HHS Public Access

Author manuscript

Am J Addict. Author manuscript; available in PMC 2019 October 01.

Published in final edited form as:

Am J Addict. 2018 October ; 27(7): 578–585. doi:10.1111/ajad.12803.

Trends in DMT and Other Tryptamine Use Among Young Adults in the United States

Joseph J. Palamar, MPH, PhD[1] and **Austin Le, Msc**[1,2]

[1]Department of Population Health, New York University Langone Medical Center, New York, New York

[2]New York University College of Dentistry, New York, New York

Abstract

Background and Objectives—The popularity of tryptamines such as *N,N*-dimethyltryptamine (DMT) appears to be increasing in the United States (US), but epidemiologic literature on prevalence of use is scant. This paper aims to determine trends in prevalence and correlates of past-year tryptamine use among a nationally representative sample of young adults in the US.

Methods—Participants in the National Survey on Drug Use and Health survey were queried about past-year use of tryptamines—specifically DMT, α-methyltryptamine (AMT), and 5-MeO-DIPT ("Foxy"). Data were examined from young adults (ages 18–25), years 2007–2014 (N = 144,787). Linear trends in prevalence of past-year tryptamine use were examined in the full sample and stratified by specific demographic and drug use characteristics.

Results—Tryptamine use is rare, but increased from .2% in 2007/08 to .7% in 2013/14, a 273% relative increase ($p < .001$). While prevalence increased among all demographic groups, prevalence was substantially higher among individuals who use other drugs. In particular, between 2007/08 and 2013/14, prevalence of tryptamine use increased among past-year ecstasy users (from 2.1% to 10.0%) and LSD users (from 7.0% to 15.5%) ($ps < .01$). Prevalence of tryptamine use tended to be higher among lifetime and past-year users of psychedelic drugs compared to users of non-psychedelic drugs.

Conclusion—While tryptamine use is not prevalent in the general young adult population, prevalence is increasing. Users of various other drugs—particularly drugs with psychedelic effects—report higher prevalence of tryptamine use.

Scientific Significance—Users of other drugs can be targeted when disseminating information about tryptamines to ensure user safety. (Am J Addict 2018;27:578–585)

Address correspondence to Palamar, Department of Population Health, New York University Langone Medical Center, 180 Madison Avenue, Room 1752, New York, NY 10016., Joseph.Palamar@nyulangone.org.

Declaration of Interest

The authors declare no conflict of interest. The authors alone are responsible for the content and writing of this paper.

BACKGROUND AND OBJECTIVES

Tryptamine is a monoamine alkaloid structurally similar to tryptophan (an amino acid) and found in various plants, fungi, and the mammalian brain in trace amounts. Naturally occurring tryptamines such as *N,N*-dimethyltryptamine (DMT), found in *Psychotria viridis* leaves and commonly used to make ayahuasca, have long been exploited by indigenous Amazonian tribes for their capacity to produce profound psychedelic and hallucinogenic effects. More recently, ceremonial use of psychedelic concoctions, including ayahuasca, have gained popularity in the United States (US) for reasons such as perceived natural healing or personal and spiritual growth, and religious sacrament.[–] While synthetic versions of DMT and other psychedelic tryptamines such as α-methyltryptamine (AMT) also exist and have been used for over half a century, dozens of newer tryptamines have been discovered and continue to be discovered.[,] Indeed, it appears that many of these tryptamines (eg, 5-MeO-DMT, 4-AcO-DMT) have emerged or re-emerged in the recreational drug space as the next-generation drugs projected to grow in popularity alongside more common psychedelics such as LSD.[,]

While naturally occurring tryptamines are also available as dried or brewed mushrooms for oral ingestion, synthetic derivatives are typically sold in tablet or powder form, and can be consumed by inhalation (smoking), ingestion (swallowing), insufflation (snorting), or intravenous injection.[,] Most tryptamines and their derivatives are classified as Schedule I drugs in the US, though legislation protecting the religious use of ayahuasca was implemented in 2006 under the Religious Freedom Restoration Act.

