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Perceived Risk of Heroin in Relation to Other Drug Use In a Representative US Sample

Joseph J. Palamar[1,2], **Austin Le**[1,3], **Pedro Mateu-Gelabert**[2,4]

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

[2]Center for Drug Use and HIV/HCV Research, New York University College of Nursing

[3]New York University College of Dentistry, New York, NY

[4]National Development and Research Institutes, New York, NY

Abstract

Low perception of risk is a risk factor for heroin use. Research is needed to determine whether this risk factor for heroin use is affected by use of other drugs. Data were analyzed from participants in the 2015/2016 National Surveys on Drug Use and Health who denied lifetime heroin use (N = 110,102). We examined how recency of use of various drugs and number of drugs used relate to perceptions that using heroin is not a great risk. Results from multivariable models suggest that no lifetime drug use, and recent prescription opioid misuse and methamphetamine use in particular, were associated with higher odds of perceiving that heroin use is not of great risk. Recent marijuana use was associated with lower odds for reporting that heroin use is not of great risk. Use of more drugs in one's lifetime, past year, and/or past month tended to be associated with lower odds of reporting heroin use as not a great risk. Prevention experts should consider that recent prescription opioid misuse in particular is a risk factor for lower perception of risk, while individuals reporting no lifetime drug use may also require better education regarding harms associated with heroin use.

Keywords

heroin; prescription opioid misuse; perceived harm

Introduction

Many studies focusing on nationally representative samples in the United States (US) have confirmed strong associations between drug use and low perception of drug use-related risk. Most have focused on the link between perceived risk associated with marijuana use and prevalence of use, confirming a negative association whereby lower perception of risk is associated with higher risk of use (Miech, Johnston, and O'Malley 2017, Terry-McElrath et

Address correspondence to: Joseph J. Palamar, Department of Population Health, 180 Madison Avenue, Room 1752, New York, NY 10016, joseph.palamar@nyulangone.org, T: 646-501-3555.

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al. 2017, Hughes, Lipari, and Williams 2016). Similar associations have been reported with cocaine use (Lipari et al. 2017), while a study analyzing data from the National Survey on Drug Use and Health (NSDUH) found that the perception that trying heroin or regularly using heroin are great risks were both associated with reduced risk of lifetime heroin use (Votaw et al. 2017). To our knowledge, however, few studies have extensively examined how use of one drug is associated with perceived harm of other drugs. As deaths related to heroin use continue to increase in the US (Jones, Einstein, and Compton 2018), further research in this area is needed to determine how use of other drugs may influence perceptions of harm associated with heroin use and, by extension, actual heroin use. The need is further underscored by the fact that use of various psychoactive substances is prevalent among heroin users (Palamar, Le, and Mateu-Gelabert 2018, Conway et al. 2013, Ihongbe and Masho 2016).

Heroin use in and of itself represents a major public health problem, with prevalence of use rising in the US from 1.6 per 1,000 persons aged ≥12 years in 2002–2004 to 2.6 per 1,000 in 2011–2013 (Jones et al. 2015). In fact, an estimated half-million Americans aged 12 or older in 2016 were current heroin users (defined as having used in the past month) (Substance Abuse and Mental Health Services Administration 2017), while an estimated 170,000 had initiated heroin use that year (Lipari et al. 2017). Equally notable is the downward trend in perceived risks associated with heroin use between 2002 and 2013 (Votaw et al. 2017).

One recent study of Monitoring the Future (MTF), a nationally representative sample of high school seniors in the US, found that consumption of energy drinks or shots—especially frequent consumption—was associated with reporting no risk associated with drugs such as cocaine, crack, and heroin (Jackson and Leal 2018). Meanwhile, an NSDUH study on nonmedical users of prescription opioids reported that high-frequency nonmedical use of prescription opioids was associated with lower odds for regular heroin use being perceived as a great risk (Votaw et al. 2017), a finding which has since been echoed by a more recent study on never-users of heroin (Kapadia and Bao 2019) and ultimately warrants concern given the increasing body of literature demonstrating that nonmedical opioid users in particular are at high risk for heroin initiation (Cicero, Ellis, and Harney 2015, Palamar JJ et al. 2016). The same NSDUH study also examined whether past-year use of various other drugs relates to perceived risk associated with heroin use, and found that past-year use of cocaine and/or hallucinogens was associated with decreased odds for reporting that trying heroin is a great risk, and crack use with decreased odds for reporting that using heroin regularly is a great risk (Votaw et al. 2017).

