Published in final edited form as:
Addict Behav. 2011 May ; 36(5): 551–554. doi:10.1016/j.addbeh.2011.01.013.

Perceived risk associated with ecstasy use: a latent class analysis approach

SS Martins[1,*], **RG Carlson**[2], **PK Alexandre**[1], and **RS Falck**[2]

[1] Department of Mental Health, Johns Hopkins Bloomberg School of Public Health

[2] Center for Interventions, Treatment and Addictions Research, Wright State University School of Medicine

Abstract

This study aims to define categories of perceived health problems among ecstasy users based on observed clustering of their perceptions of ecstasy-related health problems. Data from a community sample of ecstasy users (n=402) aged 18 to 30, in Ohio, was used in this study. Data was analyzed via Latent Class Analysis (LCA) and Regression. This study identified five different subgroups of ecstasy users based on their perceptions of health problems they associated with their ecstasy use. Almost one third of the sample (28.9%) belonged to a class with "low level of perceived problems" (Class 4). About one fourth (25.6%) of the sample (Class 2), had high probabilities of "perceiving problems on sexual-related items", but generally low or moderate probabilities of perceiving problems in other areas. Roughly one-fifth of the sample (21.1%, Class 1) had moderate probabilities of perceiving ecstasy health-related problems in all areas. A small proportion of respondents (11.9%, Class 5) had high probabilities of reporting "perceived memory and cognitive problems, and of perceiving "ecstasy related-problems in all areas" (12.4%, Class 3). A large proportion of ecstasy users perceive either low or moderate risk associated with their ecstasy use. It is important to further investigate whether lower levels of risk perception are associated with persistence of ecstasy use.

Keywords

Ecstasy (MDMA); young adults; perceived risk; ecstasy health-related problems

[*]Corresponding author: Silvia S. Martins, MD, PhD, Johns Hopkins Bloomberg School of Public Health, Department of Mental Health, 624 N. Broadway, 8th floor, Suite 896, Baltimore, MD 21205-1900. Tel.: (410)-614-2852; Fax: (410)-955-9088, smartins@jhsph.edu.

Contributors

Authors Carlson and Falck designed the study and coordinated the data collection. Authors Martins and Alexandre wrote the research questions for this paper and conducted literature review. Author Martins conducted the statistical analysis and wrote the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

Conflict of Interest

All authors report no conflict of interest.

1. Introduction

While many ecstasy users perceive some health risk related to their ecstasy use (Gamma, Liechti, & Sumnall, 2004; White, McMorris, Catalano, Fleming, Haggerty, & Abbott, 2006), others perceive no risk or harm at all (Carlson, Falck, McCaughan, & Siegal, 2004a; Carlson et al., 2004b). Perceived risk about the consequences of drug use can influence the intent to try drugs and to continue using them. Consequently, individuals who underestimate the risks and harms associated with drug use are usually the ones more likely to engage in drug use (O Callaghan, O Callaghan, Najman, Williams, Bor & Alati, 2006). Furthermore, those who believe that a specific drug causes harm are more likely not to use it (Johnston, O Malley, Bachman, & Schulenberg, 2006). Leung and colleagues (2010) studied ecstasy users at two time points: ecstasy users considered using ecstasy once a week for at least a month "dangerous," and that those who considered ecstasy "not at all dangerous" at time 1 were more than three times as likely to use ecstasy between time 1 and time 2, compared to those who considered ecstasy "extremely dangerous."

This cross-sectional study seeks to define categories of perceived health problems among ecstasy users based on observed clustering of their perceptions of ecstasy-related health problems. We also test for associations between lifetime occasions of ecstasy use, depressive symptoms, and demographic characteristics with latent class membership.

