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Attitudes and Beliefs About New Psychoactive Substance Use Among Electronic Dance Music Party Attendees

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Abstract

Background—Attitudes and beliefs about drug use have been shown to be robust correlates of use of drugs such as alcohol, marijuana, and cocaine; however, little is known regarding attitudes or beliefs about new psychoactive substances (NPS). We sought to examine attitudes and beliefs about NPS and how they relate to self-reported use in a high-risk population—electronic dance music (EDM) party attendees.

Method—1,048 individuals (age 18–40) were surveyed entering EDM parties in New York City in 2016. We queried lifetime use and attitudes and beliefs specific to NBOMe, 2C series drugs, “bath salts” (synthetic cathinones), tryptamines, dissociative NPS, and synthetic cannabinoids.

Results—More than half the sample reported being unfamiliar with NPS other than “bath salts” and synthetic cannabinoids. “Bath salts” received the highest ratings of strong disapproval (34.3%), followed by synthetic cannabinoids (23.3%), compared to other NPS (10–14%). “Bath salts” were perceived to be a great risk by 43.1% of the sample, followed by synthetic cannabinoids (27.0%), and other NPS (12–16%). “Bath salts” were reportedly least likely to be used if offered (2.9%). In multivariable models, reporting no disapproval towards use was associated with increased odds of reporting use of 2C drugs, “bath salts”, and tryptamines. Having friends who use and reporting intent to use or willingness to use if offered were also associated with use of various NPS classes.

Conclusions—This study delineated attitudinal and belief-related correlates of use of various NPS classes. Results can inform prevention effects as NPS continue to emerge.

Keywords

New psychoactive substances; attitudes; beliefs; social norms

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Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

Introduction

In recent years, the use of new psychoactive substances (NPS) has become a public health issue in the US and throughout much of the world (American Association of Poison Control Centers, 2015a, 2015b; European Monitoring Centre for Drugs and Drug Addiction, 2015; Law, Schier, Martin, Chang, & Wolkin, 2015). Hundreds of NPS have emerged in recent years (European Monitoring Centre for Drugs and Drug Addiction, 2015; US Drug Enforcement Administration, 2016); however, surveys rarely query use of such substances, so little is known about prevalence or correlates of use. Studies are needed to examine attitudes and beliefs about NPS and their relation to use of various classes of NPS as better understanding of attitudes and beliefs about NPS can inform prevention—especially in high-risk populations.

Perception of risk of harming oneself from use of various drugs has been assessed by Monitoring the Future (MTF), an annual nationally representative survey of high school students in the US, every year since 1975 (Miech, Johnston, O'Malley, Bachman, & Schulenberg, 2016). Perception of risk has frequently been shown to be a robust protective factor against use of various drugs according to such large-scale national surveys. At the population level, highly prevalent drugs such as marijuana are associated with low perceived risk; for example, 44.7% of high school seniors reported lifetime use in 2015 with only 12.3% reporting that trying the drug once or twice is high risk (Miech et al., 2016). Such negative associations have also been found in analyses of data from other national surveys (Hughes, Lipari, & Williams, 2016; Substance Abuse and Mental Health Services Administration [SAMHSA], 2013, 2015). MTF is the only national survey in the US that queries use and attitudes toward use of synthetic cannabinoids and “bath salts.” Past-year synthetic cannabinoid use among high school seniors decreased from 11.3% in 2012 to 5.2% in 2015, perception of great risk increased from 23.5% to 33.0% in the same years (Keyes, Rutherford, Hamilton, & Palamar, 2016; Miech et al., 2016). Although prevalence of self-reported past-year “bath salt” use among high school seniors remained low—at about 1%—between 2012 and 2015, perception of great risk increased from 32.3% in 2012 to 49.1% in 2015 (Miech et al., 2016; Palamar, 2015). Thus, results from population data consistently suggest perception of a drug being high-risk is a protective factor against use.

While beliefs (e.g., about risk) have been shown to be strongly associated with prevalence of use, so too have attitudes towards use. Both perceived harm and disapproval towards use in the MTF sample have been found to be robust correlates of use of marijuana and cocaine over time (Bachman, Johnson, & O'Malley, 1998; Bachman, Johnston, & O'Malley, 1990; Keyes et al., 2011, 2012)—sometimes above and beyond associations regarding lifestyle factors and perceived drug availability (Bachman et al., 1998; Bachman et al., 1990). Results from other national studies have yielded similar results (Abrahamsson & Hakansson, 2013; Salas-Wright, Vaughn, Todic, Cordova, & Perron, 2015). Smaller studies have also found robust associations between stigma towards users and self-reported use (Palamar, Kiang, & Halkitis, 2011). However, no studies have examined attitudes towards use of various NPS classes. Likewise, studies have not examined other attitudinal or belief-related factors specific to NPS such as perception of friends' use, perception of easiness to get the drug(s),

intention to use, and whether the drug(s) would be used if offered. Such information is important, especially given the lack of data on prevalence and correlates of NPS use.