Recent evidence suggests that the popularity of psychedelic tryptamines is on the rise. For example, previous reports focusing on use of new psychoactive substances (NPS) and other uncommon substances found that DMT and other tryptamines are common among NPS users in nationally representative samples, as well as high-risk drug-using populations such as nightclub attendees in the US.[,] Similarly, data derived from the Global Drug Survey, a self-selected online sample, showed that a larger proportion (24%) of DMT users in 2012 were identified as new users (measured by the ratio of users for whom DMT was the last new drug used versus those who reported lifetime DMT use) when compared to users of other drugs with psychedelic effects (ie, ketamine, LSD, magic mushrooms [psilocybin]), which may be indicative of increasing prevalence. Furthermore, survey respondents reported DMT as having the most desirable effect profile of the four psychedelics queried, largely attributable to a rapid onset of action and low levels of reported negative effects while high. More generally, the wide availability of and ease of access to tryptamines on the internet, and among specific populations (eg, individuals whofrequent raves or nightclubs), may have further facilitated the re-emergence in popularity of psychedelic tryptamines.[,] Anecdotal evidence from mainstream media outlets has also often alluded to the growing popularity of DMT.[,]

Despite growing popularity, the epidemiologic literature on psychedelic tryptamines is currently scant, and little is known about prevalence and correlates of use as it pertains to the American population. The aforementioned study based on the Global Drug Survey, taken mainly by individuals who use drugs, estimated that lifetime and past-year prevalence of

DMT use in 2012 were 8.9% and 5%, respectively, but these findings are not necessarily representative of the US population nor generalizable to the overall population. In the US, there were over 10,500 total seizures of tryptamines between 2011 and 2015, though the annual number of seizures has decreased from 4,046 in 2011 to 1,066 in 2015. However, seizure data typically cannot be used to adequately estimate prevalence of use. Data based on hospitalizations and poisonings related to tryptamines are also scant and similarly limited in their capacity to estimate use, though one recent study noted a significant increase in ayahuasca-related calls to poison centers throughout the US between 2005 and 2015.

In short, seizure data and data from self-reports via convenience samples are informative but limited. Data on self-reported use from a repeated cross-sectional representative survey of adults would better allow us to estimate trends in prevalence of use and detect groups who are more or less likely to use. Accordingly, this study examines trends in use of tryptamines in nationally representative samples of young adults in the US to help address a dearth in research and ensure that those most likely to use can be adequately targeted by providing information about this expanding group of psychedelic substances.

METHODS

Procedure

The National Survey on Drug Use and Health (NSDUH) is a nationally representative cross-sectional survey of non-institutionalized individuals ages 12 and older in the 50 US states and the District of Columbia every year. The sampling frame is obtained via four stages. Surveys are administered via computer-assisted interviewing conducted by an interviewer, and audio computer-assisted self-interviewing is utilized to increase honest reporting. Sample weights were provided by NSDUH to address unit- and individual-level non-response and to produce nationally representative estimates. Additional methodology of this study can be found elsewhere. We focused on data from the last eight available cohorts (2007–2014) during which question wording was consistent across years. Cohorts were aggregated into pairs (ie, 2007/08, 2009/10, 2011/12, 2013/14) to increase power. We also limited analyses to young adults (ages 18–25) as prevalence of the main outcome variable (tryptamine use) was too rare among younger and older age groups. The analytic sample was 144,787 young adults. Weighted interview response rates ranged from 71.2% to 73.9%.

Measures

Past-year use of DMT and other tryptamines was queried via a single item including three tryptamines. Specifically, participants were asked, “Have you ever, even once, used any of the following: DMT, also called dimethyltryptamine, AMT, also called alpha-methyltryptamine, or Foxy, also called 5-MeO-DIPT?” Those answering affirmatively were then asked, “Earlier, the computer recorded that you have used DMT, AMT, or Foxy. How long has it been since you last used any of these drugs?” Answer options were “Within the past 30 days,” “More than 30 days ago, but within the past 12 months,” and “More than 12 months ago.” Responses were coded to indicate whether past-year use was reported. Participants were also asked about lifetime and past-year use of cannabis, cocaine, LSD, ecstasy, ketamine, heroin, and nonmedical use of opioids. Participants were also asked if

they ever used psilocybin (mushrooms), peyote, or mescaline in their lifetime. While these drug use variables were all examined as binary variables, we also computed count variables indicating number of other drugs reportedly used in one's lifetime and in the past year. With regard to demographic characteristics, participants were asked their sex, race/ethnicity, education, and annual family income.

Analyses

Prevalence of past-year use of DMT and other tryptamines over time was first estimated. Similar to previous epidemiologic studies,[7] to increase power in light of a rare outcome, we analyzed years by pairs (ie, 2007/08, 2009/10, 2011/12, 2013/14) to detect potential changes over time and linear trends. We computed both the absolute and relative change (ie, percentage) in prevalence from 2007/08 to 2013/14 for overall tryptamine use and then stratified by each level of each covariate; we then estimated whether there were linear time trends.

