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Differential Risk for Drug Use by Sexual Minority Status among Electronic Dance Music Party Attendees in New York City

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Abstract

Background: Drug use among electronic dance music (EDM) party attendees is common; however, studies are needed to examine associations between drug use and sexual orientation as this can inform prevention and harm reduction efforts in the lesbian, gay, and bisexual (LGB) community.

Methods: Data were examined from a repeated cross-sectional study of 3066 young adult EDM party attendees surveyed entering nightclubs and dance festivals in New York City between 2016 and 2018. Of these participants, 277 identified as gay/lesbian, 293 identified as bisexual, and 83 identified as other sexuality. We examined how sexual orientation relates to past-year use of various ‘traditional’ drugs (e.g., ecstasy/MDMA/Molly) and new psychoactive substances (NPS; e.g., “bath salts”) in a bivariable and multivariable manner, stratified by sex.

Results: Compared to heterosexual males, gay males were at higher odds for use of ecstasy, GHB, and methamphetamine; bisexual males were at higher odds for use of LSD and unknown powders, and males identifying as “other” sexuality were at higher odds for use of mushrooms and 2C drugs. Compared to heterosexual females, lesbians were at higher odds for use of mushrooms and GHB; bisexual females were at higher odds for use of cocaine, LSD, mushrooms, and tryptamines, and females identifying as “other” sexuality were at higher odds for use of cocaine and tryptamines.

Conclusions: We determined differential risk of use of different drugs among those who attend EDM parties according to sexual orientation. Findings can be used to tailor prevention messaging to specific groups within the LGB community.

Keywords

Sexual orientation; drug use; electronic dance music; new psychoactive substances

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Disclosure statement

The authors declare that they have no conflict of interest. The authors alone are responsible for the content and writing of the article.

Introduction

Extensive research has suggested that prevalence of use of illegal drugs in the United States (U.S.) differs sharply between individuals of different sexual orientations (Duncan, Zweig, Hambrick, & Palamar, 2019; Green & Feinstein, 2012; Schuler, Rice, Evans-Polce, & Collins, 2018). Higher prevalence of drug use among lesbian, gay and bisexual (LGB) people compared with their heterosexual peers is well documented (Corliss et al., 2014; Graham et al., 2011; Green & Feinstein, 2012; McCabe, West, Hughes, & Boyd, 2013; Schuler et al., 2018). In the 2015 National Survey on Drug Use and Health (NSDUH), a national representative survey of non-institutionalized individuals in the U.S., LGB adults were estimated to be more than twice as likely than heterosexuals to use illegal drugs in the past year (Medley et al., 2016). This same dataset reveals distinct drug use patterns by sexual orientation. Aside from marijuana, adult gay and bisexual men are more likely to report using inhalants (e.g., amyl nitrate) and methamphetamine (Medley et al., 2016). Similarly, prevalence of drug use, especially the use of ecstasy/MDMA (Medley et al., 2016), among lesbian and bisexual women, is higher when compared to heterosexual women (McCabe, Hughes, Bostwick, West, & Boyd, 2009; Schuler et al., 2018). Numerous studies have investigated the relationship between sexual identity and drug use; however, these studies have focused mainly on more ‘traditional’ or common drugs such as cocaine, LSD, and ecstasy. In recent years, the drug landscape has changed with the introduction of hundreds of new psychoactive substances (NPS) (European Monitoring Centre for Drugs and Drug Addiction, 2018; Zawilska & Andrzejczak, 2015). Given the higher prevalence of drug use among LGB individuals, a more comprehensive examination drug use – including both ‘traditional’ drugs and less common drugs such as NPS – in this population will allow us to more comprehensively examine the relationship between sexual identity and substance use among a wider variety of drugs.

While most epidemiological surveys of drug use focus on more ‘traditional’ or common drugs such as marijuana, ecstasy, or LSD, hundreds of new drugs (commonly referred to as NPS) have emerged in recent years (European Monitoring Centre for Drugs and Drug Addiction, 2018) that have received little focus in survey research. Synthetic cannabinoids and synthetic cathinones (commonly referred to as “bath salts” in the US) are among the most prevalent NPS (Miech et al., 2018). Other drugs such as various 2C series drugs and tryptamines (e.g., DMT) are also rarely the focus of epidemiologic surveys and many of these compounds are also new (Palamar & Le, 2019). Not only is there a lack of information about use of new and uncommon drugs in the general population, but there is also a lack of focus on use among specific at-risk groups, including LGB individuals.

Recent scholarship underscores the importance of understanding drug use among discrete sexual minority groups (Abdulrahim, Whiteley, Moncrieff, & Bowden-Jones, 2016; Degenhardt, Dillon, Duff, & Ross, 2006; Demant et al., 2018; Desai, Bourne, Hope, & Halkitis, 2018; Mereish & Bradford, 2014; Roxburgh, Lea, de Wit, & Degenhardt, 2016). This contributes to the robust literature by comparing risk for past-year use of various drugs (including NPS) among LGB within a high-risk population—electronic dance music (EDM) party attendees. Drug use among individuals involved in these nightlife and rave scenes is common (Hughes, Moxham-Hall, Ritter, Weatherburn, & MacCoun, 2017; Palamar, Acosta,

Ompad, & Cleland, 2017; Palamar, Griffin-Tomas, & Ompad, 2015) and individuals who attend these events more frequently have higher odds of reporting drug use (Palamar, Griffin-Tomas, & Ompad, 2015). To better understand drug use patterns of LGB individuals involved in the EDM scene, we compared self-reported prevalence of use of various drugs according to sexual orientation, stratified by sex.

Methods

Procedures and participants

Participants were surveyed throughout the summers (May through September) of 2016, 2017, and 2018, outside parties selected using time-space sampling (MacKellar et al., 2007). Each week, parties (primarily at nightclubs) were randomly selected to survey attendees. Each week, a list of upcoming EDM parties (located primarily in Brooklyn and Manhattan) was created. The list was based on websites that sell EDM party tickets, party listings on social media (e.g., Facebook), and recommendations from key informants. These venues/parties were not specifically LGBT-focused. We considered parties from ticket websites eligible for random selection if at least 15 tickets were purchased for the party by mid-week. Parties were randomly selected each week using R software (R Development Core Team, 2013). Recruitment typically occurred on one to two nights per week on Thursday through Sunday. Time slots, however, were not randomly selected and recruitment (for night parties) was typically conducted between 11:30 pm and 2:30 am. Different time slots could not be utilized because the majority of parties ended at 4 am (with very few parties ending at 5 am or 6 am). While most participants were surveyed outside of nightclubs, participants were also surveyed outside of 1–2 large daytime festivals each year, which were not selected via random selection.