In this paper, we examine self-reported attitudes and beliefs about six different NPS classes in a high-risk population—electronic dance music (EDM) nightclub and dance festival attendees. Previous studies have shown this population to be at high risk for drug use in general and to be at particularly high risk for use of NPS (Hughes, Moxham-Hall, Ritter, Weatherburn, & MacCoun, 2017; Palamar, Acosta, Ompad, & Cleland, 2016; Palamar, Acosta, Sherman, Ompad, & Cleland, 2016; Palamar, Barratt, Ferris, & Winstock, 2016; Palamar, Griffin-Tomas, & Ompad, 2015). For example, a recent study comparing EDM rave attendees to non-attendees in a nationally representative sample of high school seniors found that those reporting rave attendance reported significantly higher past-year prevalence of use of amphetamine (nonmedical use; 16.2% vs. 5.6%), opioids (nonmedical use; 15.7% vs. 6.6%), powder cocaine (6.6% vs. 1.4%), LSD (6.6% vs. 1.4%), ketamine (3.9% vs. 0.7%), *gamma*-hydroxybutyrate (GHB; 3.8% vs. 0.6%), methamphetamine (3.7% vs. 0.7%), crack (3.5% vs. 0.6%), and heroin (1.6% vs. 0.1%) (Palamar et al., 2015). Alarming, self-reported use of NPS was significantly higher among rave attendees with a fifth (20.4%) of rave attendees reporting past-year use of synthetic cannabinoids (vs. 7.6% of non-attendees) and 3.7% reporting past-year use of “bath salts” (vs. 0.9% of non-attendees). In addition, more frequent drug use was more common among rave attendees—particularly frequent attendees. For example, a quarter of students who attended raves monthly or more often reported past-year synthetic cannabinoid use (compared to 7.6% of non-attendees).

Recent studies focusing specifically on EDM party attendees have also found them to be a high-risk population with regard to NPS use. A recent study focusing on past-year nightclub attendees taking part in the annual Global Drug Survey found that nearly half (46.4%) of those surveyed reported lifetime NPS use, with a quarter (24.8%) reporting synthetic cannabinoid use, 23.0% reporting use of tryptamines (e.g., 4-AcO-DMT, 5-MeO-DMT), 18.4% reporting use of 2C series drugs (e.g., 2C-B, 2C-I), 8.1% reporting use of NBOME (e.g., 25i-NBOMe), 10.5% reporting use of “bath salts” (e.g., methylone, mephedrone), and 3.9% reporting use of novel dissociatives (e.g., methoxetamine [MXE]) (Palamar et al., 2016). Similarly, a recent survey of EDM party attendees in New York City (NYC) found that over a third (35.1%) reported lifetime use of an NPS, with 16.3% reporting use of synthetic cannabinoids, 9.0% reporting NBOME use, 6.9% reporting “bath salt” use, and 5.1% reporting tryptamine use (Palamar et al., 2016).

Higher prevalence in such a population provides the opportunity to examine relationships between use and beliefs and attitudes toward use of various NPS classes (e.g., tryptamines) that are less prevalent in the general population. Therefore, in this paper we aim to describe self-reported beliefs and attitudes specific to NPS classes and examine potential associations with self-reported use.

Methods

Participants and procedure

We surveyed 1,087 individuals entering EDM parties in New York City from June through September of 2016 using time-space sampling (MacKellar et al., 2007; Palamar et al., 2016). Individuals were eligible if they identified as 1) ages 18–40, and 2) were about to attend the randomly selected party. Trained recruiters approached passersby (who were alone or in groups) and asked if they were going to the randomly selected party. Those who were confirmed eligible were asked if they would like to take a survey asking about drug use. After providing informed consent, participants completed the survey on tablets. The response rate for those approached who were believed to be eligible was 77%. This study was approved by the authors' institutional review board.

Measures

Drug use—After answering questions about demographics (e.g., gender, race/ethnicity, educational attainment), the survey informed participants that the following section asks about “use of relatively uncommon synthetic drugs, some of which are called ‘legal highs’ or research chemicals.” We asked participants about known use of 146 NPS, which were presented in lists grouped by NPS category—each category with its own section. On the top of each NPS category page, participants were asked if they had ever used any of the following “new” synthetic drugs. For example, one page queried lifetime (known) use of any NBOMe ([2-(4-iodo-2,5-dimethoxyphenyl)-*N*-[(2-methoxyphenyl)methyl]ethanamine], “pronounced ‘N-bomb’”) drug. This format was used for each NPS class including 2C series drugs, “bath salts” (synthetic cathinones), tryptamines, dissociative NPS, and “synthetic marijuana” (synthetic cannabinoids). Participants were also given the opportunity to type in names of any new drugs we did not ask about. If a participant checked off lifetime use of one or more NPS in a particular category then he or she was coded as using drugs in the specific NPS category. For example, lifetime methylone use was coded into a variable indicating any “bath salt” use. To help detect over-reporting, we included a question on its own page asking participants whether they had ever used a drug called nadropax—a fictitious drug (Parker, Aldridge, & Measham, 1998). Four percent ($n = 39$) of those surveyed checked off “yes” and were excluded from the analytic sample ($n = 1048$).

