



Published in final edited form as:

J Sex Res. 2015 ; 52(6): 659–668. doi:10.1080/00224499.2014.918085.

Prescription Drug Misuse and Sexual Behavior among Young Adults

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Abstract

Though research indicates a complex link between substance use and sexual risk behavior, there is limited research on the association between sexual risk behavior and prescription drug misuse. In light of the alarming increases in prescription drug misuse and the role of demographic characteristics in sexual risk behavior and outcomes, the current study examines demographic differences (gender, sexual identity, age, relationship status, parental class background, and race/ethnicity) in sexual risk behavior, sexual behavior under the influence of prescription drugs, and sexual risk behavior under the influence of prescription drugs in a sample of 402 young adults (18–29) who misuse prescription drugs. Nearly half of the sexually active young adult prescription drug misusers in this sample reported recent sex under the influence of prescription drugs, more than three quarters reported recent sex without a condom, and more than one-third reported recent sex without a condom after using prescription drugs. Zero-inflated Poisson regression models indicated that white race, younger age, higher parental class, and being a heterosexual man were all associated with sexual risk behavior, sex under the influence of prescription drugs, and sexual risk under the influence of prescription drugs. Findings have implications for the targeting of prevention and intervention efforts.

Keywords

prescription drug misuse; sexual risk behavior; young adults; gender; sexual identity; race/ethnicity

Research often links alcohol and other drug (AOD) use to sexual risk behavior (King, Nguyen, Kosterman, Bailey, & Hawkins, 2012; Patrick, O'Malley, Johnston, Terry-McElrath, & Schulenberg, 2012; Wells, Kelly, Golub, Grov, & Parsons, 2010), including unprotected sex, sex with multiple or unknown partners, and HIV transmission and sexually transmitted infection. However, this body of research also indicates the complexity of the connections between substance use and sexual risk behavior, with the associations varying

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by personality, demographics, substance type and dose, and contextual factors (Cooper, Peirce, & Huselid, 1994; Khan, Berger, Wells, & Cleland, 2012; King, et al., 2012; Newcomb, 2013; Vosburgh, Mansergh, Sullivan, & Purcell, 2012).

Despite recent increases in prescription drug misuse, there is limited research on the association between sexual risk behavior and prescription drug misuse, and the demographic factors that may influence this association. Prescription drug misuse has increased dramatically in recent decades (Compton & Volkow, 2006; Johnston, O'Malley, Bachman, & Schulenberg, 2012), particularly among young adults. Results from the 2012 National Survey on Drug Use and Health (NSDUH) indicate that 5.3% of 18–25 year olds report past month nonmedical use of prescription drugs (Substance Abuse and Mental Health Services Administration, 2013). Studies of college students indicate even higher rates of use, with 25% of college students reporting illicit prescription stimulant use ever during college in one sample (Bavarian, Flay, Ketcham, & Smit, 2013) and 10.6% reporting past year nonmedical prescription stimulant use in another sample of college students (Egan, Reboussin, Blocker, Wolfson, & Sutfin, 2013). Surveys in New York City bars and clubs find even higher rates of misuse among young adults (18–29 year olds), with 46.7% reporting lifetime prescription drug misuse and 22.4% reporting misuse in the prior three months (Kelly et al., 2013a). Rates of prescription drug misuse are particularly concerning considering the host of negative health consequences associated with their misuse, including psychiatric disorders, other substance use and binge drinking (McCabe, Boyd, & Teter, 2009), and the potential for overdose (Paulozzi, Budnitz, & Xi, 2006). However, sexual risk behavior has not been widely examined in association with prescription drug misuse.

In the few studies that have examined associations between prescription drug misuse and sexual risk behavior, research consistently indicates that, when compared to individuals who do not report prescription drug misuse, prescription drug misusers are more likely to report HIV risk behavior (Kelly & Parsons, 2013) and report higher rates of HIV risk behavior, including more partners and more unprotected sex acts (Benotsch, Koester, Luckman, Martin, & Cejka, 2011; Benotsch, Martin, Koester, Cejka, & Luckman, 2011; Bonar, Cunningham, Chermack, Blow, Barry, Booth, & Walton, 2014; Kelly & Parsons, 2013). In a study of risky behaviors among college students, the frequency of prescription drug use without a prescription was positively associated with sexual risk behavior using a metric that assessed and summed across a range of sexual risk behaviors (condom use, AOD use prior to sex, relationship status, sexual regret, etc.) (Miller, 2008). Further, among men who have sex with men (MSM), those who reported recently having sex after misusing prescription drugs were more likely than those who did not combine sex with prescription drugs to report having unprotected anal sex (Kelly & Parsons, 2013). Analyses also indicate that misuse of two or three classes of prescription drugs (vs. one class or no prescription drug misuse) is associated with higher odds of reporting multiple sexual partners (Bonar et al., 2014).