While trends were the main focus of this analysis, we also examined overall correlates of past-year use while controlling for secular trends and/or cohort effects (utilizing aggregated data for all cohorts). We first computed unadjusted odds ratios (ORs) for each covariate and then fit all covariates into two multivariable logistic regression models. The first model contained all demographic covariates plus variables indicating lifetime use (ever-use) of the ten other drugs. The second model contained all demographic covariates plus variables indicating past-year use of seven other drugs. Past-year use was not queried for psilocybin, peyote, or mescaline, which is why these three drugs could not be included in the second model. These two models produced adjusted ORs (aORs) for each covariate which represent the odds with all else being equal. We confirmed that multicollinearity was not present in these multivariable models with no covariate reaching a variance inflation factor of 2.0. Since typtamine use in relation to use of other drugs was a major focus of this study, we also examined descriptive statistics for the sum variables indicating number of other drugs used in one's lifetime and in the past year. Specifically, we estimated the prevalence of tryptamine use among those reporting no lifetime or past-year other drug use, and we examined measures of central tendency (ie, mean, median, mode) to describe the average number of other drugs reportedly used.

Analyses were weighted to account for the complex survey design. Since data were used from eight cohorts, survey weights were divided by eight to obtain nationally representative estimates. Data were analyzed using Stata 13 SE (StataCorp LP, 2013, College Station, TX), and Taylor series estimation methods were used to provide accurate standard errors. This secondary analysis was exempt for review by the New York University Langone Medical Center Institutional Review Board.

RESULTS

There was a linear increase in prevalence of DMT and other tryptamine use from .2% in 2007/08 to .7% in 2013/14, a 273% relative increase ($p < .001$). Table 1 presents differences over time and trends in prevalence stratified by each level of each covariate. Prevalence within all levels of sex, race/ethnicity, education, and family income significantly increased

over time. While prevalence among females increased 539.1% from .0% to .3% ($p < .001$), males experienced a 232.3% increase in prevalence from .3% to 1.1% ($p < .001$). Among individuals of each race/ethnicity, prevalence at least doubled ($ps < .05$), and white individuals are estimated to have had the highest prevalence of all races in 2013/14 at .9%. Individuals with less than a college degree reported higher prevalence of use in 2013/14 than those with a college degree, but prevalence did increase 517.6% over time among those with at least a college degree ($p = .019$). Prevalence also more than doubled among individuals earning less than or more than $20,000 per year.

Prevalence of DMT and other tryptamine use significantly increased across time among lifetime and past-year users of cannabis, cocaine, LSD, ecstasy, and opioids ($ps < .01$). Of note, prevalence increased among past-year LSD users from 7.0% to 15.5% ($p = .001$), and prevalence increased among past-year ecstasy users from 2.1% to 10.0% ($p < .001$). Although prevalence of past-year use did not increase significantly in a linear manner, it should be noted that almost three out of ten (28.2%) past-year ketamine users are estimated to have used DMT or other tryptamines in 2013/14. Prevalence of use did increase, however, among lifetime ketamine users ($p < .001$) and among lifetime heroin users ($p = .010$). Prevalence also increased exponentially among lifetime users of psilocybin, peyote, and mescaline ($ps < .01$). Specifically, DMT and other tryptamine use increased from 1.2% to 6.0% among psilocybin users, from 2.5% to 11.2% among peyote users, and from 3.3% to 15.9% among mescaline users.

As shown in Table 2, females were consistently at less than half the odds of males for reporting tryptamine use, and those a college degree or higher were consistently at about half the odds of reporting use compared to those with less than a high school education. Individuals identifying as black and those with an annual family income of >$20,000 also tended to be at low odds for reporting use. With regard to lifetime and past-year use of other drugs, each drug was associated with robust increases in odds of reporting tryptamine use. In the multivariable models, with all else being equal, lifetime use of marijuana, LSD, ecstasy, ketamine, psilocybin, and mescaline were all associated with increased odds of reporting tryptamine use; however, lifetime use of cocaine, heroin, peyote, and nonmedical use of opioids lost significance. With regard to past-year use of other drugs, use of marijuana, LSD, ecstasy, ketamine, heroin, and nonmedical use of opioids remained significant correlates of tryptamine use. Past-year cocaine use, however, was no longer significant in the model.