2. Methods

2.1. Sample

The 402 participants in this study were recruited between May 2002 and June 2003 in the Columbus, Ohio, area to participate in a natural history project examining drug use practices among ecstasy users and their potential relationship to HIV/STD risk behaviors (Carlson, Wang, Falck, & Siegel, 2005). Structured questionnaires were administered by trained interviewers at baseline and then every 6 months for 3 years. This study uses data collected from the baseline questionnaires. Participants had to be between 18 and 30 years old, Ohio residents, not involved in formal drug treatment within the past 30 days, able to give an address and telephone number at which they could be contacted for follow-up interviews, and report having used ecstasy at least once in the past 6 months. Subjects who reported having used ecstasy within 3 days prior to the baseline questionnaire were rescheduled to help minimize the potential effects of the post-ecstasy use wash-out period affecting the interview (Curran, 2000; Curran & Travill, 1997). Participants were recruited using respondent-driven sampling (RDS), a modified form of snowball or chain-referral sampling that compensates participants for recruiting their peers (Heckathorn, 1997, 2002). Details about the sampling process are available elsewhere (Heckathorn, 1997; Wang et al., 2005). In formed consent was obtained from all participants following a protocol that was approved by Wright State University Institutional Review Board. Demographic, adverse consequences associated with ecstasy use, and depressive symptoms data were collected.

2.2. Measures

This study focuses on 31 questionnaire items, which assessed perceived adverse consequences related to ecstasy use. These items included: a) three statements about global perceived harm to health, b) nine statements about perceived problems with memory and cognition, c) nineteen statements on beliefs about other ecstasy-related issues-see Table 1. Response options were: 0-Strongly Disagree, 1-Disagree, 2-Neither Agree or Disagree, 3-Agree, 4-Strongly agree. For this study, those that agreed or strongly agreed with a statement were recoded as 1 and those that answered otherwise were recoded as 0.

Data on presence of depressive symptoms was assessed by the Beck Depression Inventory II (BDI-II, Beck, Steer, & Brown, 1996) and lifetime occasions of ecstasy use as well as demographic data such as age, gender, race/ethnicity and education. The BDI-II screens for and measures the severity of symptoms of depression that have occurred in the last two weeks. Lifetime occasions of ecstasy use was categorized as 1–10 times, 11–20 times, 21–49 times and 50 or more times (Carlson et al., 2005).

2.3. Statistical Analysis

Univariate statistics were used to describe the overall prevalence of agreement with the 31 statements directly related to perceived health problems associated with ecstasy use. To empirically derive groups of ecstasy users based on observed clustering of the 31 perceived health problem items, Latent Class Analysis (LCA) was applied using M-Plus version 5.1 (Muthén & Muthén, 2007). Fit indices and theory were used to identify the best-fitting and most parsimonious model. Individuals were then assigned to their modal class, or the class they most likely belong to, based on their probability of being in each class. Classes were then regressed on demographics, lifetime occasions of ecstasy use, and depressive symptoms using multinomial logistic regression models in Stata 10.0 (StataCorp, 2008). Adjusted odds ratio estimates, 95% confidence intervals, and p-values are presented.

3. Results

As described elsewhere (Carlson et al., 2005), about 64% of the sample was male, and 81.6% were of White ethnicity, mean age of participants was 20.9 years (median = 20 years; range = 18–30). About 11.4% of the sample had less than a high school education, 36.1% had completed high school, and 52.5% had some college or a college degree.

Derivation of different classes proceeded sequentially from the most parsimonious one-class model (i.e., ecstasy users do not differ with regard to the thirty-one perceived risk statements) to a more differentiated seven-class model. Based on fit statistics, there was an improvement with increasing number of classes, peaking at around five classes. The Bayesian Information Criteria (BIC) (lower value, better fit) (4 class: 12822.99; 5 class: 12817.80 and 6 class: 12864.78) and entropy, an indication of misclassification error, (4 class: 0.881; 5 class: 0.896; 6class: 0.902) indicated no appreciable improvement in the fit of a 6 class model in comparison to a 5 class model, pointing towards a 5-class model as the most parsimonious and identifiable solution (Figure 1). Recent simulation studies reinforce that the BIC works well to discriminate the number of classes (Nylund, Asparouhhov, & Muthen, 2007).

Table 1 shows the conditional probabilities for perceived health problems among ecstasy users. One group (Class 4, 28.9% of the sample) had low to moderate probabilities of perceiving most problems related to ecstasy use (0. 00–0.65); most of them agreed that “Ecstasy destroys brain cells” but did not think it could cause other type of harm. Those in Class 3 (12.4%) had mainly high probabilities of perceiving problems in all areas related to ecstasy use. In between these two divergent classes, ecstasy users in Class 1 (21.1%) generally had moderate probabilities of perceiving problems in all areas related to ecstasy use. Respondents in Class 2 (25.6%) tended to have high probabilities of perceiving problems associated with ecstasy use and sexual-related statements such as “When high on ecstasy, people are more likely to have sex with people they would not normally have sex with;”“ When using ecstasy, people are more likely to have unsafe sex;” and “Ecstasy use might lead to the development of depression.” Finally, respondents in Class 5 (11.9%) had high probabilities of perceiving that ecstasy caused memory and cognitive problems as well as some sexual problems, but, different from those in Class 3, had low probabilities of perceiving other problems such as physical harm and health harm secondary to ecstasy use.