Present Study

While research has examined sexual risk behavior differences between prescription drug misusers and non-misusers, and has examined associations between sexual risk and prescription drug misuse among gay and bisexual men, no research, to our knowledge, has

examined demographic differences in the likelihood of combining prescription drugs with sexual behavior and in engaging in sexual risk behavior under the influence of prescription drugs. Because prescription drug abusers represent a potentially risky population, it is critical to examine overall rates of sexual risk behaviors as well as demographic differences in sexual risk behaviors within samples of individuals who misuse prescription drugs. Further, because negative sexual health outcomes (HIV, STI, and unintended pregnancy) differentially affect demographic groups and because prevention and intervention efforts need to be targeted in specific ways to each of these groups, it is critical to better understand the demographic factors associated with sexual behavior and sexual risk behavior under the influence of prescription drugs. As such, the current study examines demographic differences (gender, sexual identity, age, relationship status, parental class background, and race/ethnicity) in sexual risk behavior, sexual behavior under the influence of prescription drugs, and sexual risk behavior under the influence of prescription drugs in a sample of young adults (ages 18–29) who misuse prescription drugs. Because of the inconsistency in previous literature examining the associations between AOD and sexual risk behavior, we do not make any directional hypotheses regarding demographic predictors of these associations.

Methods

Procedure

To generate the sample for this study, we utilized time-space sampling between December 2010 and June 2013 in a wide range of urban venues that house youth cultural scenes, supplemented by online scene-targeted recruitment. Time-space sampling was originally developed to capture hard-to-reach populations (MacKellar, Valleroy, Karon, Lemp, & Janssen, 1996; Muhib et al., 2001; Stueve, O'Donnell, Duran, San Doval, & Blome, 2001), but it has also been useful in generating estimates of venue-based populations (Parsons, Grov, & Kelly, 2008). As young adults active in nightlife scenes can be considered a venue-based population, we used venues as our basic unit of sampling in order to systematically generate a sample of socially active young adults involved in urban nightlife. We captured a range of variability among these young adults through randomizing 1) the venues attended and 2) the days and times we attended them.

We randomized “time” and “space” using a sampling frame of venues and times of operation. To construct the sampling frame, ethnographic fieldwork conducted over the previous twelve months enabled the assessment of “socially viable” venues for each day of the week. A venue was deemed socially viable if a threshold of young adult patron traffic existed at the venue on that given day of the week. We generated lists of socially viable venues for each day of the week across several key youth cultures – e.g. electronic dance music (EDM) venues, gay clubs, lesbian parties and clubs, indie rock venues, and the Brooklyn warehouse scene. The venues included bars, clubs, lounges, warehouse or loft spaces, and performance spaces. For each day of the week (Monday-Sunday), all socially viable venues were listed and assigned a number. Using a random digit generator, a random number was drawn corresponding to a particular venue on a particular day, yielding our schedule of venues for each month. Recruitment shifts were three hours per shift, and times

of recruitment corresponded to the opening and closing times of the venue, starting and end times of parties or concerts, and/or ethnographic field work indicating peak attendance times at each of the venues. As such, recruitment generally happened between six p.m. and three a.m.

At the venue (either inside or outside of the venue, depending on weather, noise-level, and venue staff decisions about recruitment staff venue entrance), staff attempted to survey as many individuals as possible, aiming to achieve saturation. Staff approached a patron, identified themselves, described the anonymous brief survey as a survey designed to gather information about health behaviors among people involved in nightlife scenes, and requested verbal consent for survey participation. The survey was conducted on an iPod Touch®, designed using iFormBuilder™ software, and required roughly three minutes to complete. For those who provided consent, the beginning of the brief survey was administered by trained staff (consent, age, and NYC residency) and individuals self-reported more sensitive information (race, sexual orientation, gender, sexual behavior, and substance use) to maximize confidentiality of sensitive information and minimize bias of reporting sensitive behavior in a public setting. Staff members were trained not to administer surveys to individuals who were visibly impaired by intoxication of any kind to ensure the capacity to consent, though recruiters were not asked to track the number of people who were not approached because of intoxication. In total, recruiters approached 17,022 individuals during venue-based recruitment. Of these, 12,885 consented to the survey (75% response rate), and 10,879 of those lived in NYC and completed the survey. Of the 10,879 completed surveys, 1,018 individuals were eligible for the full project (9.4% eligibility rate; see eligibility criteria below).