Finally, with regard to polydrug use, we estimate that only .04% ($n = 3$) of tryptamine users have not engaged in lifetime use of any of the other drugs examined, and an estimated 1.9% ($n = 15$) of tryptamine users have not engaged in past-year use of any of the other drugs examined. Tryptamine users, on average, used six other drugs in their lifetime (mean = 5.6 [SE = .1], median = 6, mode = 6) and 2–3 other drugs in the past year (mean = 3.2 [SE = .1], median = 3, mode = 2).

DISCUSSION

DMT and other tryptamines appear to have emerged or re-emerged in recent years, and there is a general sense that their popularity will continue to grow,” though no previous studies

have examined trends in prevalence of use among the general American population. In this study, we examined overall prevalence and correlates of use of DMT and other tryptamines in representative samples of young adults in the US from 2007/08 through 2013/14. We estimate that the prevalence of use of DMT and other tryptamines has increased in linear fashion between 2007/08 and 2013/14, more than tripling from .2% to .7%.

While we determined that prevalence increased across all demographic groups, prevalence across each demographic group was still relatively rare. The only exception was that 1.1% of males are currently estimated to be users. Other studies have also previously reported that tryptamine users are significantly more likely to be male,[9] and findings from a previous study indicated that males are more likely than females to be exposed to or hospitalized from use of tryptamines. While we alsofound that the majority of tryptamine users each year were male, it is worth noting that prevalence of use among female users actually increased by more than fivefold, suggesting that females may be “catching up” to males.

With regard to socioeconomic status and race/ethnicity, a notably large increase in prevalence occurred among those with a college degree. However, college-educated individuals are still less likely to use than individuals with lower levels of education. Another study focusing on NSDUH data found that individuals who had ever used a psychedelic tended to be more educated than those who had never used a psychedelic; however, the differences in that study appear to have been driven by those who had only attended some college. Prevalence of use also more than doubled among those in both family income groups and across all race/ethnicity categories. However, black individuals and those with family income of >$20,000 per year are still less likely to use tryptamines (than white individuals and those of lower income, respectively) despite large relative increases in prevalence over time. As tryptamine use continues to grow in popularity, more research is needed to determine how demographic and socioeconomic factors relate to use in order to better target education or safety measures for those most likely to use.

The most robust and consistent finding in this study was that tryptamine use tends to be highly prevalent among individuals who use other drugs. Prevalence of tryptamine use increased over time in particular among individuals who use cannabis, cocaine, LSD, ecstasy, and/or opioids. However, with all else being equal, cocaine, heroin, and nonmedical opioid use were not as strongly related to use as drugs that are psychedelic or hallucinogenic in nature. Previous studies have also suggested that tryptamine use is significantly more likely among users of other drugs, especially psychedelics.[9] For example, among lifetime tryptamine users, it has been estimated that four out of five (80.5%) have used ecstasy, and three out of four (76.1%) have used LSD. Our results also show that the prevalence of tryptamine use among individuals who reported using LSD in the past year more than doubled to nearly 16%, and quintupled to 10% among past-year ecstasy users. Prevalence also increased exponentially among individuals who reported ever using psilocybin, peyote, or mescaline, which are psychoactive hallucinogenic compounds found in various species of mushrooms or cacti. With regard to polydrug use, we estimate that use of multiple drugs is so common among tryptamine users that only .04% of tryptamine users have not engaged in lifetime use any of the other drugs examined, and only 1.9% of tryptamine users have not engaged in past-year use of any of the other drugs examined. Tryptamine users, on average,

used six other drugs in their lifetime and 2–3 other drugs in the past year. Thus, we confirm that tryptamine use is strongly linked to use of other drugs and that individuals who have not used (multiple) other drugs appears to be rare. In summary, while prevalence of tryptamine use is increasing across demographic groups, tryptamine use is becoming particularly prevalent among individuals who use other drugs, suggesting that DMT and/or other tryptamines is increasingly being added individuals' drug repertoires. Therefore, we believe that researchers could target individuals who use other drugs, particularly those who use traditional psychedelics, in order to acquire a more in depth knowledge about current use of psychedelic tryptamines—especially newly emergent analogs about which both users and researchers alike often know very little.