Passersby were eligible if they were between 18 and 40 years old, and about to enter the selected party. Recruiters approached passersby (who were alone or in groups), and if eligible, were asked if they would be willing to take a survey about drug use. Recruiters tried to ensure that potential participants were not visibly intoxicated. They ensured that those approached did not display impaired attention or gait or exhibit slurred speech. Surveys were taken on tablets after participants provided informed consent, and those completing the survey were compensated \$10 USD. Surveys were administered outside of 100 parties (37 in 2016, 39 in 2017, and 24 in 2018). Parties at nightclubs ($n = 86$) were randomly selected and festivals (with recruitment occurring on 14 separate days) were not randomly selected and targeted because festivals in NYC are infrequent and were a major focus of the parent study. The survey response rate was 75% (77% in 2016, 74% in 2017, and 73% in 2018). The total aggregated analytic sample size was 3066 (1083 in 2016, 954 in 2017, and 1029 in 2018). Study methods approved by the New York University Langone Medical Center institutional review board.

Measures

Participants were asked about their age (dichotomized into young adult [18–24] vs. older adult [25–40]), sex (i.e., male, female), race/ethnicity (i.e., white, black, Hispanic, Asian, other/mixed), education (dichotomized into college graduate vs. less than college degree),

weekly income (median-split into <\$500 vs. >\$500 per week), and sexual orientation (i.e., heterosexual, gay/lesbian, bisexual, other). Participants were also asked about their frequency of past-year nightclub, festival, and/or other EDM party attendance. Participants were then asked about past-year use of party drugs prevalent in the EDM scene. While most drugs were queried as single items (i.e. ecstasy/MDMA/Molly, powder cocaine, LSD, mushrooms, unknown powders, methamphetamine, GHB), NPS were queried via lists of specific compounds within each group. Specifically, each year we asked about 13–26 synthetic cathinones (“bath salts”) (e.g. methylone, mephedrone, Flakka [alpha-PVP]), 8–27 tryptamines (e.g., DMT, 4-AcO-DMT), 5–18 2C series drugs (e.g. 2C-B, 2C-E), and 1–6 NBOMe series drugs (e.g. 25i-NBOMe). Lists of specific drugs were shortened in later years due to low reported prevalence of use of various specific compounds. However, lists always contained an item indicating use of a drug in the class not listed (e.g. “bath salt not listed” and/or “bath salt unknown”) and abbreviated drug lists still provided examples of other specific compounds not listed (e.g. in 2018 the 2C series drug list was shortened to five items, but we listed 13 other compounds below the “2C not listed” response). An affirmative response to any compound in a class was coded as an affirmative response to use of a drug in that class (e.g. those reporting use of methylone were coded as reporting “bath salt” use).

Probability weights

We computed selection probabilities which were composed of two components: (1) self-reported past-year frequency of party attendance and (2) the proportion of eligible individuals outside the event (where the individual was surveyed) who agreed to participate upon being approached by study staff (response rate). For the attendance component, weights were inversely proportional to frequency of attendance (e.g. the weight for once-per-year attendees was 52 times larger than the weight for weekly attendees). For the response rate component, weights were inversely proportional to the party-level response rate. The two weight components were combined by multiplication and normalized (i.e. the sum of the weights was equal to the total sample size). This up-weighting of participants believed to have a lower probability of selection (relative to other participants) and down-weighting of participants believed to have a higher probability of selection has been used in other studies with venue-based sampling (Jenness et al., 2011; MacKellar et al., 2007).

Statistical analyses

We first examined sample characteristics and estimated the past-year prevalence of use of the 12 drugs examined in this analysis. We then estimated prevalence of past-year use of each drug according to self-reported sexual orientation and this was repeated, stratified by sex. Rao-Scott chi-square was used to examine potential differences in prevalence of use of each drug according to sexual orientation—in the full sample and then stratified by sex. We then examined sexual orientation in relation to past-year use of each drug in separate multivariable binary logistic regression models (with heterosexual as the comparison group), controlling for age, race/ethnicity, education, and weekly income. We first examined the full sample and then stratified by sex. Models produced adjusted odds ratios (aORs) for each level of sexual orientation in comparison to heterosexual. Finally, we examined sexual orientation in relation to number of drugs used in the past year. Since a skewed count distribution was examined as the dependent variable, we used generalized negative binomial

models. We first examined associations in an unadjusted manner and then in multivariable models controlling for demographic characteristics. Models produced incidence rate ratios (IRRs) for each level of sexual orientation in comparison to heterosexual. Data were analyzed using Stata 13 SE, utilizing Taylor series estimation to obtain accurate standard errors (Heeringa, West, & Berglund, 2010). Probability weights were utilized in all analyses.

Results

As shown in Table 1, the majority of the sample was age 18–24 (59.8%), male (55.8%), white (52.1%), and heterosexual (82.4%). We estimate that ecstasy/MDMA/Molly was the most prevalent drug used in the past year, used by an estimated quarter (26.5%) of EDM attendees, and we estimate that over a fifth (21.6%) have used powder cocaine in the past year. LSD and mushrooms were used by over a tenth of attendees, and under a tenth have used other drugs examined.

Table 2 presents prevalence estimates according to each sexual orientation group, overall and stratified by sex. It also presents bivariable comparisons of sexual orientation according to past-year use of each drug. Significant differences were detected for all drugs other than “bath salts” and NBOMe. Table 3 presents associations by sexual orientation from multivariable models. Compared to heterosexuals, those identifying as a sexual minority were at increased odds for reporting any drug use. When stratified, only gay males (aOR = 1.80, 95% CI: 1.04, 3.12, $p = .036$) and bisexual females (aOR = 2.04, 95% CI: 1.23, 3.38, $p = .006$) were at increased odds for use. Compared to heterosexuals, those identifying as gay/lesbian were at higher odds for ecstasy use. This association was limited to gay males in stratified analyses (aOR = 2.07, 95% CI: 1.28, 3.36, $p = .003$). Compared to heterosexuals, those identifying as other sexuality were at higher odds for powder cocaine use. Stratified analysis revealed this association was limited to females (aOR = 5.52, 95% CI: 1.76, 17.31, $p = .003$). Females identifying as bisexual were also at increased odds for powder cocaine use (aOR = 2.05, 95% CI: 1.14, 3.71, $p = .030$).

Identifying as bisexual was a consistent risk factor for LSD use (compared to heterosexuals). While those identifying as bisexual or other sexuality were at increased odds for using mushrooms (compared to heterosexuals), in the stratified models, the increased odds were limited to males of other sexuality (aOR = 4.38, 95% CI: 1.38, 13.91, $p = .012$) and lesbian (aOR = 3.27, 95% CI: 1.33, 8.02, $p = .010$) and bisexual females (aOR = 2.71, 95% CI: 1.45, 5.06, $p = .002$). Compared to heterosexuals, those identifying as other sexuality were at increased odds for ketamine use. In stratified analysis, only bisexual females were at increased odds for use (aOR = 2.41, 95% CI: 1.25, 4.63, $p = .008$).