If venue patrons were eligible for the full study, they were given a brief description of the study and asked to provide contact information if they were interested in participating. Later in the timeline of study enrollment, the recruiters also provided eligible patrons the opportunity to verify age and identity at the point of recruitment so that participation in the full study could then be completed online. Of the 1,018 eligible individuals, 788 (77.4%) provided some form of contact information. Of those providing contact information (though not all contact information turned out to be valid), 343 were enrolled in the study (43.5% of contacts). Near the end of the project, recruitment was also supplemented by scene-targeted recruitment via online groups associated with the scenes of interest. The research team first developed a list of these groups that were relevant to each of the scenes of interest. Group members who were between the ages of 18–29 and resided in the NYC metropolitan area were invited to a Qualtrics® survey (via an advertisement) that screened for study eligibility and, if eligible, collected their contact information. Less than 5% of the sample was recruited via this supplemental online method.

Regardless of recruitment location, research staff contacted participants by phone and e-mail to provide more information about the study, confirm eligibility, and schedule the initial assessment (or send them the link to the online survey if they showed proof of age and identity in the field). Eligibility criteria were as follows: (1) being aged 18–29; (2) having reported the misuse of prescription drugs at least three times in the past six months; and (3) having reported the misuse of prescription drugs at least once in the past three months.

Prescription drug misuse was defined in the screening surveys as having used a prescription drug “in a way other than prescribed or without a prescription.”

During their initial assessment, from which current data are drawn, participants completed the informed consent process, then completed the survey (either online via Qualtrics or in our research office via ACASI). Once completed, participants were compensated \$50 in cash, by check, or by Amazon.com gift card (depending on their preference). All procedures were reviewed and approved by the Institutional Review Boards of Purdue University and the City University of New York (CUNY).

Measures

Participants self-reported all demographic information in the survey portion of their assessment (age, race/ethnicity, gender, and sexual identity). All sexual behaviors were asked using a three-month (90 day) recall period, as a three-month recall period has been shown to produce reliable data (Napper, Fisher, Reynolds, & Johnson, 2010). Participants were first asked to indicate their relationship status. If in a relationship, they were asked to report the number of times they engaged in a variety of sexual behaviors with their main partner (oral, vaginal sex with a condom and vaginal sex without a condom, and anal sex with and without a condom) in total, after drinking, while sober, and after using prescription drugs. They were asked these questions separately for male and female main partners, with the appropriate response options for each gender pair configuration (i.e., men with female partners were asked about all behaviors, whereas women with female partners were not asked about vaginal and anal sex with those partners). All participants were asked to report their total number of non-main partners and the gender of those partners (male only, female only, both male and female partners) and then asked, with those partners, the number of times they engaged in oral, vaginal sex with and without a condom, and anal sex with and without a condom, in total, after drinking, while sober, and after using prescription drugs. Similar to the main partner questions, vaginal and anal sex were only asked about for women who reported recent sex with a male partner(s). The totals for vaginal and anal sex for each partner type were combined to calculate the total number of vaginal and anal sex acts while sober, the total number of vaginal and anal sex acts without a condom, the total number of vaginal and anal sex acts after using prescription drugs, and the total number of vaginal and anal sex acts without a condom after using prescription drugs (collapsed across partner type).

Data Analysis

Zero-inflated Poisson regression models were used to model the number of vaginal and anal sex acts, the number of vaginal and anal sex acts without a condom, the number of vaginal or anal sex acts under the influence of prescription drugs, and the number of vaginal and anal sex acts without a condom that were under the influence of prescription drugs. Poisson regression models were used because these variables constitute count variables and the Poisson distribution is appropriate for the analysis of count data (Coxe, West, & Aiken, 2009). Because of a large number of cases with values of zero, we utilized a zero-inflated version of the Poisson model in Mplus version 7.1. Zero-inflated Poisson models were utilized to better estimate both the likelihood of the occurrence of each behavior (using a

logit model to model the likelihood of a true zero) while also modeling the count frequency outcome for each outcome variable (using a Poisson count model). In contrast to ordinary Poisson models, the zero-inflated Poisson is a two-part model that simultaneously models a binary and a count outcome (Hilbe, 2011). This simultaneous modeling process accounts for an excess of zeroes by assuming that they were generated by two processes – one process that leads to structural or “true” zeroes (i.e., individuals for whom a value on the outcome can be assumed to be not applicable) and another process that operates under a Poisson distribution of counts, which can include some zeroes. This flexible approach to simultaneously modeling excess zeroes allows for the specification of distinct predictors of “true” zeroes versus the count distribution, though the same set of processes (i.e., predictors) can also be used. In the case of sexual behavior, such a model is useful for determining processes that distinguish individuals who do and do not engage in a behavior (e.g., unprotected vaginal or anal intercourse) from those who do while simultaneously examining the processes that lead to the frequency of engagement in the behavior (which, for some people, may be zero).