Furthermore, tracking trends in use remains important, in part, because relatively little is definitively known about the potential dangers or extent of harm stemming from frequent or long-term tryptamine use, with current evidence largely being limited to case studies or reports from poison centers. For example, although ritualistic ayahuasca use has typically been reported as safe and free from major adverse effects, the number of ayahuasca-related calls to poison centers in the US over the past decade has been rising, with commonly cited clinical effects including tachycardia, hypertension, and mydriasis. And, although rare, 5% or less of the cases involved endotracheal intubation, seizures, cardiac arrest, and respiratory arrest. Synthetic tryptamines such as Foxy have also been associated with toxicity and hospitalizations and are generally regarded as being less safe than plant-derived tryptamines. In addition, it is well-known that individuals who use multiple drugs concomitantly are at often at risk for more adverse health outcomes, including overdose. While current (past-month) use was not examined in this study, results suggest that concomitant use of tryptamines with other drugs may be occurring among some individuals, which may place such users at higher risk for experiencing adverse outcomes. Consequently, the rise in tryptamine use among this population warrants additional monitoring and surveillance, especially as novel tryptamines continue to emerge.

Limitations

NSDUH only surveyed individuals living in households and non-institutionalized group quarters (eg, dormitories, shelters) and from civilians residing at military bases. Homeless individuals who do not use shelters are excluded, as are military personnel on active duty, and residents of institutional group quarters, such as hospitals and jails. Consequently, exclusion of certain populations may affect the generalizability of results. Prevalence was rare so we had to pair years for analyses in order to increase power. NSDUH changed wording (and order) of some questions in 2015 so we did not include more recent cohorts in order to maintain consistency across questions. NSDUH only queried tryptamine use via a single item asking about use of three different compounds. While most tryptamine use is likely in fact DMT, dozens of other tryptamines are available and thus overall tryptamine use in the population is likely slightly underestimated.

Ayahuasca was not specifically mentioned or queried in any NSDUH questions so we believe exposure to DMT via ayahuasca is likely underreported. We believe the majority of self-reported DMT use relates to use of synthetic DMT as the survey did not specifically ask

about ayahuasca use. We therefore strongly caution interpretation of these trends as they may not be generalizable to individuals who have used ayahuasca, but have not used synthetic DMT. Finally, we limited our analyses to adults ages 18–25 because use among younger and older age groups pre-defined by NSDUH was too rare to examine. We do not believe limiting analyses to young adults limited our findings because previous research has determined that the mean age of those exposed to or hospitalized from use of tryptamines is 19, with nearly nine out of ten poisonings occurring among individuals younger than age 21. Thus, we believe our analyses focused on the most relevant age group; however, more research is indeed needed tofocus on other age groups as well as prevalence of use increases.

CONCLUSION AND SCIENTIFIC SIGNIFICANCE

While tryptamine use is not highly prevalent in the general young adult population, prevalence is increasing. In particular, individuals who use various other drugs report high prevalence of past-year psychedelic tryptamine use. Since concomitant use of drugs can place individuals at increased risk for experiencing adverse outcomes, individuals who use other drugs should be educated on the importance of avoiding combining other drugs with various tryptamines. Further research is also needed to determine whether popularity of use of DMT and other tryptamines is related to the recent increase in popularity of ayahuasca in the US. Ayahuasca is increasingly promoted online and in the media, while ayahuasca retreats and local plant medicine ceremonies are becoming more commonplace in the US. We believe that users and potential users of any synthetic tryptamine or natural tryptamine-containing concoction should be educated about the drug effects being dependent on the drug, user mindset, and environment, and that users should ensure that they limit or appropriately gauge their doses, avoid co-use of other drugs, avoid adulterants or potential drug replacements, and limit use to safe environments. Continuing to track patterns of use of newly emerging or re-emerging drugs such as tryptamines is important in order to inform prevention, safe use, or harm reduction where necessary.

Acknowledgments

Research reported in this publication was supported by the National Institute on Drug Abuse of the National Institutes of Health under Award Number K01DA038800 (PI: Palamar).

The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. The authors would like to thank the Inter-university Consortium for Political and Social Research for providing access to these data (http://www.icpsr.umich.edu/icpsrweb/landing.jsp).