With regard to use of unknown powders (Table 3), males identifying as bisexual were at higher odds (aOR = 4.18, 95% CI: 1.12, 15.67, $p = .034$) of reporting use in comparison to heterosexual males. Females identifying as bisexual (aOR = 3.19, 95% CI: 1.24, 8.24, $p = .016$) or other sexuality (aOR = 7.25, 95% CI: 1.64, 32.08, $p = .009$) were at higher odds of reporting tryptamine use than females identifying as heterosexual. Those identifying as gay/lesbian were at higher odds for reporting methamphetamine use than those identifying as heterosexual, but in stratified models, only gay males were at higher odds (aOR = 4.41, 95%

CI: 1.62, 12.00, $p = .004$). Males identifying as other sexuality were at increased odds of reporting 2C use than heterosexual males (aOR = 7.31, 95% CI: 1.65, 32.38, $p = .009$). Males identifying as gay (aOR = 11.59, 95% CI: 5.27, 25.47, $p < .001$) were at higher odds for reporting GHB use compared to heterosexuals, as were females identifying as lesbian (aOR = 6.76, 95% CI: 1.19, 38.43, $p = .031$).

Finally, as is shown in Table 4, all sexual minority groups in the full sample were at higher risk for reporting use of a higher number of drugs than heterosexuals; however, when stratified, males identifying as gay or other sexuality (but not bisexual) and females identifying as bisexual or other sexuality (but not lesbian) were at higher risk for reporting use of a higher number of drugs.

Discussion

As EDM dance festivals become more prominent in popular culture, understanding patterns of drug use among attendees is increasingly relevant to understanding the harm reduction messages and drug use education that is most relevant to this population. We estimate that drug use is more prevalent among LGB-identified individuals in this scene across all queried substances with the exception of “bath salts” and NBOMe as compared to heterosexual participants. We estimate that prevalence of use of ecstasy/MDMA/Molly and powder cocaine, the two most prevalent drugs used in the population, are significantly higher among LGB-identified individuals as compared to heterosexuals. Among LGB participants, approximately a third report using ecstasy/MDMA/Molly as compared to a quarter of heterosexual participants. Powder cocaine use among LGB participants was within the range of a quarter (bisexual participants) to nearly half (other sexuality) as compared to a fifth of heterosexuals who reported powder cocaine use. These findings are corroborate research from the U.K. that examined drug use in the past year among LGB-identified individuals that found higher prevalence of ecstasy and cocaine use among LGB-identified participants as compared to heterosexual participants, although overall prevalence of use was lower than in our sample (Abdulrahim et al., 2016).

The minority stress model may be useful in explaining increased risk for drug use among LGB populations and those who identify their sexuality outside of commonly used terms for sexual orientation as compared to their heterosexual counterparts. Lack of social support from within the LGB community (Balsam & Mohr, 2007), bisexual invisibility within the LGB community (Schuler, Stein, & Collins, 2019), pressure individuals may feel to prove their masculinity (Fields et al., 2015; Smalley, Warren, & Barefoot, 2016), or as a means to increase their affinity with gay culture within the night life scene (Green & Feinstein, 2012) may also contribute to the increased risk for drug use.

Compared to heterosexual females, we estimate that lesbians are at higher odds for using mushrooms (9.1% among heterosexuals versus 20.0% among lesbians) and GHB (0.7% among heterosexuals versus 5.8% among lesbians). These findings confirm higher prevalence of mushroom use among lesbians involved in the club scene as was found in previous studies (Abdulrahim et al., 2016). Similarly, a study of lesbian and bisexual women involved in the NYC club scene found that this group also had higher lifetime GHB use

(9.4% of the sample) compared to heterosexual women (7.3%) (Parsons, Kelly, & Wells, 2006). Situating our findings within the extant literature, among sexual minority women, sex (i.e. being female) is a risk factor for overall drug use as compared to heterosexual women (Green & Feinstein, 2012); furthermore, identifying as a sexual minority group places such individuals at risk for higher prevalence of drug use (Demant et al., 2018; Green & Feinstein, 2012; Mereish & Bradford, 2014).

Compared to heterosexual men we estimated that gay men have higher prevalence of use of ecstasy/MDMA/Molly, methamphetamine, and GHB. As indicated by a wealth of extant literature, gay men are at higher risk for the more traditional ‘club drugs’ (i.e. cocaine, methamphetamine, GHB) than other drug categories (e.g., NPS) (Abdulrahim et al., 2016; Ahmed et al., 2016; Bryant et al., 2018; Degenhardt et al., 2006; Desai et al., 2018; Edmundson et al., 2018; Prestage et al., 2018; Roxburgh et al., 2016). Two of these drugs, methamphetamine and GHB, are also commonly used for chemsex (Giorgetti et al., 2017) and have remained the popular drugs of choice for gay men and/or men who have sex with men (MSM) for the past two decades (Palamar, Kiang, Storholm, & Halkitis, 2014). We also estimate that gay men in the EDM scene are not at increased risk for NPS use compared to heterosexual men. This finding is supported by a previous study using data from the Global Drug Survey that found that gay men have lower prevalence of NPS use as compared to heterosexual individuals (Palamar, Barratt, Ferris, & Winstock, 2016).

We estimate that bisexual women in the EDM scene experience a more diverse pattern of drug use than women identifying as gay or lesbian. As compared to heterosexual females, bisexual females are estimated to be at higher odds for powder cocaine, LSD, mushroom, ketamine, and tryptamine use. This represents the widest and most divergent drug use pattern across all sex and sexual orientation groups examined in this study and suggests that bisexual women have higher risk for drug use across drug classifications than members of other sexual orientation groups. Another study examining lesbian and bisexual women involved in the NYC club scene also found that lesbian and bisexual women had high lifetime prevalence rates for cocaine (47.3%), LSD (33.0%), and ketamine (18.7%) use (Parsons et al., 2006). A previous study of bisexual individuals in the U.S. state of California found that lesbian and bisexual females had higher prevalence of cocaine use than heterosexual women (Flentje, Heck, & Sorensen, 2015), and another study found that bisexual women also had higher odds of NPS use as compared to heterosexual women (Palamar et al., 2016). Thus, these findings suggest that bisexual women are uniquely at increased risk for drug use across all drug classifications. Bisexual women may be more inclined to use drugs as a means to cope with the social exclusion from groups based on both gender-based identities and queer identities (Feinstein & Dyar, 2017; Paul, 2014).

Bisexual males are estimated to be at higher odds for use of LSD and unknown powders. Our findings add to previous research on drug use patterns among bisexual men. For example, a recent study of drug use among gay and bisexual men in the U.S. state of California found that they had higher odds of ‘problem’ methamphetamine use with 21.8% of the participants reporting use (Flentje et al., 2015). Situating our findings within the literature on bisexual individuals is challenging as existing research often collapses data for bisexual individuals with lesbians or gay men.

