies had been used one or more times during the two-month assessment period by at least 75%, and often by more than 90%, of the participants regardless of country of residence or frequency of ecstasy consumption. Of

those 11 strategies employed by a large majority of participants, two (#10 and #6) differed significantly, but not meaningfully, by country of residence or frequency of ecstasy use. Of the eight strategies used by relatively smaller proportions of participants, three (# 8, # 5, #4) had been employed one or more times by at least 50% of participants, and there were no significant differences in the proportions within country or across country by frequency of ecstasy use. Of the five remaining strategies employed by smaller proportions of participants, a larger proportion of higher-frequency American ecstasy users employed the pill testing/drug checking (#3) and the pre-loading/post-loading (#2) strategies than did higher-frequency British ecstasy users. In addition, a higher proportion of lower-frequency British ecstasy users employed the pill-testing/drug-checking (#3) strategy than did the higher-frequency British ecstasy users, but a smaller proportion of lower-frequency British ecstasy users took a chill-out break because of bad thoughts (#9) compared to higher-frequency British ecstasy users. Finally, a larger proportion of lower-frequency American ecstasy users stretched their muscles (#17) compared to lower-frequency British ecstasy users.

Strategies employed by participants that were not listed on the questionnaire

In response to an open-ended question asking them to report any other strategies they employed to reduce or ameliorate the potential harms associated with ecstasy consumption, 34 participants from the US and 22 from the UK provided a response. Aside from responses similar or identical to items listed on the questionnaire, new strategies reported by more than one participant from the US included limiting number of doses within a session (n=4), using only in specific locations (e.g., home, festival, club; n=4), maintaining a healthy diet (n=4), physical exercise (n=3), resting the day after consumption (n=3), and chewing gum (n=2). In addition to repeating some of the 19 listed strategies, new strategies reported by more than one participant from the UK included eating a healthy diet prior to and following consumption (n=3), measuring exact dose (n=2), limiting dose within a session (n=2), and keeping their cell phone charged (n=2).

Discussion

Using a more extensive list of ecstasy-related and other harm reduction strategies than previously published investigations (Allot & Redman, 2006; Chinet et al., 2007; Henry & Rella, 2001; Jacinto, Duerte, Sales, & Murphy, 2006; Panagopoulos & Ricciardeli, 2005; Shewan, Dalgarno, & Reith, 2000), we found that recreational MDMA/ecstasy users employed a wide range of harm reduction strategies to manage the potential injurious effects of acute intoxication. Specifically, at least three quarters (and often more than 90%) of participants had employed 11 of 19 harm reduction strategies at least once during a two-month assessment period, whether they lived in the US or UK and whether they were lower- or higher-frequency ecstasy users.

Contrary to our expectation, and several significant differences notwithstanding, there were few meaningful differences in the proportions of lower-frequency versus higher-frequency users who employed most of the listed strategies. Perhaps those who used ecstasy less frequently did so, in part, as a form of harm reduction in itself, and were no less concerned

about or aware of the value of these interventions than higher-frequency users. We also found relatively few and notably minor differences in the proportions of British versus American participants who used each of the 19 strategies. Although harm reduction has been more acceptable to professionals in the UK than to professionals in the US, American ecstasy users apparently recognize the value of harm reduction even if the American treatment industry promotes abstinence and discourages safer consumption practices. Furthermore, social support and information about harm reduction is readily available via the Internet to recreational users living in both countries, which likely has broad implications in user acceptability.

The results from the present study should be considered in light of several methodological limitations. First, we employed a web-based recruitment and data collection procedure and the proportion of ecstasy users who implement harm reduction strategies may have been lower among the non-responders and users who were unable or unwilling to participate in internet-based research. Second, we asked participants to report their use of harm reduction strategies when they consumed ecstasy during a two-month period and their memories could have been influenced by both the passage of time and the acute effects of intoxication at the time they reportedly employed these strategies. Third, our study was comprised of relatively small samples of primarily young Caucasian men from only two countries, and the frequency with which women, individuals from diverse ethnic backgrounds, and from other parts of the world use these strategies warrants further investigation.

We recognize these findings may be limited to users with similar demographic and drug history characteristics, but that such high proportions of our participants used 11 of these 19 strategies implies that there is little need to encourage younger, male, web savvy ecstasy users to employ these particular strategies. Of the remaining eight strategies, some may have been used less frequently because they were irrelevant given the circumstances or contexts in which the person consumes ecstasy (e.g., chill out break because of bad thoughts and emotions; stretch muscles prior to consumption). However, other less frequently used harm reduction strategies may apply to every user regardless of context. For example, because ecstasy is not a diverted pharmaceutical of known quality and potency, testing for the presence of MDMA, other stimulants, and adulterants is a strategy that everyone should employ, regardless of country of residence or how frequently one consumes ecstasy.