Latent class regression models tested for associations between class membership and the demographic characteristics of the ecstasy users, their lifetime occasions of ecstasy use and past-two week depressive symptom scores (Table 2). Blacks were four times more likely than Whites to be in Class 3 ("perceived problems in all areas") versus Class 4 ("low level of perceived problems", reference class). Those with more years of education were less likely to be in Classes 2 ("perceived problems on sexual-related items") or 3 ("perceived problems in all areas") versus Class 4. Ecstasy users in Class 3 ("perceived problems in all areas") were more likely to have used ecstasy 11–20 times and 50 or more times, respectively, in their lifetime than those in Class 4. Those in Class 2 ("perceived problems on sexual-related items") and 3 ("perceived problems in all areas" were more likely to have had higher levels of depressive symptoms in the past two weeks than those in Class 4.

4. Discussion

This study identified five different subgroups of ecstasy users based on their perceptions of health problems they associated with their ecstasy use. It is notable that one-third of the ecstasy users did not perceive much health-risk in using ecstasy, and that one fourth of them mainly perceived problems on sexual related items. Researchers have suggested that prevention programs that target ecstasy use should focus on the more common acute and sub-acute side-effects of ecstasy use in order to increase perceived risk of ecstasy use (Baggott, 2002; Carlson et al., 2004b). Our findings are in line with those of Murphy and colleagues (2006) that examined ecstasy risk perceptions among 328 young adult ecstasy users in the UK, and found that less than 30% of males and 40% of females saw any risk (either psychiatric, neuroanatomical, neurochemical, functional dementia or physical) in ecstasy consumption. Moreover, Leung and colleagues (2010) have shown that ecstasy users who perceive health-related risks associated with ecstasy are more likely to diminish their frequency and quantity of ecstasy consumption.

Blacks were more likely than Whites to "perceive ecstasy-related problems in all areas", suggesting that Whites may be more at risk to use ecstasy on more occasions and to persist using ecstasy. Higher levels of education were associated with the classes in which participants perceived more health-related problems due to ecstasy use. As such, those with lower levels of education have a greater likelihood of not perceiving problems related to their ecstasy use which may influence their use of the drug.

Those who had used ecstasy on more occasions were the ones more likely to "perceive problems in all areas." One explanation for this finding might be that most ecstasy users in the other classes who had used ecstasy on fewer occasions had not had the opportunity to experience health-related problems due to ecstasy use. Only analyses of longitudinal data from this sample will clarify if the respondents that "perceived problems in all areas" were the ones more likely to diminish or quit ecstasy use during follow-up. On the other hand, there was a subgroup of respondents that perceived at least some memory and cognitive problems (Class 5) even though they used ecstasy on fewer occasions.

Respondents who "perceived problems in all areas" were more likely to have experienced depressive symptoms as compared to those with "low levels of perceived problems." Notably, participants in this Class were also more likely to have used ecstasy more than 50 times prior to the interview. This is consistent with prior research showing that ecstasy users who have used ecstasy 50 or more times have higher depressive symptom scores compared to people who have used on fewer occasions (Falck, Wang, & Carlson; 2008).

This study has several limitations. First, participants were recruited in one large metropolitan area in the Midwest United States, and the overwhelming majority is of white

ethnicity. Secondly, findings are based on self-reported data. However, there is little reason to believe respondents were not providing the most accurate estimates of drug use possible (Carlson et al., 2005). Findings by Stuerenburg et al. (2002, p. 260) found a 91.3% concordance between self-reported use of ecstasy and levels of MDMA found in hair analysis. In addition, self-reported use of ecstasy does not necessarily mean that MDMA was ingested, because tablets sold as ecstasy may actually contain a wide range of other drugs, (Cole, Bailey, Sumnall, Wagstaff, & King et al., 2002; Hayner, 2002). Notwithstanding these limitations, this study is a valid attempt to identify subgroups of ecstasy users based on their perceptions of perceived risks associated with use of the drug.