Our study also estimated the prevalence of drug use among individuals identifying as “other” sexuality. Compared to heterosexual females, we estimate that females identifying as “other” sexuality are at higher risk for use of powder cocaine (16.7% among heterosexuals versus 52.2% among “other”) and tryptamines (0.8% among heterosexuals versus 10.6% among “other”). We estimate that compared to heterosexual males, males of “other sexuality” are at higher odds of using mushrooms (11.1% among heterosexuals versus 32.3% among “other”) and/or 2C (2.3% among heterosexuals versus 15.1% among “other”). A recent study from Ireland found that male participants identifying as other sexuality had higher odds for any recreational drug use (other than poppers) than both gay and bisexual men (Barrett et al., 2019). Extant literature among individuals with other sexuality identifiers is extremely limited as studies often exclude these individuals from the analysis or do not query other sexual identities (Roxburgh et al., 2016).

Taken together, these findings provide critical insights into harm reduction programming and messaging for the LGB community. Public health messages are more effective when tailored for specific identities and behaviors (Crano, Alvaro, & Siegel, 2019; Ems & Gonzales, 2016). Given the unique substance use patterns among attendees of EDM events as well as the higher prevalence of drug use in this scene, safer drug use messages should be developed for this context. EDM-specific harm reduction messages such as Amsterdam’s Unity campaign provide holistic harm reduction messages including legal information about substance use, “safe” sources to purchase drugs, testing of drugs, and they recommend water consumption and day-after care (Unity Project, 2019). In addition to tailored messaging, EDM party attendees can benefit if festival organizers provided information about medical services available to attendees and allow drug testing services.

Limitations

First, the study design is cross-sectional which limits our ability to examine temporal associations. All analysis was conducted based on sex (binary) and sexual orientation. Furthermore, we measured sexual orientation at a single point in time. Sexual orientation can shift among adolescence and/or young adulthood (Arnett, 2000) so it is unknown whether all reported drug use occurred during each participant’s self-identified sexual orientation. Recall of drug use is a limitation of this study, but we believe focusing on past-year use (more recent use) helps ameliorate this limitation. Research staff made efforts to ensure that participants were not visibly intoxicated during survey administration; however, it is possible that some participants had used substances prior to arriving at the venue. Possible intoxication (undetected by recruiters) may have added to the difficulty of remembering past experiences of substance use. Although the study was anonymous, as with any study that addresses the use of illegal drugs, social desirability bias and fear of arrest could have contributed to underreporting of drug use. This study did not specifically query poly-drug use – the use of multiple drugs at the same time – and thus prevalence estimates provided may not fully reflect participants’ drug use patterns with regard to polydrug use. We also had a 25% participation refusal rate. We did not record reasons for refusal so we were unable to determine whether there were differential rates of refusal based on demographic factors. Unlike the 1990s and early 2000s, there are now very few gay EDM parties at nightclubs in NYC so the vast majority of parties where recruitment occurred (99

out of 100) were not “gay parties”. Finally, this study may not be generalizable to the larger population outside of EDM party attendees, and generalizability to attendees outside of NYC may also be limited. However, NYC residence was not a requirement to participate in this study.

Conclusion

This study is one of the first to examine the relationship between drug use and sexual orientation within the EDM scene. The results of this study can inform the development of harm reduction programs for the LGB community, specifically tailoring messages for the drugs more commonly used by a particular group. Furthermore, this research highlights the importance of including messages about psychoactive drugs such as “bath salts”, tryptamines, and 2C Series drugs. We believe that additional research is needed among traditionally under-researched members of the LGB community, specifically lesbians, bisexual individuals, and individuals who identify their sexuality outside of the standard LGB labels. Moreover, it is important to understand the unique experiences and risk factors associated with these discrete populations as opposed to larger combined categories (e.g. lesbians and bisexual women). This future research should continue to examine LGB disparities in drug use, including a focus on novel drugs, but it should also examine social contextual correlates of drug use in specific LGB population groups.

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References

- Abdulrahim D, Whiteley C, Moncrieff M, & Bowden-Jones O (2016). Club drug use among lesbian, gay, bisexual and trans (LGBT) people: Novel Psychoactive Treatment UK Network (NEPTUNE). London.
- Ahmed A-K, Weatherburn P, Reid D, Hickson F, Torres-Rueda S, Steinberg P, & Bourne A (2016). Social norms related to combining drugs and sex (“chemsex”) among gay men in South London. *International Journal of Drug Policy*, 38, 29–35. doi:10.1016/j.drugpo.2016.10.007 [PubMed: 27842251]
- Arnett JJ (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, 55(5), 469. doi:10.1037/0003-066X.55.5.469 [PubMed: 10842426]
- Balsam KF, & Mohr JJ (2007). Adaptation to sexual orientation stigma: A comparison of bisexual and lesbian/gay adults. *Journal of Counseling Psychology*, 54(3), 306. doi:10.1037/0022-0167.54.3.306
- Barrett P, O'Donnell K, Fitzgerald M, Schmidt AJ, Hickson F, Quinlan M, ... Igoe D (2019). Drug use among men who have sex with men in Ireland: Prevalence and associated factors from a national online survey. *International Journal of Drug Policy*, 64, 5–12. doi:10.1016/j.drugpo.2018.11.011 [PubMed: 30513421]
- Bryant J, Hopwood M, Dowsett GW, Aggleton P, Holt M, Lea T, ... Treloar C (2018). The rush to risk when interrogating the relationship between methamphetamine use and sexual practice among gay

and bisexual men. *International Journal of Drug Policy*, 55, 242–248. doi:10.1016/j.drugpo.2017.12.010 [PubMed: 29279253]

Corliss HL, Rosario M, Birkett MA, Newcomb ME, Buchting FO, & Matthews AK (2014). Sexual orientation disparities in adolescent cigarette smoking: Intersections with race/ethnicity, gender, and age. *American Journal of Public Health*, 104(6), 1137–1147. doi:10.2105/AJPH.2013.301819 [PubMed: 24825218]

Crano WD, Alvaro EM, & Siegel JT (2019). Creating persuasive substance-use prevention communications: The EQUIP model In *Prevention of substance use* (pp. 303–318). New York, New York: Springer.