Results

Sample Characteristics

We enrolled 404 young adults (ages 18–29; $M = 24.57$, $SD = 2.69$) who reported misusing prescription drugs at least three times in the past six months and at least once in the last three months. Sample enrollment was stratified to enroll gay and bisexual men, heterosexual men, heterosexual women, and lesbian and bisexual women. Two participants identified as transgender and, because insufficient power prevented analyses with that group, these two participants were excluded, creating an analytic sample of 402. A majority of the sample was white (67%) and largely raised in middle class, upper middle class, or rich homes (77%). These racial characteristics reflect the venues in which recruitment happened (over 40% of those approached were white) and also reflect higher rates of eligibility among white venue patrons. In terms of prescription drug misuse, 70.9% of the sample reported past 90-day misuse of prescription painkillers, 74.4% reported recent misuse of a prescription sedative, and 69.4% reported recent prescription stimulant misuse. Most participants reported using drugs from two or three classes of prescription drugs (painkillers, sedatives, and stimulants), with only 23.6% reporting single class misuse. See Table 1 for sample demographics.

Sexual Behavior

In total, 75.6% of the sample reported any vaginal or anal sex during the preceding 90 days, with a median of 10 acts during that time (ranging from 0 – 196). Of those who had vaginal or anal sex, 78.3% reported sex without a condom, with a median of six acts without a condom (ranging from 0 – 150). Of those who were sexually active, 47.4% reported vaginal or anal sex under the influence of a prescription drug, with a range of 0 – 80 acts under the influence. Finally, 35.9% of the sexually active participants reported sex without a condom while under the influence of prescription drugs, with a range of 0 – 80 acts without a condom after using prescription drugs.

To better understand the various demographic factors associated with sexual risk behavior, sex under the influence of prescription drugs, and sexual risk behavior under the influence of prescription drugs, zero inflated Poisson regressions were run (as described above), with all of the predictors entered simultaneously. Predictors included relationship status (dichotomized into single or partnered), age, race/ethnicity (white vs. non-white), parental class (middle class and above vs. poor and working class), and the gender by sexual orientation categories (gay/bisexual men, heterosexual men, heterosexual women, lesbian/bisexual women). See Table 2.

The logit portion of the zero-inflated Poisson models (left side of Table 2) can be interpreted as the odds of being a true zero on the given outcome. Thus, in these analyses, the odds can be interpreted as the odds of not engaging in the behavior. Compared to participants of color, White participants had *lower* odds of being vaginally or anally sexually *inactive* (AOR = .22, $p < .001$; i.e., white participants had higher odds of being sexually active, compared to participants of color) and white participants also reported more vaginal and/or anal sex acts than participants of color (ARR = 2.68, $p < .001$). Lesbian and bisexual women had *higher* odds of being vaginally or anally sexually *inactive* than heterosexual men (AOR = 8.04, $p < .001$; i.e., heterosexual men had higher odds of being sexually active compared to lesbian and bisexual women). Gay and bisexual men reported fewer vaginal and anal sex acts than heterosexual men (ARR = .74, $p = .054$).

White participants had *lower* odds of *not* reporting unprotected vaginal or anal sex than participants of color (AOR = .33, $p = .001$; i.e., white participants had higher odds of having any unprotected vaginal or anal sex) and reported a greater number of acts without a condom than participants of color (ARR = 3.23, $p < .001$). Gay and bisexual men and heterosexual women both had *higher* odds of *not* reporting unprotected anal or vaginal sex than heterosexual men (AOR = 4.68, $p < .001$; AOR = 2.54, $p = .033$; i.e., heterosexual men had higher odds of any unprotected anal or vaginal sex than gay and bisexual men and heterosexual women), and gay and bisexual men reported fewer vaginal and anal sex acts without a condom than heterosexual men (ARR = .67, $p = .039$). Being in a relationship was associated with a greater number of acts without a condom when compared to those who were single (ARR = 1.39, $p = .032$).

White participants had *lower* odds of *not* having sex after using prescription drugs than participants of color (AOR = .58, $p = .026$; i.e., white participants had higher odds of having sex after using prescription drugs) and reported a greater number of acts under the influence (ARR = 2.51, $p = .003$). Participants reporting that their parents were middle class, upper middle class, or rich reported a greater number of acts under the influence of prescription drugs than participants who reported that their parents were working class or poor (ARR = 1.74, $p = .053$). Gay and bisexual men had *higher* odds of *not* reporting sex under the influence of prescription drugs than straight men (AOR = 1.98, $p = .025$; i.e., gay and bisexual men had lower odds of any sex under the influence of prescription drugs). Older age was associated with reporting fewer acts under the influence (ARR = 0.91, $p = .007$).