In conclusion, this study identified five different subgroups of ecstasy users based on their risk perception. A large proportion of ecstasy users perceive either low or moderate risk associated with their ecstasy use. It is important to further investigate whether lower levels of risk perception are associated with persistence of ecstasy use.

Acknowledgments

Role of funding sources

This study was funded by the National Institute on Drug Abuse, grants R01 DA14488 (P.I.: Carlson) and DA020630 (P.I.: Alexandre). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute on Drug Abuse or the National Institutes of Health.

The authors wish to thank Interviewers Cindy Baker and Darby Schaaf, database manager Linna Li, and Grace P. Lee, MHS, for help in formatting the paper.

References

Ajzen, I.; Fishbein, M. Understanding attitudes and predicting social behavior. Englewood Cliffs, NJ: Prentice Hall; 1980.

Ajzen I. Nature and operation of attitudes. Annual Review of Psychology 2001;52:27–58.

Bachman JG, Johnson LD, O'Malley PM. Explaining recent increases in students' marijuana use: Impacts of perceived risks and disapproval, 1976 through 1996. American Journal of Public Health 1998;88(6):887–892. [PubMed: 9618614]

Baggott MJ. Preventing problems in ecstasy users: Reduce use to reduce harm. Journal of Psychoactive Drugs 2002;34 (2):145–162. [PubMed: 12691205]

Beck, AT.; Steer, RA.; Brown, GK. Beck depression inventory manual. 2. San Antonio, TX: The Psychological Corporation; 1996.

Carlson RG, Falck RS, McCaughan JA, Siegal HA. MDMA/Ecstasy use among young people in ohio: Perceived risk and barriers to intervention. Journal of Psychoactive Drugs 2004a;36(2):181–189. [PubMed: 15369199]

Carlson R, McCaughan J, Falck R, Wang J, Siegal H, Daniulaityte R. Perceived adverse consequences associated with MDMA/ecstasy use among young polydrug users in ohio: Implications for intervention. Int J Drug Policy 2004b;15:265–274.

Carlson RG, Wang J, Falck RS, Siegal HA. Drug use practices among MDMA/ecstasy users in ohio: A latent class analysis. Drug and Alcohol Dependence 2005;79(2):167–179. [PubMed: 16002026]

Cole JC, Bailey M, Sumnall HR, Wagstaff GF, King LA. The content of ecstasy tablets: Implications for the study of their long-term effects. Addiction (Abingdon, England) 2002;97(12):1531–1536.

Cole JC, Sumnall H. Altered states: the clinical effects of Ecstasy. Pharmacology and Therapeutics 2003;98:35–58. [PubMed: 12667887]

Cole J, Sumnall H, Wagstaff G. What is a dose of ecstasy? Journal of Psychopharmacology 2002;16:185–186.

Cottler LB, Womack SB, Compton WM, Ben-Abdallah A. Ecstasy abuse and dependence among adolescents and young adults: Applicability and reliability of DSM-IV criteria. Human Psychopharmacology 2001;16(8):599–606. [PubMed: 12404539]

Curran HV. Is MDMA ('ecstasy') neurotoxic in humans? an overview of evidence and of methodological problems in research. Neuropsychobiology 2000;42 (1):34–41. [PubMed: 10867554]

Curran HV, Travill RA. Mood and cognitive effects of +/− 3,4-methylenedioxymethamphetamine (MDMA, 'ecstasy'): Week-end 'high' followed by midweek low. Addiction (Abingdon, England) 1997;92(7):821–831.

Danseco ER, Kingery PM, Coggeshall MB. Perceived risk of harm from marijuana use among youth in the USA. School Psychology International 1999;20(1):39–56.

Duitsman DM, Colbry SL. Perceived risk and use as predictors of substance use among college students. Health Values 1995;19:44–52.

Falck RS, Wang J, Carlson RG. Depressive symptomatology in young adults with a history of MDMA use: a longitudinal analysis. Journal of Psychopharmacology 2008;22(1):47–54. [PubMed: 18187532]

Gamma A, Jerome L, Liechti ME, Sumnall HR. Is ecstasy perceived to be safe? A critical survey. Drug and Alcohol Dependence 2005;77 (2):185–193. [PubMed: 15664720]

Gonzalez GM, Haney ML. Perceptions of risk as predictors of alcohol, marijuana, and cocaine use among college students. Alcoholism: Clinical and Experimental Research 1990;31:313–318.