REFERENCES

1. Tittarelli R, Mannocchi G, Pantano F, et al. Recreational use, analysis and toxicity of tryptamines. Curr Neuropharmacol. 2015;13:26–46. [PubMed: 26074742]
2. McKenna DJ. Clinical investigations of the therapeutic potential of ayahuasca: Rationale and regulatory challenges. Pharmacol Ther. 2004;102:111–129. [PubMed: 15163593]
3. Dorsen C, Palamar J, Shedlin MG. Ceremonial ‘plant medicine’ use and its relationship to recreational drug use: An exploratory study. Addict Res Theory. 2018;1–8. in press.
4. Harris R, Gurel L. A study of ayahuasca use in North America. J Psychoactive Drugs. 2012;44:209–215. [PubMed: 23061320]

5. Halpern JH, Sherwood AR, Passie T, et al. Evidence of health and safety in American members of a religion who use a hallucinogenic sacrament. Med Sci Monit. 2008;14:Sr15–Sr22. [PubMed: 18668010]

6. European Monitoring Centre for Drugs and Drug Addiction and Eurojust. New psychoactive substances in Europe. An update from the EU Early Warning System (March 2015). Publications Office of the European Union, Luxembourg: EMCDAA-Eurojust joint publication; 2015.

7. Araujo AM, Carvalho F, Bastos Mde L, et al. The hallucinogenic world of tryptamines: An updated review. Arch Toxicol. 2015;89:1151–1173. [PubMed: 25877327]

8. Palma-Conesa AJ, Ventura M, Galindo L, et al. Something new about something old: A 10-year follow-up on classical and new psychoactive tryptamines and results of analysis. J Psychoactive Drugs. 2017;49:297–305. [PubMed: 28569652]

9. Corkery JM, Durkin E, Elliott S, et al. The recreational tryptamine 5-MeO-DALT (N,N-diallyl-5-methoxytryptamine): A brief review. Prog Neuro-Psychopharmacol Biol Psychiatry. 2012;39:259–262.

10. Kjellgren A, Soussan C. Heaven and hell—A phenomenological study of recreational use of 4-HO-MET in Sweden. J Psychoactive Drugs. 2011;43:211–219. [PubMed: 22111404]

11. US Drug Enforcement Administration. Drugs of Abuse: A DEA Resource Guide. Drug Enforcement Administration, US Department of Justice; 2017.

12. Bullis RK. The “vine of the soul” vs. the controlled substances act: Implications of the hoasca case. J Psychoactive Drugs. 2008;40:193–199. [PubMed: 18720669]

13. Palamar JJ, Martins SS, Su MK, et al. Self-reported use of novel psychoactive substances in a US nationally representative survey: Prevalence, correlates, and a call for new survey methods to prevent underreporting. Drug Alcohol Depend. 2015;156:112–119. [PubMed: 26377051]

14. Palamar JJ, Barratt MJ, Ferris JA, et al. Correlates of new psychoactive substance use among a self-selected sample of nightclub attendees in the United States. Am J Addict. 2016;25:400–407. [PubMed: 27419383]

15. Palamar JJ, Acosta P, Sherman S, et al. Self-reported use of novel psychoactive substances among attendees of electronic dance music venues. Am J Drug Alcohol Abuse. 2016;42:624–632. [PubMed: 27315522]

16. Winstock AR, Kaar S, Borschmann R. Dimethyltryptamine (DMT): Prevalence, user characteristics and abuse liability in a large global sample. J Psychopharmacol. 2014;28:49–54. [PubMed: 24284475]

17. Jovel A, Felthous A, Bhattacharyya A. Delirium due to intoxication from the novel synthetic tryptamine 5-MeO-DALT. J Forensic Sci. 2014;59:844–846. [PubMed: 24329118]

18. Musselman ME, Hampton JP. “Not for human consumption”: A review of emerging designer drugs. Pharmacotherapy 2014;34:745–757. [PubMed: 24710806]

19. Levy A. The Drug of Choice for the Age of Kale. The New Yorker 2016.

20. Scaccia A. What Psychedelics Really Do to Your Brain. Rolling Stone. 2017.

21. US Drug Enforcement Administration. 2C-Phenethylamines, Piperazines, and Tryptamines Reported in NFLIS, 2011–2015. Springfield, VA: US DEA, Diversion Control Division; 2017.

22. Heise CW, Brooks DE. Ayahuasca exposure: Descriptive analysis of calls to US poison control centers from 2005 to 2015. J Med Toxicol. 2017;13:245–248. [PubMed: 27896660]

23. Center for Behavioral Health Statistics and Quality. 2014 National Survey on Drug Use and Health: Methodological summary and definitions. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2015.