Attitudes and beliefs—After each section asking about use of drugs from a specific NPS class, all participants were then asked six questions about attitudes and beliefs about that drug class. The first four questions were modified items based on the MTF nationally representative survey which have been used every year since 1975 (Miech et al., 2016). To assess beliefs about harm, participants were asked, “How much do you think people risk harming themselves (physically or in other ways) if they use [drug name]?” Answer options were “No risk”, “Slight risk”, “Moderate risk”, “Great risk”, and “Can’t say, drug unfamiliar.” To assess attitudes of disapproval, we asked, “Do you disapprove of people (who are 18 or older) using [drug name]?” Answer options were “Don’t disapprove”, “Disapprove”, “Strongly disapprove”, and “Can’t say, drug unfamiliar.” To assess beliefs about availability, we asked, “How difficult do you think it would be for you to get [drug name] if you wanted some?” Answer options were “Probably impossible”, “Very difficult”,

“Fairly difficult”, “Fairly easy”, “Very easy”, and “Can’t say, drug unfamiliar.” To assess beliefs about level of exposure to users, we asked, “How many of your friends would you estimate use [drug name]?” Answer options were “None”, “A few”, “Some”, “Most”, “All”, and “Can’t say, drug unfamiliar.” Similar to MTF annual reports, we also created dichotomous variables indicating whether the participant checked off “Great risk”, that a drug was “fairly” or “very easy” to get, and whether “most” or “all” friends use.

We also asked an additional two questions assessing intention to use. Specifically, we asked, “Do you intend to use [drug name] within the next 12 months?” We also asked, “Would you use [drug name] if it was offered to you by a friend?” Answer options for both questions were “No”, “Yes”, “Unsure”, and “Can’t say, drug unfamiliar.” Both variables were also coded into dichotomous variables indicating an affirmative response. While the first four items were based on validated MTF items, MTF only includes the “Can’t say, drug unfamiliar” option for perceived risk (Johnston, Bachman, O’Malley, Schulenberg, & Miech, 2016). However, since many participants were expected to be unfamiliar with many of the drugs were queried, as described above, we included this as an answer option for all items.

Analyses—We first examined participant characteristics and self-reported prevalence for use of drugs in each NPS category. We also conducted univariable analyses to present the estimated prevalence of each response option for each NPS class. We then computed chi-squares to compare dichotomous attitudinal and belief responses according to whether the participant reported lifetime use of the corresponding drug class. For the risk of harm item, “Can’t say, drug unfamiliar” was combined with perceived risk of harm and coded into the reference category and contrasted with “No risk.” For the disapproval item, “Can’t say, drug unfamiliar” was combined with disapproval into the reference category and contrasted with “No disapproval.” For the ease to get item, “Can’t say, drug unfamiliar” was combined with “Difficult” into the reference category and contrasted with “Fairly easy” or “Very easy.” For the friends who use item, “Can’t say, drug unfamiliar” was combined with “None”, “A few”, and “Some” into the reference category and contrasted with “Most” or “All.” With this coding, each attitude or belief was expected to increase the odds of drug use.

Finally, to determine unique associations of attitudinal and belief variables with lifetime use, we fit these indicator variables in multivariable binary logistic regression models with lifetime use of the corresponding drug class as the outcome. We controlled for gender, race/ethnicity, and educational attainment in these models. Two models were computed for each drug outcome in a block-wise manner—the first model included the four variables derived from MTF, and the second model additionally contained the intention and willingness to use variables. Tests were conducted to ensure that multicollinearity was not present. We tested numerous versions of these models with “drug unfamiliar” responses combined with other responses, included as a separate category, and entered as a separate variable. While results were relatively consistent across models, we present the most parsimonious models which utilize the same coding used in our bivariable tests. To correct for potential Type-I Error resulting from multiple testing, we utilized a Bonferroni correction ($\alpha = .05/6 = .008$). We also utilized 99% confidence intervals (CIs) in our multivariable logistic regression models.

We created and utilized sample weights to adjust for more frequent party attendees and attendees entering parties having a higher proportion of suspected eligible individuals approached having a higher probability of being surveyed. We calculated each participant's selection probability (MacKellar et al., 2007) and weighted prevalence estimates by the inverse of that probability (Jenness et al., 2011). Probability weights incorporated self-reported frequency of nightclub/festival attendance as well as the proportion of potentially eligible participants approached outside the party the participant attended. Since time-space sampling was utilized along with data weights, analyses took into account clustering of participants by party and differential probability of selection, using Taylor series estimation methods to obtain accurate standard errors (Heeringa, West, & Berglund, 2010). In this complex sampling design we specified party as the primary sampling unit and utilized probability weights for individual participants. Weights were utilized for all analyses and all statistics were computed using Stata SE 13 (StataCorp, 2009).

Results

Sample characteristics are presented in Table 1. The average age was 23.4 years and the majority of participants identified as white (60.9%). Lifetime synthetic cannabinoid use was most prevalent (16.7%), followed by use of "bath salts" (e.g., methylene, 7.7%), dissociative NPS (e.g., methoxetamine [MXE], 6.1%), 2C drugs (e.g., 2C-I, 4.9%), tryptamines (e.g., 4-MeO-DMT, 4.3%), and NBOMe (e.g., 25i-NBOMe, 3.0%).