Degenhardt L, Dillon P, Duff C, & Ross J (2006). Driving, drug use behaviour and risk perceptions of nightclub attendees in Victoria, Australia. *International Journal of Drug Policy*, 17(1), 41–46. doi:10.1016/j.drugpo.2005.12.004

Demant D, Oviedo-Trespalacios O, Carroll JA, Ferris JA, Maier L, Barratt MJ, & Winstock AR (2018). Do people with intersecting identities report more high-risk alcohol use and lifetime substance use? *International Journal of Public Health*, 63(5), 621–630. doi:10.1007/s00038-018-1095-5 [PubMed: 29605878]

Desai M, Bourne A, Hope V, & Halkitis PN (2018). Sexualised drug use: LGTB communities and beyond. *The International Journal on Drug Policy*, 55, 128–130. doi:10.1016/j.drugpo.2018.04.015 [PubMed: 29801810]

Duncan DT, Zweig S, Hambrick HR, & Palamar JJ (2019). Sexual orientation disparities in prescription opioid misuse among U.S. adults. *American Journal of Preventive Medicine*, 56(1), 17–26. doi:10.1016/j.amepre.2018.07.032 [PubMed: 30467089]

Edmundson C, Heinsbroek E, Glass R, Hope V, Mohammed H, White M, & Desai M (2018). Sexualised drug use in the United Kingdom (UK): A review of the literature. *International Journal of Drug Policy*, 55, 131–148. doi:10.1016/j.drugpo.2018.02.002 [PubMed: 29625796]

Ems L, & Gonzales AL (2016). Subculture-centered public health communication: A social media strategy. *New Media & Society*, 18(8), 1750–1767. doi:10.1177/1461444815570294

European Monitoring Centre for Drugs and Drug Addiction. (2018). *European Drug Report 2018: Trends and Developments* (9294972836). Publications Office of the European Union, Luxembourg: Office for Official Publications of the European Communities.

Feinstein BA, & Dyar C (2017). Bisexuality, minority stress, and health. *Current Sexual Health Reports*, 9(1), 42–49. doi:10.1007/s11930-017-0096-3 [PubMed: 28943815]

Fields EL, Bogart LM, Smith KC, Malebranche DJ, Ellen J, & Schuster MA (2015). “I always felt I had to prove my manhood”: Homosexuality, masculinity, gender role strain, and HIV risk among young Black men who have sex with men. *American Journal of Public Health*, 105(1), 122–131. doi:10.2105/AJPH.2013.301866 [PubMed: 24832150]

Flentje A, Heck NC, & Sorensen JL (2015). Substance use among lesbian, gay, and bisexual clients entering substance abuse treatment: Comparisons to heterosexual clients. *Journal of Consulting and Clinical Psychology*, 83(2), 325. doi:10.1037/a0038724 [PubMed: 25622196]

Giorgetti R, Tagliabracci A, Schifano F, Zaami S, Marinelli E, & Busardò FP (2017). When “chems” meet sex: A rising phenomenon called “chemsex. *Current Neuropharmacology*, 15(5), 762–770. doi:10.2174/1570159X15666161117151148 [PubMed: 27855594]

Graham R, Berkowitz B, Blum R, Bockting W, Bradford J, de Vries B, & Makadon H (2011). *The health of lesbian, gay, bisexual, and transgender people: Building a foundation for better understanding*. Washington, DC: Institute of Medicine.

Green KE, & Feinstein BA (2012). Substance use in lesbian, gay, and bisexual populations: An update on empirical research and implications for treatment. *Psychology of Addictive Behaviors*, 26(2), 265. doi:10.1037/a0025424 [PubMed: 22061339]

Heeringa SG, West BT, & Berglund PA (2010). *Applied survey data analysis*. London: Chapman and Hall: CRC Press.

Hughes CE, Moxham-Hall V, Ritter A, Weatherburn D, & MacCoun R (2017). The deterrent effects of Australian street-level drug law enforcement on illicit drug offending at outdoor music festivals. *International Journal of Drug Policy*, 41, 91–100. doi:10.1016/j.drugpo.2016.12.018 [PubMed: 28131615]

- Jenness SM, Neaigus A, Murrill CS, Gelpi-Acosta C, Wendel T, & Hagan H (2011). Recruitment-adjusted estimates of HIV prevalence and risk among men who have sex with men: Effects of weighting venue-based sampling data. *Public Health Reports*, 126(5), 635–642. doi: 10.1177/003335491112600505 [PubMed: 21886323]
- MacKellar DA, Gallagher KM, Finlayson T, Sanchez T, Lansky A, & Sullivan PS (2007). Surveillance of HIV risk and prevention behaviors of men who have sex with men—a national application of venue-based, time-space sampling. *Public Health Reports*, 122(1_suppl), 39–47. doi: 10.1177/00333549071220S107 [PubMed: 17354526]
- McCabe SE, Hughes TL, Bostwick WB, West BT, & Boyd CJ (2009). Sexual orientation, substance use behaviors and substance dependence in the United States. *Addiction*, 104(8), 1333–1345. doi: 10.1111/j.1360-0443.2009.02596.x [PubMed: 19438839]
- McCabe SE, West BT, Hughes TL, & Boyd CJ (2013). Sexual orientation and substance abuse treatment utilization in the United States: Results from a national survey. *Journal of Substance Abuse Treatment*, 44(1), 4–12. doi:10.1016/j.jsat.2012.01.007 [PubMed: 22444421]
- Medley G, Lipari R, Bose J, Cribb D, Kroutil L, & McHenry G (2016). Sexual orientation and estimates of adult substance use and mental health: Results from the 2015 National Survey on Drug Use and Health. Rockville, MD: Substance Abuse and Mental Health Services Administration, U.S. Department of Health and Human Services.
- Mereish EH, & Bradford JB (2014). Intersecting identities and substance use problems: Sexual orientation, gender, race, and lifetime substance use problems. *Journal of Studies on Alcohol and Drugs*, 75(1), 179–188. doi:10.15288/jsad.2014.75.179 [PubMed: 24411810]
- Miech RA, Johnston LD, O'Malley PM, Bachman JG, Schulenberg JE, & Patrick ME (2018). Monitoring the future national survey results on drug use, 1975–2017: Volume I, secondary school students. Ann Arbor: Institute for Social Research, The University of Michigan
- Palamar JJ, Acosta P, Ompad DC, & Cleland CM (2017). Self-reported Ecstasy/MDMA/“Molly” Use in a sample of nightclub and dance festival attendees in New York City. *Substance Use & Misuse*, 52(1), 82–91. doi:10.1080/10826084.2016.1219373 [PubMed: 27661470]
- Palamar JJ, Barratt MJ, Ferris JA, & Winstock AR (2016). Correlates of new psychoactive substance use among a self-selected sample of nightclub attendees in the United States. *The American Journal on Addictions*, 25(5), 400–407. doi:10.1111/ajad.12403 [PubMed: 27419383]
- Palamar JJ, Griffin-Tomas M, & Ompad DC (2015). Illicit drug use among rave attendees in a nationally representative sample of US high school seniors. *Drug and Alcohol Dependence*, 152, 24–31. doi:10.1016/j.drugalcdep.2015.05.002 [PubMed: 26005041]
- Palamar JJ, Kiang MV, Storholm ED, & Halkitis PN (2014). A qualitative descriptive study of perceived sexual effects of club drug use in gay and bisexual men. *Psychology & Sexuality*, 5(2), 143–160. doi:10.1080/19419899.2012.679363 [PubMed: 24883174]
- Palamar JJ, & Le A (2019). Use of new and uncommon synthetic psychoactive drugs among a nationally representative sample in the United States, 2005–2017. *Human Psychopharmacology: Clinical and Experimental*, 34(2), e2690. doi:10.1002/hup.2690 [PubMed: 30843283]
- Parsons JT, Kelly BC, & Wells BE (2006). Differences in club drug use between heterosexual and lesbian/bisexual females. *Addictive Behaviors*, 31(12), 2344–2349. doi:10.1016/j.addbeh.2006.03.006 [PubMed: 16632210]
- Paul JP (2014). The bisexual identity: An idea without social recognition In *Origins of sexuality and homosexuality* (pp. 45–64). New York, New York: Routledge.
- Prestage G, Hammoud M, Jin F, Degenhardt L, Bourne A, & Maher L (2018). Mental health, drug use and sexual risk behavior among gay and bisexual men. *International Journal of Drug Policy*, 55, 169–179. doi:10.1016/j.drugpo.2018.01.020 [PubMed: 29429865]
- R Core Team (2013). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria <http://www.R-project.org>
- Roxburgh A, Lea T, de Wit J, & Degenhardt L (2016). Sexual identity and prevalence of alcohol and other drug use among Australians in the general population. *International Journal of Drug Policy*, 28, 76–82. doi:10.1016/j.drugpo.2015.11.005 [PubMed: 26691433]