Therefore, we suggest that prevention specialists, harm reduction workers, and clinicians in the US and the UK encourage ecstasy users to use drug testing services (where available), personal drug testing kits (which can be purchased on the internet), and drug checking websites (e.g., pillreports.org). Because we recognize that high quality testing facilities are not always available, that home testing kits may be unreliable or misinterpreted, and that online drug-checking sites may not reveal up-to-date information about current batches of ecstasy, we also recommend that researchers evaluate the efficacy and the economic and health-related benefits of drug checking to develop an empirical basis to support policy changes and provide funding for such enhancing such services. Lastly, that many ecstasy users in the US and the UK consume a variety of substances either separately or simultaneously, we recommend further evaluation of harm reduction strategies that reduce harms associated with consumption of multiple substances.

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Table 1

Demographic Characteristics and Ecstasy Use History by Country

Variable	U.S. Sample (<i>ns</i> range from 99-104) %	U.K. Sample (<i>ns</i> range from 72-80)%
<u>Demographic Characteristics</u>		
Gender ^a		
Male	71	85
Age		
18-24	71	71
25-34	23	26
35-54	6	3
Sexual Orientation		
Heterosexual	83	85
Homosexual	3	4
Bisexual	11	8
Other	4	3
Ethnicity		
Caucasian	78	89
Other/Multi -racial	22	11
Education Level		
Less than High School or High school graduate/equivalent	12	20
Some college/Associate's degree	56	54
Bachelor's degree	23	23
Graduate degree	10	4
Relationship Status		
Single	66	75
Married/Partnered	34	25
<u>Ecstasy Use History Characteristics</u>		
General frequency of use		
Less than monthly	55	41
Once per month	24	34
Every other week	18	17
At least Weekly	2	9
Past three-month frequency of use at baseline		
One time	30	25
Two times	22	21
Three times	15	21
Four times or more	33	32
Frequency of use since baseline		
1-2	62	58
3-4	21	25
5 or more	17	18

Variable	U.S. Sample (<i>ns</i> range from 99-104) %	U.K. Sample (<i>ns</i> range from 72-80)%
Number of times used - lifetime		
1-20	47	49
21-50	29	25
51-100	12	14
100 or more	13	13
Typical consumption environment		
Home/Friend's house	26	14
Rave/Club/Festival	71	85
Other	3	1
Last time consumed ecstasy		
More than one week ago	57	59
Approximately one week ago	25	20
A few days ago	12	15
Yesterday	7	4
Earlier today	0	3

^a $\chi^2(1) = 4.48, p = .034$.

Table 2

Proportion of participants who employed each ecstasy-related harm reduction strategy at least once when he or she consumed ecstasy during previous two months by country and frequency of drug use

Strategies (significant items and proportions in bold type)	U.S. Sample		U.K. Sample	
	Lower Freq (n= 50-64) [‡]	Higher Freq (n= 33-40) [‡]	Lower Freq (n= 40-46) [‡]	Higher Freq (n= 29-34) [‡]
1. I drank water/electrolyte-rich fluids to replace the fluids lost while I was using MDMA/ecstasy	100%	100%	100%	97%
10. I bought MDMA/ecstasy from a trusted source	100% ^a	100%	89% ^a	94%
6. I avoided frequent and heavy MDMA/ecstasy use	98 [§]	82 [§]	94	88
11. I got in a good mood prior to using MDMA/ecstasy (e.g., drank a small amount of wine, smoked a little bit of cannabis, rested, ate some food, listened to music)	95	95	96	100
12. I used MDMA/ecstasy only when in a good mood	97	97	96	97
13. I used MDMA/ecstasy only with friends	97	95	93	94
19. I found a safe way to get home from where I had been using MDMA/ecstasy	98	100	98	97
7. I urinated while intoxicated to avoid the buildup of excess fluids I drank during the MDMA/ecstasy session	97	100	91	94
18. I had a trusted friend I could go to for help if troubling events/thoughts occurred while I was on MDMA/ecstasy	95	89	91	91
15. I did not get into cars with others who were intoxicated	92	85	84	97
16. I carried money for an emergency exit plan	90	92	78	79
5. I reduced how much I used substances other than MDMA/ecstasy during a session	78	77	68	59
8. I took a chill-out break to control my body temperature	77	90	84	88
4. I reduced how much MDMA/ecstasy I consumed during a session	62	65	60	55
3. I used a test kit to test for the presence of MDMA and adulteran or checked an online database or MDMA testing service	63	74 ^b	63 [#]	34 ^{b#}
2. I pre-loaded/post-loaded (by consuming herbal and/or pharmacological products) in an attempt to decrease physiological, psychological, or neurological effects of MDMA/ecstasy intoxication	63	70 ^c	46	38 ^c
14. I used a new batch of MDMA/ecstasy only after I saw how others reacted to it	49	61	35	56
17. I stretched muscles prior to consuming MDMA/ecstasy	47 ^d	47	24 ^d	24
9. I took a chill-out break because of bad thoughts/emotions (e.g., found a quiet corner, talked to a trusted friend, listened to music, engaged in mindfulness exercises)	38	49	42 [‡]	74 [‡]

[‡] Numbers of participants who provided data for each strategy varied by country and frequency of drug use.

^a $z = 2.7, p = .007$

[§] $z = 2.9, p = .004$

^b $z = 3.4, p < .001$

[#] $z = 2.5, p = .013$

^c $z = 2.8, p = .006$

^d $z = 2.3, p = .022$

♣ $z = 2.7, p = .007$

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