Estimates of self-reported attitudes and beliefs about use of each of the six NPS classes are presented in Table 2. Reporting unfamiliarity with each NPS class was common, but less common with regard to "bath salts" and synthetic cannabinoids. Two-thirds (66.5%) of the sample reported unfamiliarity to at least one item regarding NBOMe, followed by 62.0% reporting unfamiliarity at least once for 2C drugs, followed by dissociative NPS (54.6%), tryptamines (53.6%), "bath salts" (39.5%), and synthetic cannabinoids (33.6%) (data not presented in table). Estimated prevalence of considering "bath salts" (43.1%) and synthetic cannabinoids (27.0%) a great risk was higher than for other NPS categories. Likewise, prevalence of strong disapproval and reporting that the drug is very easy to get were higher for "bath salts" and synthetic cannabinoids than other NPS classes. Six out of ten (59.7%) of participants reported that no friends use "bath salts", while about a third of participants reported that no friends used some other individual NPS category drugs. Intention not to use was highest for "bath salts" (73.3%) and synthetic cannabinoids (71.1%), followed by other NPS classes (50.0–55.2%). Findings were similar for willingness to use if offered with 71.1% of participants reporting they would not use "bath salts", followed by synthetic cannabinoids (67.9%), and other NPS classes (46.9–52.5%).

In bivariable analysis (Table 3), perceptions of no risk were not related to lifetime use, and reporting no disapproval was positively associated with self-reported use of NBOMe, 2C drugs, tryptamines, and dissociative NPS. Reporting that the drug is fairly or very easy to get was positively associated with use of 2C drugs, tryptamines, dissociative NPS, and synthetic cannabinoids, and reporting any friends' use was positively associated with use of each NPS class other than synthetic cannabinoids. Intent to use was positively associated with self-reported use of NBOMe, 2C drugs, tryptamines, and dissociative NPS, and willingness to try

if offered was positively associated with use of all NPS classes other than synthetic cannabinoids.

Results from multivariable models are presented in Table 4. With all else being equal, friends' use of NBOMe was associated with increased odds of self-reported NBOMe use until controlling for intention and willingness to use, and intention to use was associated with a robust increase in odds of reporting use. Reporting no disapproval toward 2C use was strongly and consistently associated with an increase in odds of 2C use and intention to use was also associated with an increase in odds of reporting use. Reporting use by any friends was also a consistent risk factor for reporting 2C use. Reporting no disapproval towards "bath salt" use was a risk factor for reporting use, but this association was no longer significant when controlling for intention to use and willingness to use if offered. Reporting willingness to use "bath salts" was associated with an increase in odds of reporting use. With regard to tryptamines, the only significant (and consistent) correlate of use was reporting no disapproval toward use. Reporting no disapproval towards dissociative NPS use was significantly associated with reporting use, but significance was lost upon controlling for intention and willingness to use. Use by any friends was a consistent risk factor for reporting dissociative NPS use. Finally, reporting that synthetic cannabinoids are fairly or very easy to get consistently increased the odds of reporting use.

Discussion

This is the first study to examine attitudes and beliefs about use of NPS in relation to self-reported use, and this was examined in a high-risk population—attendees of EDM dance parties at nightclubs and festivals. A large proportion of participants reported unfamiliarity with NBOMe, 2C drugs, tryptamines, and dissociative NPS, but most reported familiarity regarding "bath salts" and synthetic cannabinoids. According to recent MTF data, reports of drug unfamiliarity tend to increase as the drug queried is riskier. For example, in 2015, only 4% of students checked off that marijuana was unfamiliar; followed by crystal meth (7%) and PCP (15%). Newer and/or less traditional drugs are more likely to be reported as unfamiliar; for example, in MTF, 62% of students report being unfamiliar with salvia divinorum, and "bath salts" and synthetic cannabinoids were unfamiliar to 19% and 27% of students, respectively (Johnston et al., 2016). Within the high-risk scene examined in this study, these two drug classes were more familiar than less prevalent drugs.

"Bath salts" and synthetic cannabinoids were not only reportedly more familiar than other drugs, but were more commonly perceived to be of great risk and easy to obtain. These two NPS classes also were more highly disapproved of by individuals in this population. Likewise, fewer participants reported intention to use or willingness to use either of these two drug classes if offered. We hypothesize this is driven by information from peers and the media about adverse effects associated with use of these drugs. For example, warnings about potential adverse effects and high rates of poisonings associated with use of synthetic cannabinoids have been ubiquitous in recent years—particularly in NYC—where this study was conducted (Adams et al., 2017; Joseph, Manseau, Lalane, Rajparia, & Lewis, 2017; New York City Department of Health and Mental Hygiene, 2015; Palamar, Su, & Hoffman, 2016). Almost half (48.1%) of this NYC sample reported synthetic cannabinoid use as being

of moderate or great risk and only a third (33.0%) of high school seniors in the US report that using is of moderate or great risk (Miech et al., 2016) so perceived risk might be more specific to areas where synthetic cannabinoid use is more problematic or it might be more specific to EDM party attendees. “Bath salts” and synthetic cannabinoids have also acquired a reputation for turning users into “zombies” or “cannibals” (Adams et al., 2017; Carstensen, 2016), but it is unknown whether individuals in the EDM party population have stronger views towards such drugs because prevalence of use (and thus possibly adverse effects) is higher in this population. Regardless, continued information about potential negative effects associated with use likely affected attitudes and beliefs about these drugs. Similarly, a study examining MTF data found that as publication of newspaper articles about tobacco increased, so too did the odds of perception of harm and disapproval towards smoking. This was also associated with a decrease in odds of reporting that all or most friends smoke and a decrease in odds of reporting smoking in the last 30 days (Smith et al., 2008).