- Schuler MS, Rice CE, Evans-Polce RJ, & Collins RL (2018). Disparities in substance use behaviors and disorders among adult sexual minorities by age, gender, and sexual identity. *Drug and Alcohol Dependence*, 189, 139–146. doi:10.1016/j.drugalcdep.2018.05.008 [PubMed: 29944989]
- Schuler MS, Stein BD, & Collins RL (2019). Differences in substance use disparities across age groups in a national cross-sectional survey of lesbian, gay, and bisexual adults. *LGBT Health*, 6(2), 68–76. doi:10.1089/lgbt.2018.0125 [PubMed: 30735084]
- Smalley KB, Warren JC, & Barefoot KN (2016). Differences in health risk behaviors across understudied LGBT subgroups. *Health Psychology*, 35(2), 103–114. doi:10.1037/hea0000231 [PubMed: 26375040]
- Unity Project. (2019). Info for tourists. Retrieved from <https://www.unity.nl/themas/info-for-tourists/#0>
- Zawilska JB, & Andrzejczak D (2015). Next generation of novel psychoactive substances on the horizon—A complex problem to face. *Drug and Alcohol Dependence*, 157, 1–17. doi:10.1016/j.drugalcdep.2015.09.030 [PubMed: 26482089]

Table 1.Sample characteristics ($N = 3066$).

	<i>N</i>	Weighted % (95% CI)
Age		
18–24	1829	59.8 (57.1, 62.5)
25–40	1237	40.2 (37.5, 42.9)
Sex		
Male	1720	55.8 (53.0, 58.6)
Female	1346	44.2 (41.4, 47.0)
Race/ethnicity		
White	1679	52.1 (49.3, 54.9)
Black	235	7.7 (6.26, 9.5)
Hispanic	531	18.5 (16.3, 20.8)
Asian	377	14.6 (12.7, 16.7)
Other/mixed	244	7.2 (5.9, 8.7)
Education		
High school or less	466	19.4 (17.1, 21.9)
Some college	827	25.5 (23.2, 27.9)
College degree	1351	41.9 (39.2, 44.7)
Graduate school	422	13.3 (11.5, 15.2)
Weekly income		
<\$500	1472	48.6 (45.8, 51.4)
\$500	1594	51.4 (48.6, 54.2)
Sexual orientation		
Heterosexual	2413	82.4 (80.2, 84.4)
Gay/Lesbian	277	8.2 (6.8, 9.9)
Bisexual	293	7.3 (6.0, 8.9)
Other sexuality	83	2.2 (1.4, 3.2)
Past-year drug use		
Any drug use	1730	42.3 (39.6, 45.0)
Ecstasy/MDMA/molly	1237	26.5 (24.4, 28.8)
Powder cocaine	990	21.6 (19.6, 23.8)
LSD	686	13.0 (11.4, 14.7)
Mushrooms	587	11.1 (9.8, 12.7)
Ketamine	461	6.3 (5.4, 7.4)
Bath salts	104	3.0 (2.2, 4.0)
Unknown powders	102	2.1 (1.4, 3.0)
Tryptamines	107	1.9 (1.4, 2.6)
Methamphetamine	102	1.8 (1.2, 2.7)
2C series	105	1.7 (1.2, 2.4)
GHB	108	1.6 (1.2, 2.1)
NBOMe	70	1.6 (1.1, 2.4)

“Any drug use” indicates the participant reported use of any of the 12 drugs considered in analyses.

CI: confidence interval.

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Table 2.

Bivariable tests comparing prevalence of past-year drug use according to sexual orientation.

Any drug	Full sample, % (95% CI) (n = 3066)	Males, % (95% CI) (n = 1720)	Females, % (95% CI) (n = 1346)
Any drug			
Heterosexual	39.6 (36.7, 42.5) **	43.8 (39.7, 47.9) **	34.1 (30.2, 38.2) **
Gay/lesbian	54.6 (44.3, 64.6)	61.0 (48.2, 72.4)	34.1 (20.3, 51.3)
Bisexual	52.3 (42.2, 62.2)	54.4 (35.5, 72.1)	51.4 (39.6, 63.1)
Other sexuality	63.8 (41.5, 81.4)	68.3 (33.0, 90.4)	62.2 (35.2, 83.3)
Ecstasy/MDMA/Molly			
Heterosexual	25.0 (22.6, 27.5) *	26.2 (22.9, 29.7) **	23.4 (20.2, 27.0)
Gay/lesbian	37.1 (28.7, 46.4)	43.1 (32.5, 54.4)	17.7 (9.2, 31.3)
Bisexual	31.2 (23.1, 40.6)	34.2 (20.4, 51.5)	30.0 (20.6, 41.5)
Other sexuality	29.8 (17.2, 46.4)	51.7 (24.2, 78.1)	21.9 (10.6, 39.9)
Powder cocaine			
Heterosexual	20.0 (17.8, 22.3) **	22.4 (19.3, 25.9)	16.7 (14.0, 25.7) ***
Gay/lesbian	26.8 (19.9, 35.0)	30.5 (22.0, 40.7)	14.8 (8.0, 25.7)
Bisexual	27.6 (19.5, 37.4)	22.0 (12.0, 36.9)	29.8 (19.8, 42.1)
Other sexuality	45.4 (27.2, 64.9)	26.4 (11.1, 50.8)	52.2 (28.5, 75.0)
LSD			
Heterosexual	11.8 (10.1, 13.6) ***	13.5 (11.1, 16.3) **	9.4 (7.4, 11.9) *
Gay/lesbian	13.6 (9.3, 19.6)	13.7 (8.8, 20.8)	13.3 (6.1, 26.5)
Bisexual	23.0 (16.6, 31.1)	33.7 (19.3, 51.8)	18.9 (12.5, 27.3)
Other sexuality	22.4 (10.7, 41.1)	30.8 (13.1, 56.9)	19.4 (6.5, 45.2)
Mushrooms			
Heterosexual	9.8 (8.37, 11.5) ***	11.1 (9.1, 13.5)	8.1 (6.2, 10.5) ***
Gay/lesbian	14.9 (10.1, 21.5)	13.3 (8.4, 20.5)	20.0 (9.6, 37.0)
Bisexual	18.1 (12.4, 25.6)	14.8 (7.0, 28.4)	19.4 (12.5, 28.9)
Other sexuality	23.8 (12.6, 40.4)	32.3 (14.0, 58.2)	20.8 (8.6, 42.4)
Ketamine			
Heterosexual	5.6 (4.6, 6.8) **	6.7 (5.3, 8.5) **	4.1 (3.0, 5.7) **