In the final model, white participants had *lower* odds of *not* reporting unprotected vaginal or anal sex under the influence of prescription drugs (AOR = 0.36, $p < .001$; i.e., white

participants had higher odds of reporting unprotected vaginal or anal sex under the influence of prescription drugs), and also reported a greater number of unprotected acts under the influence than participants of color ($ARR = 2.65, p = .011$). Younger age was associated with *lower* odds of *not* having unprotected sex under the influence of prescription drugs ($AOR = 0.89, p = .023$; i.e., younger participants had higher odds of unprotected anal or vaginal sex under the influence of prescription drugs) and older age was associated with reporting fewer acts under the influence ($ARR = 0.91, p = .024$). Finally, gay and bisexual men and heterosexual women had *higher* odds of *not* reporting unprotected sex under the influence of prescription drugs than heterosexual men ($AOR = 3.95, p < .001$; $ARR = 2.38, p = .009$; i.e., heterosexual men had higher odds of reporting unprotected anal or vaginal sex under the influence of prescription drugs), though no differences emerged in the number of acts under the influence.

Discussion

The majority of the sample reported recent vaginal or anal sex (76%), a rate that is similar to New York City Department of Health findings indicating that 72% of adults (over the age of 18) in New York City are sexually active (Farley, Senter, Olson, & Kerker, 2008). Nationally representative data also indicate that 74% of adults aged 25–29 report past month vaginal sex (Herbenick, Reece, Schick, Sanders, Dodge, & Fortenberry, 2010). More than three quarters of those who were sexually active reported recent sex without a condom, a rate that is higher than that reported by adults in New York City, where data indicate that 40% of New Yorkers with multiple sex partners reported sex without a condom during their last sexual intercourse (Farley et al., 2008), though our time range of three months provides more opportunity to report unprotected sex. However, in a nationally representative sample, men and women aged 25–29 reported that 28% and 26.7% of their last 10 vaginal sex events were protected (Reece, Herbenick, Schick, Sanders, Dodge, & Fortenberry, 2010), indicating high rates of unprotected sex that are likely more similar to our findings. Nearly half of the sexually active young adult prescription drug misusers in our sample reported recent sex under the influence of prescription drugs, which is somewhat lower, though comparable, to rates of recent sex under the influence of alcohol in other surveys of young adults in nightlife settings (62%; Wells et al., 2010), though much higher than rates of sex after drinking at last intercourse in a nationally representative sample (22% of men and 20% of women reported drinking prior to their last intercourse; Sanders, Reece, Herbenick, Schick, Dodge, & Fortenberry, 2010). Finally, more than one-third of the young adults in this sample reported sex without a condom after using prescription drugs. Though we could not compare these rates to national survey data, these rates indicate a high prevalence of the combination of prescription drug misuse and sexual risk behavior in a sample of young adults recruited in nightlife venues in New York City.

Though the underlying motivations for prescription drug misuse in these sexual situations is unknown, these findings may indicate, as other studies have, that there may be some sexual enhancement motivations for prescription drug misuse (i.e., the use of prescription drugs to enhance a sexual experience; Rigg & Iba ez, 2010). These findings are of concern considering the detrimental cognitive effects of many prescription drugs (Hendler, Cimini, Ma, & Long, 1980; McNairy, Maruta, Ivnik, Swanson, & Ilstrup, 1984) and the role of

cognitive functioning in sexual risk behavior and the association between substance use and sexual risk (Abbey, Saenz, Buck, Parkhill, & Hayman, 2006; Golub, Starks, Kowalczyk, Thompson, & Parsons, 2012). Our findings also indicate that white race, younger age, higher parental class, and being a heterosexual man were all associated with sexual risk behavior, sex under the influence of prescription drugs, and sexual risk under the influence of prescription drugs. These findings mirror literature demonstrating higher rates of both prescription drug misuse and sexual risk behavior among these groups (Byrnes, Miller, & Schafer, 1999; Kelly et al., 2013b; Patrick, O'Malley, Johnston, Terry-McElrath, & Schulenberg, 2012; Teter, McCabe, Cranford, Boyd, & Guthrie, 2005).

The results that white participants reported more sexual risk behavior and more sex and sexual risk under the influence parallels other research showing that black young adults report more condom use than their white peers (Patrick, O'Malley, et al., 2012) and that young men who have sex with men (MSM) report more condom use with black partners, with the highest rates of condom use occurring within same-race black partnerships (Clerkin, Newcomb, & Mustanski, 2011). However, our findings also contradict other research that demonstrates more sexual risk behavior among black adolescents (Connell, Gilreath, & Hansen, 2009). Also indicating lower risk among blacks, a large meta-analysis of MSM found that black MSM were less likely to report the use of drugs with sex, when compared to white MSM (Millett et al., 2012). A study of adolescents' alcohol use and sexual risk behavior also indicated that alcohol use is more strongly associated with sexual risk behavior among white adolescents than among black adolescents (Cooper, Peirce, & Huselid, 1994). On the other hand, The National Longitudinal Study of Adolescent Health data indicated that adolescent alcohol use strongly predicted inconsistent condom use in adulthood for both black and white individuals, but adolescent alcohol use was a stronger predictor of partnership risk variables (higher numbers of partners and partners with an STI) among black participants (Khan, Berger, Wells, & Cleland, 2012). People of color have also been shown to be less likely than whites to misuse prescription drugs (Kelly et al., 2013b; Simoni-Wastila, Ritter, & Strickler, 2004; Wang, Becker, & Fiellin, 2013), which may indicate that there are race-varying norms and expectancies around prescription drug misuse. The complex associations between race, sexual risk behavior, and substance use may be dependent on the samples (i.e., age of the sample, population drawn from, etc.), substance use, and specific risk behaviors examined.