Despite perception of risk being a robust protective factor in numerous national studies (Hughes et al., 2016; Miech et al., 2016; SAMHSA, 2013, 2014, 2015), perception of no harm associated with use of drugs from these NPS classes was not significantly associated with lifetime use in bivariable or multivariable models. More research is needed to determine whether this is unique to the EDM party population, but other studies also demonstrate that other attitudes and beliefs are more important deterrents of NPS use. Disapproval, for example, has been shown to be a robust protective factor against use of various drugs (Abrahamsson & Hakansson, 2013; Bachman et al., 1998; Bachman et al., 1990; Keyes et al., 2012; Keyes et al., 2011; Salas-Wright et al., 2015), and in our bivariable models we found reporting no disapproval was positively associated with use of most NPS classes. However, when controlling for other attitude and belief domains, reporting no disapproval was only a consistent significant risk factor for use of 2Cdrugs and tryptamines. Reporting no disapproval was a risk factor for “bath salt” and dissociative NPS use, but this significant association disappeared upon controlling for intention and willingness to use. Our findings that disapproval was a more consistent correlate than perceived risk corroborates a study by Martins et al. (Martins, Storr, Alexandre, & Chilcoat, 2008) which found that lack of disapproval towards ecstasy and marijuana was more strongly associated with use than perceived risk of these drugs.

Belief that the drug is easy to obtain was also positively associated with use of various NPS classes in bivariable models; however, these associations only remained significant in multivariable models regarding use of synthetic cannabinoids. While availability is essential in order to use a drug, this determinant has been found to be less influential than other attitudes and beliefs (Johnston et al., 2016). For example, despite continued availability of cigarettes, use has declined substantially in recent decades (Miech et al., 2016). Until recently, synthetic cannabinoids were sold in many stores (e.g., bodegas) in NYC; therefore, products containing these compounds were more openly available than other NPS classes. It is possible that some of these individuals merely resorted to use of such compounds simply because they were easily available, despite effects commonly being reported as less desirable than effects of natural cannabis (Winstock & Barrat, 2012).

Friends' use was significantly associated with use of all NPS classes in bivariable models, which complement associations regarding availability, although in the case of synthetic cannabinoids, friends were not needed to be exposed to such compounds. Friends' use increased the odds of reporting use of NBOMe, 2C drugs, "bath salts", and dissociative NPS in multivariable models. While this corroborates previous studies which have found exposure to users as one of the most robust correlates of use (Palamar et al., 2011; Palamar, Kiang, & Halkitis, 2012; van den Bree & Pickworth, 2005), friends can also influence potential users' attitudes and beliefs towards use (Johnston et al., 2016), in part, due to their own attitudes towards drug use (Martins et al., 2008; Mason, Mennis, Linker, Bares, & Zaharakis, 2014). Close friends have also been found to be particularly influential (Urberg, Luo, Pilgrim, & Degirmencioglu, 2003). An older study also found that friends' use was more of a risk factor for drug use than perceived risk (Musher-Eizenman, Holub, & Arnett, 2003). Previous studies have found that NPS are commonly obtained from friends (Fletcher, Tasker, Easton, & Denvir, 2016; McElrath & O'Neill, 2011; van Amsterdam, Nabben, Keiman, Haanschoten, & Korf, 2015). However, while exposure to friends who use is a risk factor, we must keep in mind that peer drug use is often overestimated. For example, studies have found that participants were more likely to over-estimate peer use of synthetic cannabinoids or "bath salts" if they were users (Egan, Erausquin, Milroy, & Wyrick, 2016; Sanders, Stogner, & Miller, 2013). Whether or not peer use was over-estimated by this population, these findings further confirm that this is a high-risk population because high rates of friend use indicates the likelihood of (repeated) exposure and possible opportunity to use.

Intention to use and willingness to use if offered were strongly associated with use of most NPS categories in bivariable models, with synthetic cannabinoids being a notable exception. Very few non-users reported intention to initiate use of any NPS classes queried (1–3%), or try if offered (1–5%). NBOMe, 2C, and "bath salt" users were more likely to report intention or willingness to use again (11–26%), but only 5% of those reporting lifetime use of synthetic cannabinoids or "bath salts" reported intention to use again. However, 23% of "bath salt" users and 13% of synthetic cannabinoid users still reported that they would use if offered, which implies that they may still engage in use despite not having a specific desire to do so. Thus, a large portion of EDM party attendees appear to be at high risk for initiation or continued use of NPS such as "bath salts", and further research is needed to determine how to prevent individuals in this high-risk scene from initiating and/or continuing use of these substances.

Limitations

This study was conducted on nightclub and dance festival attendees so results may not be fully generalizable to other populations. Even though specific NPS were presented in groups and labeled as NPS classes (e.g., methylone was labeled a "bath salt"), this does not guarantee that participants deem a drug as part of a particular class. Or he or she may remain unaware that a drug is in fact in a particular class. For example, seven methylone users reported that "bath salts" were unfamiliar to at least one "bath salts" question. This study focused on known use of various NPS. "Bath salts", however, are often used unknowingly as these are commonly adulterants in ecstasy/Molly (Palamar, Salomone, Vincenti, & Cleland,

2016), so self-reported use only represents whether or not the participant believes he or she actually used the specific drug. Temporality could not be established as this was a cross-sectional survey. Therefore, among users, it is unknown whether most attitudes or beliefs were present before use or have remained stable or changed after use. In addition, variables assessing intention and willingness to use are somewhat limited as this was a cross-sectional study with a substantial portion of participants already reporting use. It is not surprising that many users reported intention or willingness to use (again), but the main goal of this study was to examine associations between attitudes and self-reported use. Prospective studies can most effectively determine how intention and willingness to use affects actual future decisions to use such drugs. Future studies examining causal pathways are also needed.