	Full sample, % (95% CI) (n = 3066)	Males, % (95% CI) (n = 1720)	Females, % (95% CI) (n = 1346)
Gay/lesbian	10.3 (6.6, 15.7)	11.7 (7.1, 18.7)	5.5 (2.4, 12.3)
Bisexual	8.0 (5.1, 12.4)	4.2 (2.1, 8.13)	9.5 (5.6, 15.6)
Other sexuality	12.5 (6.8, 22.0)	21.9 (8.6, 45.5)	9.2 (4.2, 18.9)
Bath salts			
Heterosexual	3.1 (2.2, 4.4)	4.2 (2.8, 6.4)	1.7 (0.9, 3.1)
Gay/lesbian	1.9 (0.6, 5.6)	1.3 (0.5, 3.6)	4.0 (0.6, 23.5)
Bisexual	2.3 (1.1, 4.9)	2.4 (0.6, 8.8)	2.3 (0.9, 5.7)
Other Sexuality	2.6 (0.8, 8.1)	4.9 (1.1, 19.0)	1.8 (0.3, 10.1)
Unknown powders			
Heterosexual	1.9 (1.2, 3.0)	2.2 (1.2, 4.0) *	1.4 (0.7, 3.0)
Gay/lesbian	2.0 (0.6, 6.0)	1.7 (0.4, 7.8)	2.9 (0.7, 11.2)
Bisexual	3.8 (1.6, 8.5)	8.8 (2.7, 25.0)	1.8 (0.7, 4.6)
Other sexuality	4.7 (1.7, 12.1)	9.4 (2.2, 32.7)	3.0 (0.8, 10.6)
Tryptamines			
Heterosexual	1.7 (1.2, 2.5) *	2.4 (1.6, 3.7) *	0.8 (0.5, 1.4) **
Gay/lesbian	1.4 (0.4, 5.4)	0.6 (0.2, 1.8)	4.0 (0.6, 23.5)
Bisexual	2.0 (1.0, 4.2)	3.6 (1.3, 10.0)	1.4 (0.5, 23.5)
Other sexuality	10.0 (2.3, 35.1)	8.6 (2.3, 27.3)	10.6 (1.6, 46.4)
Methamphetamine			
Heterosexual	1.3 (0.8, 2.2) ***	1.4 (0.8, 2.6) ***	1.2 (0.6, 2.6)
Gay/lesbian	6.4 (3.0, 13.5)	8.3 (3.8, 17.4)	0.5 (0.1, 3.5)
Bisexual	2.4 (0.8, 7.5)	6.8 (1.6, 24.6)	0.7 (0.3, 1.7)
Other sexuality	0.6 (0.1, 2.6)	0.0 (0.0)	0.8 (0.2, 3.5)
2C series			
Heterosexual	1.6 (1.1, 2.5)	2.3 (1.4, 3.7) *	0.7 (0.3, 1.7)
Gay/lesbian	2.5 (0.8, 7.5)	3.3 (1.0, 9.8)	0.1 (0.0, 1.0)
Bisexual	0.9 (0.3, 2.4)	0.9 (0.3, 2.3)	0.8 (0.2, 3.5)
Other sexuality	4.5 (1.8, 11.0)	15.1 (5.1, 37.0)	0.7 (0.1, 3.5)
GHB			
Heterosexual	0.9 (0.6, 1.5) ***	1.1 (0.6, 1.9) ***	0.7 (0.3, 1.6) **

	Full sample, % (95% CI) (<i>n</i> = 3066)	Males, % (95% CI) (<i>n</i> = 1720)	Females, % (95% CI) (<i>n</i> = 1346)
Gay/lesbian	8.6 (5.4, 13.4)	9.5 (5.8, 15.0)	5.8 (1.4, 21.5)
Bisexual	1.0 (0.4, 2.5)	1.2 (0.5, 2.7)	0.9 (0.2, 3.4)
Other sexuality	1.0 (0.2, 5.4)	3.2 (0.4, 20.4)	0.2 (0.0, 1.4)
NBOMe			
Heterosexual	1.6 (1.0, 2.6)	2.5 (1.5, 4.1)	0.5 (0.2, 1.0)
Gay/lesbian	1.7 (0.7, 4.0)	2.2 (1.0, 5.3)	0.0 (0.0, 0.0)
Bisexual	1.5 (0.7, 3.1)	3.1 (1.1, 8.4)	0.9 (0.3, 2.3)
Other sexuality	0.7 (0.2, 2.7)	2.5 (1.6, 3.9)	0.0 (0.0, 0.0)

“Any drug use” indicates the participant reported use of any of the 12 drugs considered in analyses.

* $p < .05$,

** $p < .01$,

*** $p < .001$.

CI: confidence interval.

Table 3.

Multivariable models examining sexual orientation in relation to past-year drug use.