Hayner GN. MDMA misrepresentation: An unresolved problem for ecstasy users. Journal of Psychoactive Drugs 2002;34 (2):195–198. [PubMed: 12691209]

Heckathorn DD. Respondent-driven sampling: A new approach to the study of hidden populations. Social Problems 1997;44 (2):174–199.

Heckathorn DD. Respondent-driven sampling II: Deriving valid population estimates from chain-referral samples of hidden populations. Social Problems 2002;49 (1):11–34.

Johnston, LD.; O'Malley, PM.; Bachman, JG.; Schulenberg, JE. Secondary school students. Vol. I. Bethesda, MD: National Institute on Drug Abuse; 2006. Monito ring the future national survey results on drug use, 1975–2005.

Johnston, LD.; O'Malley, PM.; Bachman, JG.; Schulenberg, JE. College students and adults ages 19–45. Vol. II. Bethesda, MD: National Institute on Drug Abuse; 2009. Monitoring the future national survey results on drug use, 1975–2008.

Johnston, LD.; O'Malley, PM.; Bachman, JG.; Schulengerg, JE. Secondary school students. Vol. I. Bethesda, MD: National Institute on Drug Abuse; 2007. Monitoring the future national survey results on drug use, 1975–2006.

Kelly BC. Conceptions of risk in the lives of club drug-using youth. Substance use & Misuse 2005;40(9–10):1443–1459. [PubMed: 16048827]

Leung KS, Ben Abdallah A, Copeland J, Cottler LB. Modifiable risk factors of ecstasy use: Risk perception, current dependence, perceived control, and depression. Addictive Behaviors 2010;35 (3):201–208. [PubMed: 19880258]

Liechti ME, Gamma A, Vollenweider FX. Gender differences in the subjective effects of MDMA. Psychopharmacology 2001;154 (2):161–168. [PubMed: 11314678]

Martins SS, Storr CL, Alexandre PK, Chilcoat HD. Adolescent ecstasy and other drug use in the national survey of parents and youth: The role of sensation-seeking, parental monitoring and peer's drug use. Addictive Behaviors 2008;33(7):919–933. [PubMed: 18355973]

McCaughan JA, Carlson RG, Falck RS, Siegal HA. From "candy kids" to "chemi-kids": A typology of young adults who attend raves in the midwestern united states. Substance use & Misuse 2005;40 (9–10):1503–1523. [PubMed: 16048830]

Morland J. Toxicity of drug abuse--amphetamine designer drugs (ecstasy): Mental effects and consequences of single dose use. Toxicology Letters 2000;112–113:147–152.

Murphy PN, Wareing M, Fisk J. Users' perceptions of the risks and effects of taking ecstasy (MDMA): A questionnaire study. Journal of Psychopharmacology (Oxford, England) 2006;20(3): 447–455.

Murphy PN, Wareing M, Fisk J. Users' perceptions of the risks and effects of taking ecstasy (MDMA): A questionnaire study. Journal of Psychopharmacology (Oxford, England) 2006;20(3): 447–455.

Muthen, LK.; Muthen, BO. M plus 5.1. Los Angeles, CA: 2007.

Nylund KL, Asparouhov T, Muthen BO. Deciding on the number of classes in latent class analysis and growth mixture modeling: A monte carlo simulation study. Structural Equation Modeling 2007;14 (4):535–569.

O'Callaghan FV, O'Callaghan M, Najman JM, Williams GM, Bor W, Alati R. Prediction of adolescent smoking from family and social risk factors at 5 years, and maternal smoking in pregnancy and at 5 and 14 years. Addiction (Abingdon, England) 2006;101(2):282–290.

Smith KM, Larive LL, Romanelli F. Club drugs: Methylenedioxymethamphetamine, flunitrazepam, ketamine hydrochloride, and gamma-hydroxybutyrate. American Journal of Health-System Pharmacy: AJHP: Official Journal of the American Society of Health-System Pharmacists 2002;59(11):1067–1076. [PubMed: 12063892]

StataCorp. Stata statistical software: Release 10.0. College Station, TX: Stata Corporation; 2008.