Conclusions

This study was the first to delineate attitude and belief-related correlates of use of various NPS classes among EDM party attendees—a high-risk population. Drug availability, friends' use, lack of disapproval towards use, intention to use, and willingness to use if offered, were found to be risk factors for use of various NPS classes in this population. This is important information as EDM party attendees tend to have high prevalence of use of NPS as well as more traditional drugs. This study should remind us that high prevalence of drug use within a scene does not appear to be a risk factor for drug initiation within itself. Repeated exposure to users (and/or dealers) and the perception of normalized use appear to be more direct risk factors, especially considering that an individual needs to be exposed to a drug in order to gain access to a drug—with or without intention or willingness to use. Heavy involvement with drug-using individuals in such a scene may thus lead to acceptance towards use (or lack of disapproval) and potential intent to use or willingness to use if offered. More research is needed to determine how these psychosocial factors relate to one another and relate to risk of use in a longitudinal manner in order to determine temporal associations, and more research is also needed to determine how use of traditional drugs influences attitudes and beliefs towards use of these newer and less-known drugs. Results can inform prevention efforts as NPS continue to emerge, particularly in such high-risk scenes. Specifically, attitudes and beliefs about NPS should be considered when devising prevention messages.

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Table 1Sample characteristics ($N = 1,048$).

Age	<i>N</i> Mean = 24.4	<i>%</i> SD = 4.9
Gender		
Male	602	54.5
Female	446	45.5
Race/Ethnicity		
White	625	60.9
Black	76	6.8
Hispanic	146	12.7
Asian American	109	13.2
Other/Mixed	92	6.4
Educational Attainment		
High School or Less	196	22.3
Some College	308	26.0
Bachelor's Degree	434	40.4
Graduate School	110	11.3
Lifetime Self-Reported NPS Use		
NBOMe	52	3.0
2C Series	118	4.9
"Bath Salts"	119	7.7
Tryptamines	84	4.3
Dissociative NPS	111	6.1
Synthetic Cannabinoids	200	16.7

Note. SD = standard deviation, NPS = novel psychoactive substance.

Table 2

Estimates of self-reported attitudes and beliefs towards use of each NPS class.

	NBOMe % (95% CI)	2C Series % (95% CI)	“Bath Salts”% (95% CI)	Tryptamines% (95% CI)	Dissociative NPS % (95% CI)	Synthetic Cannabinoids % (95% CI)
Perceived Risk						
No Risk	8.7 (5.5, 13.4)	12.4 (9.5, 16.0)	11.4 (8.8, 14.6)	15.1 (11.2, 20.2)	14.9(11.4, 19.3)	14.5 (11.4, 18.3)
Slight Risk	8.8(6.7, 11.4)	7.1 (5.1, 9.9)	6.8 (4.9, 9.4)	12.1 (8.9, 16.2)	10.7 (8.2, 14.0)	15.3 (12.2, 18.9)
Moderate Risk	18.8(14.8, 23.5)	14.0 (10.1, 18.9)	9.6 (7.1, 12.9)	11.8 (9.3, 14.8)	12.0 (9.7, 14.7)	21.1 (17.3, 25.6)
Great Risk	15.2 (11.4, 20.0)	12.5 (9.0, 17.2)	43.1 (38.4, 47.9)	15.5(11.1, 21.1)	15.4(11.6, 20.1)	27.0 (22.6, 31.8)
Can't Say, Drug Unfamiliar	48.6 (40.8, 56.6)	54.0 (47.9, 60.0)	29.1 (25.6, 32.9)	45.5 (39.7, 51.5)	47.0 (41.2, 52.8)	22.1 (17.4, 27.7)
Disapproval						
Don't Disapprove	19.4 (15.4, 24.2)	18.6(15.2, 22.6)	17.2 (14.0, 20.9)	25.9 (19.9, 33.0)	20.9 (16.1, 26.6)	29.3 (25.8, 33.1)
Disapprove	18.1 (15.0, 21.7)	15.5 (12.1, 19.6)	20.5 (17.0, 24.6)	15.2 (11.4, 20.0)	18.2 (14.2, 23.1)	21.2 (17.9, 24.9)
Strongly Disapprove	10.4 (7.4, 14.6)	10.7 (7.0, 16.0)	34.3 (29.1, 40.0)	13.8 (10.6, 17.8)	14.4 (10.5, 19.4)	23.3 (18.4, 29.0)
Can't Say, Drug Unfamiliar	52.0 (45.0, 59.0)	55.2 (49.4, 60.8)	28.1 (23.8, 32.8)	45.1 (39.9, 50.4)	46.6(40.7, 52.5)	26.2 (21.2, 31.9)
Easiness to Get						
Probably Impossible	10.0 (7.2, 13.9)	13.2 (10.4, 16.7)	15.6(11.5, 20.9)	13.7 (10.9, 17.1)	16.1 (12.5, 20.4)	11.2 (7.9, 15.8)
Very Difficult	8.9 (6.4, 12.3)	9.2 (6.6, 12.9)	12.9(11.0, 15.1)	11.4 (8.3, 15.7)	11.5 (8.1, 15.9)	9.2 (7.4, 11.4)
Fairly Difficult	12.3 (9.6, 15.6)	10.0 (7.7, 12.8)	14.6(11.8, 17.9)	14.1 (11.3, 17.4)	12.1 (9.7, 15.1)	9.9 (7.7, 12.6)
Fairly Easy	15.6 (12.8, 18.8)	9.2 (7.0, 12.2)	14.4 (12.0, 17.2)	11.3 (8.5, 15.0)	9.2 (6.9, 12.3)	27.5 (23.2, 32.2)
Very Easy	4.1 (2.5, 6.8)	4.1 (2.5, 6.7)	10.2 (7.9, 13.2)	4.4 (2.9, 6.5)	3.1 (1.8, 5.5)	15.5 (12.7, 18.9)
Can't Say, Drug Unfamiliar	49.0 (43.7, 54.5)	54.3 (48.6, 60.0)	32.2 (27.6, 37.2)	45.1 (39.5, 50.9)	48.0 (42.5, 53.6)	26.7 (22.0, 31.9)
Perception of Friends' Use						
None	32.3 (2.7, 37.7)	33.2 (28.1, 38.9)	59.7 (53.9, 65.3)	36.7 (30.5, 43.4)	37.9(32.5, 43.7)	41.0 (35.5, 46.8)
A Few	14.6(10.2, 20.4)	10.4 (7.4, 14.4)	9.6 (7.0, 13.0)	13.1 (10.0, 17.1)	10.8 (7.9, 14.6)	22.9(19.9, 26.2)
Some	6.6 (4.5, 9.5)	4.2 (2.5, 6.9)	3.6(2.4, 5.4)	4.2 (3.0, 5.9)	3.7(2.5, 5.5)	9.6 (6.5, 13.9)
Most	1.2 (0.6, 2.5)	1.7 (2.5, 6.9)	1.1 (0.5, 2.3)	15 (0.9, 2.5)	1.0 (0.6, 1.6)	2.1 (1.2, 3.6)
All	0.6 (0.1, 0.4)	0.4 (0.1, 1.4)	0.6 (0.2, 1.7)	0.9 (0.2, 3.7)	1.0 (0.3, 3.7)	1.6 (0.8, 3.1)
Can't Say, Drug Unfamiliar	44.7 (3.6, 53.6)	50.1 (43.5, 56.7)	25.4 (19.7, 32.0)	43.5 (38.2, 49.0)	45.6 (40.9, 50.2)	22.8(18.7, 27.6)
Intention to Use						
No	55.2 (48.1, 62.1)	50.0 (45.2, 54.7)	73.3 (67.6, 78.3)	53.0 (47.9, 58.1)	54.4 (49.7, 59.0)	71.1 (65.5, 76.1)
Yes	1.5 (0.7, 3.1)	1.6 (1.0, 2.5)	1.1 (0.5, 2.5)	3.6(2.6, 4.9)	3.1 (1.9, 5.0)	3.3(1.8, 6.1)