	Full sample aOR (95% CI)	Males aOR (95% CI)	Females aOR (95% CI)
Any drug			
Heterosexual	1.00	1.00	1.00
Gay/Lesbian	1.68 (1.08, 2.60) *	1.80 (1.04, 3.12) *	1.13 (0.56, 2.27)
Bisexual	1.66 (1.09, 2.50) *	1.44 (0.70, 3.01)	2.04 (1.23, 3.38) **
Other sexuality	2.73 (1.04, 7.19) *	2.54 (0.60, 10.84)	3.40 (0.99, 11.73)
Ecstasy/MDMA/Molly			
Heterosexual	1.00	1.00	1.00
Gay/Lesbian	1.73 (1.16, 2.60) **	2.07 (1.28, 3.36) **	0.71 (0.32, 1.57)
Bisexual	1.36 (0.89, 2.06)	1.43 (0.72, 2.83)	1.37 (0.80, 2.32)
Other Sexuality	1.21 (0.58, 2.56)	3.15 (0.95, 10.52)	0.91 (0.36, 2.27)
Powder Cocaine			
Heterosexual	1.00	1.00	1.00
Gay/Lesbian	1.31 (0.86, 1.99)	1.35 (0.82, 2.22)	0.91 (0.44, 1.90)
Bisexual	1.50 (0.92, 2.45)	0.90 (0.42, 1.92)	2.05 (1.14, 3.71) *
Other sexuality	3.17 (1.29, 7.79) *	1.12 (0.36, 3.48)	5.52 (1.76, 17.31) **
LSD			
Heterosexual	1.00	1.00	1.00
Gay/Lesbian	1.21 (0.74, 1.98)	1.13 (0.62, 2.04)	1.71 (0.70, 4.18)
Bisexual	2.24 (1.44, 3.49) ***	3.29 (1.50, 7.20) **	2.22 (1.28, 3.84) **
Other sexuality	2.23 (0.87, 5.74)	2.78 (0.79, 9.81)	2.31 (0.65, 8.23)
Mushrooms			
Heterosexual	1.00	1.00	1.00
Gay/Lesbian	1.54 (0.94, 2.51)	1.25 (0.71, 2.20)	3.27 (1.33, 8.02) *
Bisexual	2.01 (1.24, 3.26) **	1.28 (0.54, 3.02)	2.71 (1.45, 5.06) **
Other sexuality	2.66 (1.16, 6.09) *	4.38 (1.38, 13.91) *	2.67 (0.85, 8.37)
Ketamine			
Heterosexual	1.00	1.00	1.00

	Full sample aOR (95% CI)	Males aOR (95% CI)	Females aOR (95% CI)
Gay/Lesbian	1.68 (0.99, 2.86)	1.60 (0.85, 3.03)	1.44 (0.55, 3.76)
Bisexual	1.42 (0.83, 2.40)	0.52 (0.24, 1.14)	2.41 (1.25, 4.63)**
Other sexuality	2.26 (1.07, 4.78)*	3.15 (0.93, 10.69)	2.43 (0.91, 6.45)
Bath salts			
Heterosexual	1.00	1.00	1.00
Gay/Lesbian	0.74 (0.21, 2.53)	0.37 (0.11, 1.21)	3.29 (0.36, 29.71)
Bisexual	0.80 (0.34, 1.86)	0.54 (0.12, 2.39)	1.37 (0.40, 4.69)
Other sexuality	0.94 (0.25, 3.53)	1.56 (0.28, 8.80)	1.17 (0.16, 8.78)
Unknown powders			
Heterosexual	1.00	1.00	1.00
Gay/Lesbian	0.95 (0.27, 3.33)	0.75 (0.14, 4.05)	1.83 (0.27, 12.28)
Bisexual	1.90 (0.68, 5.28)	4.18 (1.12, 15.67)*	1.13 (0.32, 4.06)
Other sexuality	2.00 (0.58, 6.88)	2.83 (0.38, 21.28)	2.00 (0.46, 8.60)
Tryptamines			
Heterosexual	1.00	1.00	1.00
Gay/Lesbian	0.68 (0.25, 1.81)	0.34 (0.10, 1.21)	3.27 (0.59, 18.02)
Bisexual	1.59 (0.86, 2.95)	1.07 (0.46, 2.50)	3.19 (1.24, 8.24)*
Other sexuality	3.13 (0.96, 10.18)	2.22 (0.58, 8.50)	7.25 (1.64, 32.08)**
Methamphetamine			
Heterosexual	1.00	1.00	1.00
Gay/Lesbian	3.83 (1.55, 9.45)**	4.41 (1.62, 12.00)**	0.47 (0.05, 4.49)
Bisexual	1.88 (0.56, 6.32)	4.17 (0.92, 18.91)	0.58 (0.15, 2.32)
Other sexuality	0.43 (0.08, 2.21)	-	0.46 (0.06, 3.35)
2C Series			
Heterosexual	1.00	1.00	1.00
Gay/Lesbian	1.76 (0.51, 6.03)	1.82 (0.51, 6.52)	0.17 (0.01, 2.63)
Bisexual	0.51 (0.16, 1.59)	0.38 (0.12, 1.16)	1.09 (0.21, 5.59)
Other sexuality	2.63 (0.86, 7.97)	7.31 (1.65, 32.38)**	0.97 (0.16, 5.90)
GHB			
Heterosexual	1.00	1.00	1.00

	Full sample aOR (95% CI)	Males aOR (95% CI)	Females aOR (95% CI)
Gay/Lesbian	10.68 (5.41, 21.07) ***	11.59 (5.27, 25.47) ***	6.76 (1.19, 38.43) *
Bisexual	0.95 (0.33, 2.78)	1.03 (0.34, 3.13)	1.01 (0.18, 5.70)
Other sexuality	0.75 (0.12, 4.69)	1.43 (0.14, 15.02)	0.15 (0.01, 1.68)
NBOMe			
Heterosexual	1.00	1.00	1.00
Gay/Lesbian	1.34 (0.45, 3.99)	1.11 (0.35, 3.49)	-
Bisexual	0.97 (0.40, 2.36)	1.45 (0.41, 5.11)	2.32 (0.51, 10.63)
Other Sexuality	0.42 (0.09, 2.04)	1.16 (0.21, 6.28)	-

Note: aOR: adjusted odds ratio, controlling for age, race/ethnicity, education, and weekly income. “Any drug use” indicates the participant reported use of any of the 12 drugs considered in analyses.

CI: confidence interval.

“—” indicates that estimate could not be computed due to too few participants in that cell.

* $p < .05$,
** $p < .01$,
*** $p < .001$.

Table 4.

Sexual orientation in relation to number of drugs used in the past year.

	Full sample IRR (95% CI)	Males IRR (95% CI)	Females IRR (95% CI)
Unadjusted models			
Heterosexual	1.00	1.00	1.00
Gay/Lesbian	1.67 (1.26, 2.21)***	1.61 (1.17, 2.21)**	1.39 (0.76, 2.56)
Bisexual	1.44 (1.16, 1.80)**	1.40 (0.93, 2.10)	1.69 (1.29, 2.22)***
Other sexuality	1.90 (1.30, 2.77)**	2.26 (1.24, 4.12)**	2.03 (1.25, 3.29)**
	Full sample aIRR (95% CI)	Males aIRR (95% CI)	Females aIRR (95% CI)
Adjusted models			
Heterosexual	1.00	1.00	1.00
Gay/Lesbian	1.64 (1.22, 2.21)**	1.61 (1.16, 2.23)**	1.44 (0.83, 2.48)
Bisexual	1.38 (1.12, 1.70)**	1.30 (0.90, 1.89)	1.63 (1.26, 2.12)***
Other sexuality	1.93 (1.27, 2.93)**	2.29 (1.19, 4.40)*	2.17 (1.21, 3.90)**

Note: IRR: incidence rate ratio; aIRR: adjusted IRR controlling for age, race/ethnicity, education, and weekly income; CI: confidence interval.

* $p < .05$,

** $p < .01$,

*** $p < .001$.