While research has begun to focus on how past-year use of various drugs is a risk factor for low perceived harm from heroin use, there remains a need for more granular analysis to determine how different levels of recency of use (e.g., lifetime, past-month) and number of other drugs used relates to perception of risk associated with heroin use. Emphasis may be placed on nonmedical use of opioids, given that more recent and frequent use has been shown to be robust risk factors for heroin use (Palamar JJ et al. 2016, Martins et al. 2015, Jones 2013). Such information could prove useful in providing additional means for targeting prevention and policies towards higher risk groups within the general population. As such, this paper seeks to determine the extent to which recency of use of other drugs (and

number of other drugs used) is associated with perception of harm associated with heroin use, as these may serve as risk factors for heroin initiation. In addition, we examined how demographic characteristics and perception of risk related to other drugs (i.e., marijuana, cocaine, LSD) relate to perception of harm owing to heroin use. To our knowledge, associations between perception of harm of various drugs has not been examined and we believe such results may help inform prevention efforts. We hypothesized that use of more drugs, as well as more recent use, would be associated with lower odds for agreeing that using heroin is not a great risk.

Methods

Data Source and Study Population

Data from individuals aged ≥12 surveyed in the 2015 and 2016 (n=110,102) NSDUH who denied ever using heroin in their lifetime were analyzed. NSDUH is an annual cross-sectional survey of non-institutionalized individuals in the 50 US states and the District of Columbia. Each year, NSDUH obtains a nationally representative probability sample of individuals that is obtained through four stages. Surveys are administered via computer-assisted interviewing (conducted by an interviewer) and audio computer-assisted self-interviewing (ACASI). Sample weights were provided by NSDUH to address unit- and individual-level non-response. Additional information on sampling and survey methods can be found elsewhere (Center for Behavioral Health Statistics and Quality 2017). The weighted interview response rates for 2015 and 2016 were 69.7% and 68.4%, respectively.

Measures

Participants were asked how much people risk harming themselves physically or in other ways when they 1) try heroin, and 2) use heroin once or twice a week (herein referred to as “more regular use”). They were also asked the same question with regard to marijuana (smoking it once a month), LSD (trying it once or twice), and cocaine (using it once or twice a week). Response options were “no risk”, “slight risk”, “moderate risk”, and “great risk”. Similar to previous studies (Schmidt, Jacobs, and Spetz 2016, Sarvet et al. 2018, Compton et al. 2016, Azofeifa et al. 2016), we reverse-coded responses (for each of these variables) to indicate the rarer response option (“not a great risk”) as the indicator which allowed us to model these as outcomes. It should be noted that “don’t know” and refuse were also answer options to these questions. We treated such responses as missing, but typically <2% reported such answers.

Participants were asked about lifetime use (ever-use) of a variety of drugs including alcohol, marijuana, cocaine, crack, LSD, ecstasy (MDMA/Molly), ketamine, and methamphetamine. They were also asked about misuse of prescription opioids, prescription stimulants, tranquilizers, and sedatives, which was defined as using the drug only for the experience or feeling caused by the drug, or using in any way not recommended by a doctor. Those reporting lifetime use were asked if they had used in the past 12 months, and those reporting past-year use were also asked if they had used in the past 30 days. We examined recency of use of each of these drugs separately as covariates, using categorical variables created to represent never used, lifetime but not past-year use, past-year use but not past-month use,

and past-month use. We also created sum score variables indicating the number of drugs (i.e., 0, 1–2, 3–4, 5+) reportedly used by each participant in his or her lifetime, in the past year, and in the past month.

NSDUH also asked participants for their age, gender, race/ethnicity, relationship status, and annual family income. They were also asked about educational attainment; however, this variables was coded as missing for those ages 12–17 so we dichotomized this measure into less than high school (including adolescents) vs. high school or higher education based on previous research (Pacek, Mauro, and Martins 2015).

Statistical Analysis

We first calculated descriptive statistics for each variable for the full sample. The following were treated as dependent variables in all analyses: 1) agreeing that trying heroin is not a great risk, and 2) agreeing that using heroin more regularly is not a great risk. Chi-squares were computed to determine whether there were differences with regard to demographic characteristics (and perceived risk associated with using marijuana, LSD, and cocaine) in relation to the two separate dependent variables. These analyses were repeated using multivariable logistic regression to examine results with all else being equal. Next, similar chi-squares were computed to determine differences in these variables with regard to number of drugs reportedly used in one's lifetime, past year, and past month, as well as recency of use of alcohol, marijuana, cocaine, crack, LSD, ecstasy, ketamine, and methamphetamine, and misuse of prescription opioids, prescription stimulants, tranquilizers, and sedatives. For each of these comparisons, we then examined relationships controlling for all demographic and other perceived risk variables. Specifically, we utilized logistic regression to examine number of drugs used and recency of use of each separate drug in relation to the two separate dependent variables, controlling for all other covariates. We examined each drug-related covariate in a separate model to avoid multicollinearity. Therefore, each individual drug examined (as an independent variable) is associated with three adjusted odds ratios (aORs)—an aOR for past-month use, an aOR for past-year use (but no use in the past month), and an aOR for lifetime use (but no use in the past year), compared to no lifetime use. In these models examining recency of use we also controlled for number of drugs used in one's lifetime as a covariate to help control for other drugs used in a systematic manner across models. We utilized "1–2 drugs" as the comparison group for the number of drugs used variables in our models as this was the most prevalent group and we learned through extensive sensitivity testing that this coding aids interpretation of results. Results should thus be interpreted as odds of different levels of recency of use (compared to no lifetime use) while controlling for demographic characteristics and number of other drugs used in one's lifetime.