Stuerenburg HJ, Petersen K, Baumer T, Rosenkranz M, Buhmann C, Thomasius R. Plasma concentrations of 5-HT, 5-HIAA, norepinephrine, epinephrine and dopamine in ecstasy users. Neuro Endocrinology Letters 2002;23 (3):259–261. [PubMed: 12080289]

Substance Abuse and Mental Health Services Administration Office of Applied Studies (SAMHSA). DHHS Publication No. SMA 07-4293, NSDUH Series H-32. Rockville, MD: 2007. Results from the 2006 national survey on drug use and health: National findings.

Tancer M, Johanson CE. Reinforcing, subjective, and physiological effects of MDMA in humans: A comparison with d-amphetamine and mCPP. Drug and Alcohol Dependence 2003;72(1):33–44. [PubMed: 14563541]

Verheyden SL, Henry JA, Curran HV. Acute, sub-acute and long-term subjective consequences of 'ecstasy' (MDMA) consumption in 430 regular users. Human Psychopharmacology 2003;18(7): 507–517. [PubMed: 14533132]

Wang J, Carlson RG, Falck RS, Siegal HA, Rahman A, Li L. Respondent-driven sampling to recruit MDMA users: A methodological assessment. Drug and Alcohol Dependence 2005;78(2):147–157. [PubMed: 15845318]

White HR, McMorris BJ, Catalano RF, Fleming CB, Haggerty KP, Abbott RD. Increases in alcohol and marijuana use during the transition out of high school into emerging adulthood: The effects of leaving home, going to college, and high school protective factors. Journal of Studies on Alcohol 2006;67 (6):810–822. [PubMed: 17060997]

Yacoubian GS Jr, Boyle C, Harding CA, Loftus EA. It's a rave new world: Estimating the prevalence and perceived harm of ecstasy and other drug use among club rave attendees. Journal of Drug Education 2003;33(2):187–196. [PubMed: 12929709]

Table 1

Overall class prevalence and conditional probabilities for perceived health problem items among ecstasy users (N=402).

			Latent Classes				
			C1% (N)	C2% (N)	C3% (N)	C4% (N)	C5% (N)
			21.1 (85)	25.6 (103)	12.4 (50)	28.9 (116)	11.9 (48)
Abbrev.	**Statement**	**Prevalence (%)**	**Conditional probabilities**				
Physical harm	Using ecstasy has been harmful to my physical health.	24.4	34.7	14.1	70.9	12.9	7.8
Mental harm	Using ecstasy has been harmful to my mental health.	21.6	37.5	7.6	73.6	6.1	6.2
Health harm	Using ecstasy has been harmful to my health overall.	24.0	32.7	14.8	83.4	6.6	9.7
Think clearly harm	Taking ecstasy causes long-term harm to a persons ability to think clearly.	38.8	48.0	11.5	100.0	7.5	91.2
Attention harm	Taking ecstasy causes long-term harm to a persons ability to pay attention.	34.8	43.8	5.4	91.2	2.2	97.5
Solve problems harm	Taking ecstasy causes long-term harm to a persons ability to solve problems.	28.8	23.2	1.0	90.3	0.0	100.0
Long-term memory harm	Taking ecstasy causes long-term memory problems.	39.4	67.8	8.9	87.2	0.0	88.5
Remember harm	Taking ecstasy makes it harder for a person to remember things.	43.6	79.3	11.1	90.2	5.2	86.0
Destroys brain cells	Taking ecstasy destroys brain cells.	79.3	75.1	80.3	94.8	65.7	100.0
Memory worse	Taking ecstasy has made my memory worse.	20.9	44.0	2.6	81.6	1.4	2.2
Difficulty concentrating	Taking ecstasy has made it more difficult for me to concentrate.	14.3	23.5	2.1	70.8	0.0	0.0
Difficult think clearly	Taking ecstasy has made it more difficult for me to think clearly.	11.2	12.3	1.0	65.1	0.8	0.0
Sex strangers	When high on ecstasy, people are more likely to have sex with people they would not normally have sex with.	56.3	51.2	86.7	62.6	24.2	73.0
Tablets only MDMA	Tablets sold as ecstasy contain only MDMA and no other drugs.	3.7	0.0	5.2	8.2	2.6	5.6
>1 tablet for bad experience	More than one ecstasy tablet has to be taken to have a bad experience.	5.2	6.9	2.2	11.6	4.4	3.4
Tablet safe MDMA dose	Most of the tablets sold as ecstasy contain a safe dose of MDMA.	31.3	40.6	30.0	17.0	37.9	14.2
No climax	Taking ecstasy makes it difficult for a person to have an orgasm or climax.	27.5	36.0	23.8	43.5	23.0	12.3
No erection	Taking ecstasy makes it difficult for a man to get an erection.	21.3	23.8	23.8	33.8	16.9	8.6
Unsafe sex	When using ecstasy, people are more likely to have unsafe sex.	62.7	67.6	96.8	78.4	18.1	71.3
Sex better	I have used ecstasy to make sex better.	22.9	31.8	24.2	39.0	14.0	9.0
Depression	Taking ecstasy places a person at long-term risk for developing depression.	49.4	60.8	48.0	96.1	24.9	55.5
Sex no condom	After taking ecstasy, a person is more likely to have sex without using a condom, when he/she should have used one.	48.4	41.7	89.2	74.2	1.6	62.6
Worry tablets other drugs	I worry that ecstasy tablets I take may contain some other drug, besides MDMA.	61.1	63.2	59.5	85.1	46.9	70.3