	NBOMe % (95% CI)	2C Series % (95% CI)	“Bath Salts” % (95% CI)	Tryptamines % (95% CI)	Dissociative NPS % (95% CI)	Synthetic Cannabinoids % (95% CI)
Unsure	3.2 (2.3, 4.5)	4.5 (3.0, 6.9)	2.7 (1.6, 4.4)	4.5 (3.1, 6.6)	3.2 (2.0, 5.2)	5.1 (3.5, 7.4)
Can't Say, Drug Unfamiliar	40.1 (32.4, 48.4)	43.9 (37.7, 50.3)	22.9 (17.6, 29.4)	38.9 (34.0, 44.1)	39.2 (34.8, 43.9)	20.5 (16.6, 25.2)
Willingness to Use if Offered						
No	47.5 (40.5, 54.6)	46.9 (42.8, 50.9)	71.1 (65.0, 76.5)	48.0 (42.7, 53.5)	52.5 (47.3, 57.6)	67.9 (62.1, 73.2)
Yes	4.7 (3.5, 6.4)	3.4 (2.1, 5.4)	2.9 (1.6, 5.3)	6.7 (4.9, 9.1)	4.1 (2.6, 6.5)	6.2 (4.0, 9.6)
Unsure	9.4 (7.1, 12.3)	6.8 (4.0, 11.4)	2.6 (1.8, 3.8)	6.6 (4.1, 10.3)	5.4 (3.7, 7.9)	6.3 (4.3, 9.3)
Can't Say, Drug Unfamiliar	38.4 (31.8, 45.6)	42.9 (37.6, 48.5)	23.4 (18.3, 29.4)	38.7 (33.9, 43.8)	38.0 (33.2, 43.1)	19.6 (15.8, 23.9)

Note. CI = confidence interval

Table 3

Bivariable tests comparing self-reported use according to attitudes and beliefs.