The results regarding higher rates of sex under the influence and sexual risk under the influence among younger participants are also consistent with prior research demonstrating stronger associations between alcohol and sexual risk behavior among younger samples (Leigh, 2002; Newcomb, 2013), though contrast with research indicating stronger effects among older individuals (Mustanski, 2008). More consistently, studies have found a stronger association between drinking and the number of sexual partners for younger people (in this study, 21–24 year olds) compared to older participants (25–30 year olds) (Patrick, O'Malley, et al., 2012). Research also finds that younger participants (in a sample of 18–29 year olds) were more likely to report having recently been less safe as a result of their drinking (Wells et al., 2010). As research consistently finds higher rates of both substance use and sexual risk behavior among younger adults, across gender and sexual orientation groups (Kelly et al., 2013b; Salomon et al., 2009; Simoni-Wastila et al., 2004), these

findings may reflect higher rates of both behaviors. Higher rates of sex and sexual risk under the influence may also reflect less developed self-regulatory capacities among the youngest adults, which have been shown to influence the relationship between substance use and sexual risk behavior (Quinn & Fromme, 2010).

When compared to individuals who identified their parental class background as poor or working class, those who identified their background as middle class, upper middle class, or rich reported more vaginal and anal sex acts under the influence of prescription drugs and more sex without a condom under the influence of prescription drugs (the latter was marginally significant). This difference may reflect higher rates of use or more normative patterns of use among more wealthy individuals, which could be related to better access to mental health care services. Particularly since so many young adults report that they get prescription drugs from friends or family members (Fischer, Bibby, & Bouchard, 2010; Schepis & Krishnan-Sarin, 2009), the class predictor may reflect access differences.

Findings indicated that gay and bisexual men were the least likely to engage in sex without a condom, sex under the influence of prescription drugs, and sex without a condom after using prescription drugs. Though gay and bisexual men have high rates of alcohol and illicit drug use, a study of young adult club drug users found that gay and bisexual men had the lowest rates of use lifetime and recent prescription drug misuse, when compared to other gender and sexual orientation groups (Kelly & Parsons, 2007). Combined with these findings, it may be that gay and bisexual men have more developed sexual norms and expectancies about alcohol and illicit drugs, but that prescription drugs do not have a specific sexual function or association. However, the survey did not assess the frequency of prescription erection enhancement drugs, nor the frequency of sex after using those drugs, which may be critical to examine among gay and bisexual men (Pantalone, Bimbi, & Parsons, 2008). From a gender perspective, the findings that heterosexual men report the highest likelihood of risk, sex under the influence of prescription drugs, and sexual risk under the influence of prescription drugs is consistent with gendered findings of risk behavior overall. However, gender differences in the associations between alcohol and other drug use and sexual risk behavior have been less consistent in the literature. In experimental studies, alcohol and placebo-condition men were less willing to engage in sex in a hypothetical encounter than were sober men, while the opposite was true for women, such that alcohol and placebo-condition women were more willing to engage in the hypothetical sex than sober women (Cho & Span, 2010). Among STD clinic patients, alcohol use was associated with risk behavior and STD diagnosis among women but unrelated to risk behavior and disease outcomes among men (Hutton, McCaul, Santora, & Erbelding, 2008). This is the first study, to our knowledge, to report the gender and sexual identity group differences in rates of sex and sexual risk behavior under the influence of prescription drugs.