			Latent Classes				
			C1% (N)	C2% (N)	C3% (N)	C4% (N)	C5% (N)
			21.1 (85)	25.6 (103)	12.4 (50)	28.9 (116)	11.9 (48)
Abbrev.	**Statement**	**Prevalence (%)**	**Conditional probabilities**				
More harm than alcohol	Using ecstasy once a month is more harmful to your health than getting drunk once a week.	42.5	34.5	42.3	77.9	32.1	46.2
More harm than tobacco	Using ecstasy once a month is more harmful to your health than smoking 10 or more cigarettes every day.	21.8	14.1	24.9	45.7	12.7	27.2
Use positive	Overall, using ecstasy has had a positive influence in my life.	35.1	41.1	33.9	20.2	45.5	16.9
Use increasing	Among the people I know, ecstasy use is increasing.	48.6	58.1	51.4	58.4	39.2	38.4
Easy to find	It is easy to find ecstasy.	72.2	73.6	60.7	81.2	75.3	77.1
Encourage others to try	I have encouraged people who have never tried ecstasy to take it.	39.6	54.1	34.4	30.4	49.6	9.5
Talk physician	I would feel comfortable talking to my physician about my use of ecstasy.	44.9	46.5	40.5	45.2	45.4	49.6
Talk counselor	I would feel comfortable talking to a counselor about my use of ecstasy.	63.6	60.3	67.2	68.0	62.1	60.6

Table 2

Prevalence and adjusted odds ratio estimates with 95% confidence intervals for class membership and selected characteristics of all lifetime ecstasy users (N=402).