	Lifetime Use			Lifetime Use		
	No, %	Yes, %	No Disapproval	No, %	Yes, %	Yes, %
No Harm						
NBOMe	8.7	8.1	NBOMe	19.4	18.4	51.5
2C Series	12.4	12.3	2C Series***	18.6	15.4	81.1
“Bath Salts”	11.4	11.6	“Bath Salts”	172	15.4	37.8
Tryptamines	15.1	14.2	Tryptamines***	25.9	23.5	79.9
Dissociative NPS	14.9	14.8	Dissociative NPS***	20.9	18.9	50.4
Synthetic Cannabinoids	14.5	14.3	Synthetic Cannabinoids	29.3	27.3	39.2
Fairly or Very Easy to Get						
NBOMe	19.7	19.3	NBOMe*	23.0	21.7	63.6
2C Series**	13.2	11.9	2C Series***	16.6	14.1	64.3
“Bath Salts”	24.5	23.2	“Bath Salts”***	14.8	12.4	43.8
Tryptamines**	15.6	14.4	Tryptamines*	19.7	18.0	55.6
Dissociative NPS***	12.2	10.7	Dissociative NPS***	16.3	13.6	57.4
Synthetic Cannabinoids**	42.9	38.2	Synthetic Cannabinoids	36.1	33.7	47.6
Intend to Use						
NBOMe***	1.5	0.8	NBOMe***	4.7	4.0	27.1
2C Series***	1.6	1.1	2C Series***	3.4	1.6	37.7
“Bath Salts”***	1.1	0.8	“Bath Salts”***	2.9	1.2	23.2
Tryptamines***	3.5	2.6	Tryptamines***	6.6	5.3	37.1
Dissociative NPS***	3.1	2.3	Dissociative NPS***	4.1	2.7	24.2
Synthetic Cannabinoids	3.4	3.1	Synthetic Cannabinoids	6.2	4.9	12.5

Note. A Bonferroni correction was utilized ($\alpha = .05/6 = .008$); therefore,

1000' < .d

'100' < .d
**
'800' < .d
*

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Table 4

Binary multivariable logistic regression models examining attitudes and beliefs in relation to lifetime use.

NBOMe	Model 1		Model 2	
	AOR	99% CI	AOR	99% CI
No Risk	3.28	(0.10, 104.23)	3.35	(0.10, 113.41)
No Disapproval Towards Use	2.47	(0.49, 12.32)	2.36	(0.39, 14.38)
Fairly or Very Easy to Get	0.77	(0.15, 3.86)	0.79	(0.13, 4.87)
Any Friends Use	5.93*	(1.32, 26.30)	4.62	(0.78, 27.29)
Intent to Use			27.14**	(3.70, 198.87)
Would Use if Offered			1.87	(0.49, 7.16)
2C Series	AOR	99% CI	AOR	99% CI
No Risk	0.31	(0.03, 3.58)	0.38	(0.03, 4.37)
No Disapproval Towards Use	30.08**	(6.83, 132.50)	25.76**	(5.28, 125.81)
Fairly or Very Easy to Get	1.32	(0.50, 3.48)	1.15	(0.37, 3.61)
Any Friends Use	6.29**	(1.99, 19.87)	4.38*	(1.26, 15.27)
Intent to Use			4.27	(0.68, 26.73)
Would Use if Offered			5.87**	(1.59, 21.65)
“Bath Salts”	AOR	99% CI	AOR	99% CI
No Risk	0.36	(0.04, 3.49)	0.47	(0.04, 5.32)
No Disapproval Towards Use	4.15*	(1.24, 13.89)	2.68	(0.71, 10.11)
Fairly or Very Easy to Get	1.14	(0.41, 3.15)	1.27	(0.45, 3.55)
Any Friends Use	4.20**	(1.56, 11.29)	2.73	(0.98, 7.62)
Intent to Use			1.92	(0.25, 14.78)
Would Use if Offered			9.47**	(1.76, 51.40)
Tryptamines	AOR	99% CI	AOR	99% CI
No Risk	1.39	(0.27, 7.13)	1.17	(0.21, 6.43)
No Disapproval Towards Use	7.86*	(1.44, 44.89)	7.29*	(1.20, 44.17)
Fairly or Very Easy to Get	1.84	(0.41, 8.20)	1.37	(0.34, 5.53)
Any Friends Use	2.59	(0.42, 16.02)	1.72	(0.31, 9.65)
Intent to Use			3.55	(0.81, 15.54)
Would Use if Offered			2.25	(0.56, 9.04)
Dissociative NPS	AOR	99% CI	AOR	99% CI
No Risk	0.85	(0.14, 5.26)	0.81	(0.14, 4.90)
No Disapproval Towards Use	3.63*	(1.21, 10.91)	3.29	(0.95, 11.39)
Fairly or Very Easy to Get	1.26	(0.39, 4.06)	1.36	(0.41, 4.60)
Any Friends Use	6.71**	(2.53, 17.81)	4.50*	(1.52, 13.31)
Intent to Use			2.53	(0.35, 18.52)
Would Use if Offered			2.60	(0.30, 22.36)

NBOMe	Model 1		Model 2	
	AOR	99% CI	AOR	99% CI
Synthetic Cannabinoids	AOR	99% CI	AOR	99% CI
No Risk	1.07	(0.39, 3.01)	0.22	(0.02, 2.91)
No Disapproval Towards Use	1.73	(0.65, 4.61)	4.09	(0.82, 20.33)
Fairly or Very Easy to Get	2.95*	(1.08, 8.11)	4.73**	(1.58, 14.21)
Any Friends Use	1.27	(0.64, 2.51)	1.02	(0.40, 2.62)
Intent to Use			0.96	(0.12, 7.86)
Would Use if Offered			1.68	(0.15, 18.51)

Note. All models controlled for gender, race/ethnicity, and educational attainment. AOR = adjusted odds ratio, CI = confidence interval, NPS = new psychoactive substance.

* $p < .008$,

** $p < .001$