Analyses were conducted using Stata SE 13 (StataCorp, College Station, TX) and weighted to account for the complex survey design. Taylor series estimation methods were utilized to provide accurate standard errors (Heeringa, West, and Berglund 2010). This secondary data analysis was exempt for review by the New York University Langone Medical Center Institutional Review Board.

Results

The perception that trying heroin is not a great risk was reported by 14.3% of participants, and 5.8% of participants reported that using heroin more regularly is not a great risk. Younger (e.g., ages 12–17) participants, males, and those with a high school education or higher were more likely to report that trying heroin and more regular heroin use are not great risks (Table 1). With regard to race/ethnicity, Asian participants and those of other race were more likely to perceive trying heroin and more regular heroin use as not being a great risk, as were those who were never married. Not perceiving marijuana, LSD, and/or cocaine use as being a great risk was associated with being more likely to perceive trying heroin or using heroin more regularly as not being of great risk.

Multivariable models examining these associations are presented in Table 2. With all else being equal, all age groups older than adolescents were at decreased odds for reporting that trying heroin is not of great risk, but age associations were mixed regarding the belief that using heroin regularly is not a great risk. Males were at increased odds for reporting that trying heroin is not a great risk and all races/ethnicities other than white and those with less than a high school education were at higher odds for reporting that trying or using heroin regularly are not of great risk. Divorced individuals and those with higher family income (i.e., > $75,000) were at lower odds for reporting that trying or using heroin regularly are not of great risk, and those not perceiving great risk associated with use of cocaine and LSD were at higher odds for reporting that trying or using heroin regularly are not of great risk.

Table 3 presents bivariable associations between number of drugs used and recency of use of different drugs in relation to perceived risk variables. With regard to number of drugs used, those reporting no lifetime, past-year, or past-month use of any drugs were often more likely to report that trying or using heroin more frequently is not of great risk compared to those reporting use of 1–4 drugs. In some comparisons, those reporting use of no drugs were more likely to believe heroin use is not of great risk compared to those reporting use of 5+ drugs, although those using 5+ drugs in the past year or past month were more likely than never-users to believe heroin use is not of great risk. Those denying lifetime alcohol use were more likely to agree that heroin use is not of great risk compared to other individuals who use or have used alcohol. Never-users and more recent users of marijuana were more likely to agree that heroin use is not a great risk compared to less recent users. For most other drugs examined, more recent use tended to be associated with higher risk of disagreeing that heroin use is a great risk compared to less recent or never-use.

Table 4 presents models that re-examine these associations in a multivariable manner. Compared to those reporting use of 1–2 drugs, use of more drugs (more specifically, 3–4 drugs) in one’s lifetime, in the past year, and in the past month tended to be associated with lower odds for reporting that trying heroin or using heroin regularly is not a great risk. Using 0 drugs was consistently a strong risk factor for reporting that trying heroin or using heroin regularly are not of great risk. More recent marijuana use and cocaine use were associated with decreased odds of reporting that trying heroin is not a great risk, and more recent marijuana use and past-month alcohol use were associated with decreased odds of reporting that using heroin regularly is not of great risk. Some levels of recency of use of alcohol,

LSD, ecstasy, and prescription stimulants were also associated with lower odds for perceiving trying heroin as not being of great risk. More recent prescription opioid and sedative misuse was associated with increased odds for reporting that trying heroin and more regular heroin use are not of great risk, and recent methamphetamine use was associated with increased odds of reporting that using heroin regularly is not of great risk.

Discussion

While it has been established that perceiving drug use as being low risk is a risk factor for drug use, less research has investigated potential factors that affect perceptions of risk. Specifically, in light of the growing opioid crisis, further research was needed to determine how use and recency of use of various drugs relates to perception of risk associated with heroin use.