Though the results provide much needed insight into the demographic patterns of the associations between substance use and sexual risk behavior among young adults, some limitations should be considered. First, this sample of young adults was recruited largely in nightlife scenes in an urban setting. As such, these findings likely do not generalize to all young adults, but do highlight risk behavior patterns in a population that reports high rates of substance use (Kelly & Parsons, 2007; Kelly, Parsons, & Wells, 2006). Second, sexual

behavior under the influence of prescription drugs was not measured according to the specific classes of drugs—stimulants, sedatives, or painkillers. Thus, we cannot make any conclusions as to the types of prescription drug misuse that may be most problematic in terms of sexual risk behavior, particularly as most participants reported recently misusing drugs from multiple classes of prescription drugs (painkillers, sedatives, and stimulants). Further, the measures of sexual behavior are summary measures and do not take into account nuances about the particular partners and contexts in which sex with those partners occurs. Though these data present a picture of those most likely to have sex and report sexual risk behavior under the influence of prescription drugs, it is unknown if sexual motivations were a primary motivation for the prescription drug misuse. Also, because all participants reported prescription drug misuse, analyses cannot examine differential rates of risk according to whether or not participants indicated prescription drug misuse, as past studies have done (Benotsch, Koester, Luckman, Martin, & Cejka, 2011; Benotsch, Martin, Koester, Cejka, & Luckman, 2011; Kelly & Parsons, 2013). The analyses are also limited in comparisons of different racial and ethnic groups, as small cell sizes prevented more specific comparisons than those conducted. Finally, these findings do not take polydrug use into account, which may be particularly relevant considering high rates of alcohol and illicit drug use in other samples of nightlife venue patrons (Kelly et al., 2006; Parsons, Grov, & Kelly, 2009), and considering the misuse of multiple classes of prescription drugs in this sample. It is unclear if young adults are having sex under the influence of only prescription drugs or if they are combining prescription drugs with alcohol or other illicit drugs. The combination of prescription drugs with alcohol, illicit drugs, and other prescription drugs is common among young adults (Kelly, Wells, Pawson, LeClair, & Parsons, in press; McCabe, Cranford, Morales, & Young, 2006; McCabe, West, Teter, & Boyd, 2012; Nakawaki & Crano, 2012) for a variety of reasons, including to ‘come down’ from stimulants (methamphetamine, cocaine, and MDMA; Boeri, Sterk, Bahora, & Elifson, 2008) or to enhance the effects of alcohol, illicit drugs, or other prescription drugs (Boeri, Sterk, Bahora, & Elifson, 2008; Jones, Mogali, & Comer, 2012; Quintero, 2009; Zacny & Gutierrez, 2011). Further, research indicates that prescription drug and illicit substance use disorders often co-occur (Blanco et al., 2007; McCabe, Cranford, & West, 2008), further indicating that these combinations of drugs are worthy of additional examination. More nuanced data should examine the role of prescription drugs in sexual behavior both on their own and in combination with alcohol and illicit and other prescription drugs.

Despite these limitations, the findings have implications for the targeting of prevention and intervention efforts in the United States, and potentially in other countries dealing with high rates of prescription drug misuse. Clearly, efforts should target heterosexual men as they reported higher rates of risk behavior and were more likely to report both sex under the influence of prescription drugs and sexual risk behavior under the influence of prescription drugs, particularly when compared to gay and bisexual men. The comparison between gay and bisexual men and heterosexual men is particularly interesting considering the high rates of HIV among gay and bisexual men and the targeting of risk interventions to this community. Though HIV and other sexually transmitted infections may be more prevalent among gay and bisexual men for a variety of social and biological reasons, these data indicate that heterosexual men are engaged in higher rates of risk behavior than gay and

bisexual men. These results also have implications for the relationships in which sexual behavior under the influence of prescription drugs occurs. Research shows that male and female intimate partner prescription drug misuse is positively associated and that, for women, prescription drug misuse is associated with lower relationship satisfaction (Papp, 2010). In conclusion, prescription drug misuse may have both negative physical health and psychosocial health consequences, particularly when used in the context of sexual or other romantic relationships. Research should continue to examine the relationship between prescription drug misuse and sexual risk behavior, and the demographic factors that may predict and/or moderate that relationship.

Acknowledgments

This study was supported by a grant from the National Institute on Drug Abuse (R01 DA025081, Brian C Kelly, P.I.). H. Jonathon Rendina was supported in part by a National Institute of Mental Health Individual Predoctoral Fellowship (F31-MH095622). The authors acknowledge the contributions of other members of the project team, especially Amy LeClair, Chloe Mirzayi, and Mark Pawson. The views expressed in this paper do not expressly reflect the views of the National Institute on Drug Abuse or any other governmental agency.