24. Han BH, Sherman S, Mauro PM, et al. Demographic trends among older cannabis users in the United States, 2006–13. Addiction. 2017;112:516–525. [PubMed: 27767235]

25. Jones CM, Logan J, Gladden RM, et al. Vital signs: Demographic and substance use trends among heroin users—United States, 2002–2013. MMWR Morb Mortal Wkly Rep 2015;64:719–725. [PubMed: 26158353]

26. Heeringa SG, West BT, Berglund PA. Applied Survey Data analysis. London: Chapman and Hall; 2010.

27. Sutherland R, Peacock A, Whittaker E, et al. New psychoactive substance use among regular psychostimulant users in Australia, 2010–2015. Drug Alcohol Depend. 2016;161:110–118. [PubMed: 26880592]

28. Maxwell JC. Psychoactive substances—Some new, some old: A scan of the situation in the U.S. Drug Alcohol Depend. 2014;134:71–77. [PubMed: 24140401]

29. Krebs TS, Johansen P. Psychedelics and mental health: A population study. PLoS ONE. 2013;8.

30. Cakic V, Potkonyak J, Marshall A. Dimethyltryptamine (DMT): Subjective effects and patterns of use among Australian recreational users. Drug Alcohol Depend. 2010;111:30–37. [PubMed: 20570058]

31. Fernandez-Calderon F, Cleland CM, Palamar JJ. Polysubstance use profiles among electronic dance music party attendees in New York City and their relation to use of new psychoactive substances. Addict Behav. 2018;78:85–93. [PubMed: 29128711]

32. Cunningham N. Hallucinogenic plants of abuse. Emerg Med Austral. 2008;20:167–174.

33. Barbosa PC, Strassman RJ, da Silveira DX, et al. Psychological and neuropsychological assessment of regular hoasca users. Compr Psychiatry. 2016;71:95–105. [PubMed: 27653781]

34. Smolinske SC, Rastogi R, Schenkel S. Foxy methoxy: A new drug of abuse. J Med Toxicol. 2005;1:23–25.

35. Martins SS, Sampson L, Cerdá M, et al. Worldwide prevalence and trends in unintentional drug overdose: A systematic review of the literature. Am J Public Health. 2015;105:e29–e49.

TABLE 1.

Trends in prevalence of past-year use of DMT and other tryptamines

	2007–2008	2009–2010	2011–2012	2013–2014	% Absolute change from 2007–2008 to 2013–2014	% Relative change from 2007–2008 to 2013–2014	*p*-value
Prevalence (full sample)	.2	.4	.6	.7	.5	273.1	<.001
Prevalence by covariate							
Sex							
Male	.3	.5	.9	1.1	.7	232.3	<.001
Female	.0	.2	.2	.3	.3	539.1	<.001
Race/ethnicity							
Non-Hispanic White	.2	.5	.7	.9	.6	260.8	<.001
Black	.0	.0	.1	.2	.1	448.9	.030
Hispanic	.1	.3	.4	.6	.5	458.0	.015
Other	.2	.2	.3	.5	.3	198.3	.014
Education							
<High school	.2	.4	.4	.7	.5	284.7	.007
High school diploma	.1	.4	.6	.7	.6	469.1	<.001
Some college	.3	.3	.7	.8	.5	171.4	<.001
College or more	.1	.2	.2	.3	.3	517.6	.019
Annual household income							
<$20,000	.2	.4	.6	.7	.5	253.1	<.001
>$20,000	.1	.2	.5	.4	.3	353.8	<.001
Other drug use							
Marijuana							
Lifetime	.3	.7	1.0	1.3	.9	271.0	<.001
Past-year	.6	1.1	1.6	2.0	1.4	231.7	<.001
Cocaine							
Lifetime	.9	1.7	2.9	4.1	3.2	376.7	<.001
Past-year	1.4	2.7	5.3	6.5	5.1	366.9	<.001
LSD							

	2007–2008	2009–2010	2011–2012	2013–2014	% Absolute change from 2007–2008 to 2013–2014	% Relative change from 2007–2008 to 2013–2014	*p*-value
Lifetime	1.8	3.4	6.2	7.4	5.6	301.6	<.001
Past-year	7.0	10.6	12.7	15.5	8.5	122.4	.001
Ecstasy							
Lifetime	1.0	2.2	3.3	4.6	3.6	351.0	<.001
Past-year	2.1	5.0	7.2	10.0	7.8	366.4	<.001
Ketamine							
Lifetime	3.2	7.3	10.3	11.2	8.0	250.0	<.001
Past-year	19.7	27.3	20.0	28.2	8.5	43.1	.369
Opioids (nonmedical)							
Lifetime	.6	1.2	1.7	2.4	1.7	272.1	<.001
Past-year	1.0	1.7	2.1	4.1	3.1	315.5	<.001
Heroin							
Lifetime	2.3	4.8	6.0	7.5	5.1	218.8	.010
Past-year	6.6	7.0	10.4	13.3	6.7	102.1	.139
Psilocybin (mushrooms)							
Lifetime	1.2	2.4	4.5	6.0	4.9	420.7	<.001
Peyote							
Lifetime	2.5	6.9	8.7	11.2	8.7	353.4	.001
Mescaline							
Lifetime	3.3	9.6	13.5	15.9	12.6	387.7	<.001