	Class 1 "moderate perceived problems in all areas"		Class 2 "perceived problems on sexual-related items"		Class 3 "perceived problems in all areas"		Class 4 "low level of perceived problems"		Class 5 "perceived memory and cognitive problems"	
	N (%)	**aOR (95%CI)**	**N (%)**	**aOR(95%CI)**	**N (%)**	**aOR(95%CI)**	**N (%)**	**REFERENCE CLASS**	**N (%)**	**aOR(95%CI)**
Gender										
Female	28 (32.9)	1.0	33 (32.0)	1.0	23 (46.0)	1.0	44 (37.9)	---	16 (33.3)	1.0
Male	57 (67.1)	1.4 (0.7, 2.5)	70 (68.0)	1.4 (0.8,2.5)	27 (54.0)	0.9 (0.4,2.8)	72 (62.1)	---	32 (66.7)	1.2 (0.6,2.5)
Age										
Less than 20 years-old	31 (36.5)	1.0	40 (38.8)	1.0	18 (36)	1.0	43 (37.1)	---	14 (29.2)	1.0
20–24 years-old	43 (50.6)	1.0 (0.5,1.8)	51 (49.5)	1.0 (0.6,1.8)	22 (44)	0.7 (0.3,1.7)	60 (51.7)	---	28 (58.3)	1.6 (0.7,3.4)
25 years-old and older	11 (12.9)	1.1 (0.4,2.9)	12 (11.7)	0.8 (0.3,2.2)	10 (20)	1.0 (0.3,3.2)	13 (11.2)	---	6 (12.5)	1.3 (0.4,4.6)
Race/Ethnicity[§]										
White	74 (87.1)	1.0	83 (80.6)	1.0	35 (70.0)	1.0	98 (84.5)	---	38 (79.2)	1.0
Black	7 (8.2)	1.1 (0.3,3.8)	11 (10.7)	1.6 (0.5,5.1)	11 (22.0)	**4.3 (1.3,14.3)**	6 (5.2)	---	8 (16.7)	2.6 (0.8,9.0)
Other	4 (4.7)	0.4 (0.1,1.3)	9 (8.7)	0.8 (0.3,2.1)	4 (8.0)	0.8 (0.3,2.0)	12 (10.3)	---	2 (4.2)	0.5 (0.1,2.4)
Education[§]										
Less than high school	10 (11.8)	1.0	16 (15.5)	1.0	10 (20.0)	1.0	5 (4.3)	---	5 (10.4)	1.0
High school graduate	32 (37.6)	0.4 (0.1,1.3)	35 (34.0)	**0.3 (0.1,0.8)**	19 (38.0)	**0.3 (0.1,0.9)**	43 (37.1)	---	16 (33.3)	0.4 (0.1,1.7)
More than high school	43 (50.6)	0.4 (0.1,1.2)	52 (50.5)	**0.3 (0.1,0.8)**	21(42.0)	0.3 (0.1,1.0)	68 (58.6)	---	27 (56.3)	0.4 (0.1,1.6)
Lifetime Occasions of Ecstasy use[§]										
1–10 times	40 (47.1)	1.0	50 (48.5)	1.0	17 (34.0)	1.0	61 (52.6)	---	32 (66.7)	1.0
11–20 times	17 (20.0)	1.6 (0.7,3.6)	20 (19.4)	1.5 (0.7,3.2)	12 (24.0)	**3.3 (1.2,8.7)**	16 (13.8)	---	9 (18.7)	1.1 (0.4,2.7)
21–49 times	15 (17.6)	1.2 (0.5,2.6)	21 (20.4)	1.2 (0.6,2.6)	7 (14.0)	1.5 (0.5,4.5)	20 (17.2)	---	6 (12.5)	0.5 (0.2,1.5)
50+ times	13 (15.3)	0.9 (0.4,2.2)	12 (11.7)	0.7 (0.3,1.8)	14 (28.0)	**3.0 (1.1, 8.2)**	19 (16.4)	---	1 (2.1)	**0.1 (0.01,0.8)**
Depressive symptoms-BDI[*]										
Minimal (0–13)	60 (70.6)	1.0	82 (79.6)	1.0	26 (52.0)	1.0	98 (84.5)	---	38 (80.9)	1.0
Mild (14–19)	12 (14.1)	2.1 (0.8,5.3)	5 (4.9)	0.6 (0.2,1.9)	8 (16.0)	2.6 (0.9,7.7)	9 (7.8)	---	5 (10.6)	1.3 (0.4,4.4)

	Class 1 “moderate perceived problems in all areas”		Class 2 “perceived problems on sexual-related items”		Class 3 “perceived problems in all areas”		Class 4 “low level of perceived problems”		Class 5 “perceived memory and cognitive problems”	
	N (%)	**aOR (95%CI)**	**N (%)**	**aOR(95%CI)**	**N (%)**	**aOR(95%CI)**	**N (%)**	**REFERENCE CLASS**	**N (%)**	**aOR(95%CI)**
Moderate (20–28)	9 (10.6)	3.2 (1.0, 10.3)	14 (13.6)	**3.5 (1.2,10.5)**	8 (16.0)	**4.7 (1.4,16.6)**	5 (4.3)	---	3 (6.4)	1.6 (0.3,7.4)
Severe (29+)	4 (4.7)	1.6 (0.4,7.0)	2 (1.9)	0.7 (0.1,3.8)	8 (16.0)	7.0 (1.8,27.0)	4 (3.4)	---	1 (2.1)	0.6 (0.1,6.1)

§p<0.05,

*p<.001; two-tailed chi-square test. Note: Class 4 is the reference class; aOR: adjusted Odds Ratios, controlling for all variables in the model.