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Table 1

Sample Descriptive Information (N=402)

Characteristic	n	%
Gender X Sexual Identity		
Gay/Bi/Questioning Men	112	28%
Straight Men	108	27%
Lesbian/Bi/Questioning Women	81	20%
Straight Women	101	25%
Race/Ethnicity		
White	269	67%
Non-White	133	33%
Parental Class		
Working Class or Poor	92	23%
Middle Class or Above	307	77%
Relationship Status		
Single	224	56%
Partnered	178	44%
	M	SD
Age	24.57	2.69

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Sexual Behavior, Sexual Risk Behavior, and Sexual Behavior Under the Influence of Prescription Drugs

Table 2

	Vaginal and/or anal sex acts							
	Logistic Model Portion			Poisson Model Portion				
	β	S.E.	AOR	p value	β	S.E.	ARR	p value
Partnered Relationship Status (Ref: Single)	0.23	0.29	1.26	0.429	-0.03	0.13	0.97	0.825
Age	0.00	0.05	1.00	0.968	-0.01	0.02	0.99	0.499
White Race/Ethnicity (Ref: Non-White)	-1.49	0.29	0.22	<.001	0.99	0.14	2.68	<.001
Middle/Upper Middle Class Background (Ref: Working Class or Poor)	0.20	0.32	1.22	0.533	0.16	0.13	1.17	0.237
Gender X Sexual Identity (Ref: Heterosexual Men)								
Gay/Bi Men	-0.20	0.38	0.82	0.590	-0.30	0.15	0.74	0.054
Heterosexual Women	0.07	0.37	1.08	0.842	-0.22	0.12	0.81	0.077
Lesbian/Bi Women	2.08	0.37	8.04	<.001	-0.25	0.20	0.78	0.220
	Unprotected vaginal and/or anal sex acts							
	Logistic Model Portion			Poisson Model Portion				
	β	S.E.	AOR	p value	β	S.E.	ARR	p value
Partnered Relationship Status (Ref: Single)	-0.25	0.31	0.78	0.427	0.33	0.15	1.39	0.032
Age	-0.04	0.06	0.96	0.462	0.00	0.02	1.00	0.938
White Race/Ethnicity (Ref: Non-White)	-1.10	0.32	0.33	0.001	1.17	0.17	3.23	<.001
Middle/Upper Middle Class Background (Ref: Working Class or Poor)	-0.28	0.35	0.76	0.432	0.19	0.15	1.21	0.209
Gender X Sexual Identity (Ref: Heterosexual Men)								
Gay/Bi Men	1.54	0.41	4.68	<.001	-0.40	0.19	0.67	0.039
Heterosexual Women	0.93	0.44	2.54	0.033	-0.20	0.14	0.82	0.154
Lesbian/Bi Women	0.63	0.59	1.87	0.289	-0.05	0.19	0.95	0.797
	Vaginal and/or anal sex acts under the influence of Rx drugs							
	Logistic Model Portion			Poisson Model Portion				
	β	S.E.	AOR	p value	β	S.E.	ARR	p value
Partnered Relationship Status (Ref: Single)	0.34	0.27	1.40	0.206	0.05	0.25	1.05	0.851
Age	-0.07	0.05	0.93	0.129	-0.09	0.04	0.91	0.007
White Race/Ethnicity (Ref: Non-White)	-0.55	0.25	0.58	0.026	0.92	0.36	2.51	0.003

Vaginal and/or anal sex acts under the influence of Rx drugs

	Logistic Model Portion			Poisson Model Portion				
	β	S.E.	AOR	p value	β	S.E.	ARR	p value
Middle/Upper Middle Class Background (Ref: Working Class or Poor)	-0.11	0.28	0.90	0.704	0.55	0.29	1.74	0.053
Gender X Sexual Identity (Ref: Heterosexual Men)								
Gay/Bi Men	0.69	0.31	1.98	0.025	0.19	0.34	1.21	0.582
Heterosexual Women	0.52	0.31	1.68	0.097	-0.33	0.38	0.72	0.391
Lesbian/Bi Women	0.16	0.43	1.17	0.715	-0.49	0.40	0.61	0.217

Unprotected vaginal and/or anal sex acts under the influence of Rx drugs

	Logistic Model Portion			Poisson Model Portion				
	β	S.E.	AOR	p value	β	S.E.	ARR	p value
Partnered Relationship Status (Ref: Single)	-0.12	0.30	0.89	0.681	0.12	0.28	1.13	0.664
Age	-0.12	0.05	0.89	0.023	-0.10	0.04	0.91	0.024
White Race/Ethnicity (Ref: Non-White)	-1.02	0.27	0.36	<.001	0.98	0.38	2.65	0.011
Middle/Upper Middle Class Background (Ref: Working Class or Poor)	-0.17	0.32	0.84	0.586	0.53	0.32	1.71	0.090
Gender X Sexual Identity (Ref: Heterosexual Men)								
Gay/Bi Men	1.37	0.35	3.95	<.001	0.15	0.39	1.16	0.705
Heterosexual Women	0.87	0.33	2.38	0.009	-0.31	0.45	0.73	0.489
Lesbian/Bi Women	0.10	0.45	1.11	0.818	-0.71	0.40	0.49	0.077

Note: AOR = Adjusted odds ratio (exponentiated logistic beta); ARR = Adjusted rate ratio (exponentiated Poisson beta).