p-value is for linear trend for each subsequent year from 2006/2007 as the comparison.

TABLE 2.

Correlates of past-year use of DMT and other tryptamines

	Unadjusted models OR (95% CI)	Model 1 aOR (95% CI)	Model 2 aOR (95% CI)
Survey year Sex	1.49 (1.35, 1.65)***	1.56 (1.40, 1.74)***	1.49 (1.33, 1.68)***
Male	1.00	1.00	1.00
Female	.27 (.21, .33)***	.43 (.34, .56)***	.40 (.32, .52)***
Race/ethnicity			
Non-Hispanic White	1.00	1.00	1.00
Black	.14 (.07, .27)***	.48 (.23, 1.03)	.26 (.13, .55)***
Hispanic	.66 (.47, .93)*	1.27 (.91, 1.77)	1.16 (.81, 1.67)
Other	1.04 (.64, 1.70)	.99 (.67, 1.48)	.69 (.42, 1.15)
Education			
<High school	1.00	1.00	1.00
High school diploma	1.19 (.88, 1.61)	1.34 (.97, 1.85)	1.16 (.83, 1.61)
Some college	1.33 (.94, 1.86)	1.43 (1.00, 2.04)	1.14 (.82, 1.60)
College or more	.45 (.26, .77)**	.55 (.31, .98)*	.50 (.28, .89)*
Annual household income			
<$20,000	1.00	1.00	1.00
>$20,000	.55 (.40, .75)***	.41 (.29, .56)***	.70 (.83, 1.62)
Lifetime drug use			
Marijuana	63.90 (29.79, 137.05)***	10.40 (4.57, 23.65)***	–
Cocaine	14.48 (10.99, 19.09)***	.97 (.65, 1.45)	-
LSD	34.26 (25.89, 45.33)***	2.98 (2.08, 4.28)***	-
Ecstasy	26.66 (20.12, 35.31)***	2.64 (1.80, 3.87)***	-
Ketamine	25.94 (19.86, 33.88)***	1.94 (1.43, 2.65)***	-
Opioids (nonmedical)	9.72 (7.49, 12.61)***	1.25 (.90, 1.72)	-
Heroin	15.71 (11.88, 20.79)***	1.03 (.77, 1.39)	-
Psilocybin	35.13 (26.49, 46.59)***	3.63 (2.48, 5.32)***	-

	Unadjusted models	Model 1	Model 2
	OR (95% CI)	aOR (95% CI)	aOR (95% CI)
Peyote	19.55 (14.81, 25.81)***	1.20 (.86, 1.68)	-
Mescaline	33.62 (26.11, 43.28)***	2.08 (1.51, 2.86)***	-
Past-year drug use			
Marijuana	32.70 (22.21, 48.14)***	-	10.16 (6.69, 15.44)***
Cocaine	15.04 (11.54, 19.61)***	-	1.17 (.79, 1.71)
LSD	55.81 (45.46, 68.51)***	-	5.22 (4.02, 6.78)***
Ecstasy	31.99 (25.75, 39.75)***	-	3.97 (2.80, 5.64)***
Ketamine	84.48 (62.58, 114.05)***	-	5.79 (3.83, 8.76)***
Opioids (nonmedical)	8.31 (6.73, 10.27)***	-	1.45 (1.09, 1.91)*
Heroin	28.17 (19.07, 41.62)***	-	2.26 (1.32, 3.86)**

Unadjusted models do not control for other covariates. The multivariable models (Models 1 and 2) adjust for all covariates entered into the models. Survey year was entered as a continuous variable. OR, odds ratio; aOR, adjusted OR; CI, confidence interval.

* $p < .05$,

** $p < .01$,

*** $p < .001$.

Am J Addict. Author manuscript; available in PMC 2019 October 01.