Over a tenth (14.3%) of non-heroin-using individuals in the US perceives heroin use once or twice as not being a great risk. In particular, over one-third (34.8%) adolescents (age 12–17) report this belief, more than double that of other age groups. Other studies of NSDUH found similar age associations when including heroin users in their analyses (and controlling for heroin use in models) (Votaw et al. 2017, Pacek, Mauro, and Martins 2015), while another analysis of NSDUH found similar age differences with regard to perceived harm associated with cocaine and LSD use, although that study reported that adolescents were less likely to initiate heroin compared to older adults (Lipari et al. 2017). We also identified high-risk groups with regard to race/ethnicity; specifically, those identifying as non-white are at higher risk for perceiving heroin use as not a great risk. Previous research, however, has found that non-white individuals are currently at lower risk for heroin initiation than white individuals (Cicero et al. 2014, Palamar JJ et al. 2016). Thus, it is unclear to what extent perceptions of individuals in these demographic groups are in fact at risk for using heroin, especially considering that multiple other drugs are commonly initiated prior to heroin initiation.

Regarding other drugs, perception that use of drugs such as LSD and cocaine are not of great risk is strongly associated with the perception that heroin use is not a great risk, although reporting that marijuana use is not perceived as a great risk was not a significant risk factor for reporting that heroin use is not of great risk in multivariable models. However, while controlling for self-reported perceived risk associated with other drugs, those denying lifetime illegal drug use were at about twice the odds of reporting that trying or using heroin regularly are not of great risk (compared to those who used 1–2 drugs). Thus, it appears that those who are “drug-naïve” (i.e., having never used drugs) are consistently more likely to perceive using heroin as not being a great risk. Meanwhile, in contrast to our original hypothesis, individuals who have used 3–4 drugs (in one’s lifetime, or in the past year or past month) are less likely to report that trying heroin or using heroin regularly is not a great risk. It is worth noting that in our bivariable tests, individuals using ≥ 5 drugs in the past year or past month were about twice as likely than those using 1–2 drugs to report that trying or using heroin regularly is not of great risk. However, in most multivariable models, using ≥ 5 drugs was not a significant correlate. It should be noted that these associations held during sensitivity tests (not presented) utilizing no drug use as the comparisons. Together, these findings may reflect the fact that a lack of experience with drug use may limit one’s ability

to perceive risk associated with certain drugs, while experience with multiple drugs, perhaps paradoxically, may be a protective factor if fewer than five drugs were used. As such, individuals who are drug-naïve, despite being at low risk for heroin use, may benefit from increased awareness regarding the dangers associated with heroin use.

With regard to use of individual drugs, more recent misuse of prescription opioids was the most consistent risk factor for perceiving that trying heroin or using heroin regularly is not a great risk. Misuse of prescription opioids—especially more recent misuse—as a risk factor is concerning since opioid users are well known to be at heightened risk of transition to heroin (Cicero, Ellis, and Harney 2015, Palamar JJ et al. 2016). This information adds to accumulating evidence that prescription opioid misuse is a risk factor for heroin initiation, and we believe that prevention programs need to reach opioid misusers in particular to warn of the potentially harmful effects associated with heroin use. Of additional concern is that methamphetamine use, crack use, and sedative misuse in particular, also seem to increase the odds of perceiving heroin use as not being a great risk. Drug programs that work with users of various “hard” drugs should similarly emphasize that the adverse effects of heroin use (e.g., opioid dependency, drug injection as route of administration, overdose) can be more harmful or dangerous than most other drugs (Nutt, King, and Phillips 2010). And, while an important goal in prevention is the prevention or reduction of harm associated with all drug use, we must be cognizant of the fact that each drug is in fact associated with its own level of harm, both to users (e.g., physical, psychological, social) and to society (Nutt, King, and Phillips 2010). Drug prevention programs that generalize harm from all drugs may have inadvertently contributed to the lack of distinction regarding varying degrees of risk associated with different drugs.

Finally, our findings from the multivariable analyses show that marijuana use, including recent use, is actually consistently associated with lower odds of perceiving heroin use as not being a great risk. This corroborates results reported by Votaw et al. (2017), who found that past-year marijuana use was associated with increased odds for reporting that trying or using heroin regularly is a great risk. It should be noted that despite multicollinearity concerns, we sensitivity-tested our models controlling for recency of other drug use and results for recency of marijuana use were similar. While most users of various drugs have used marijuana, studies have found that more recent or frequent users of drugs such as heroin often do not currently use marijuana, or use it infrequently (Palamar, Le, and Mateu-Gelabert 2018). Similar to our marijuana findings, recent cocaine use was also associated with lower odds for perceiving that trying heroin is not of great risk, and some levels of recency of use of alcohol, LSD, ecstasy, and prescription stimulants were also associated with lower odds for perceiving trying heroin as not being of great risk. More research is needed to determine why use or more recent use of these drugs is protective in the sense that users are less likely to perceive that using heroin is not of great risk. We hypothesize that users of other drugs may be better educated about the relative dangers associated with heroin use, but more research is needed. Still, while these analyses focus on current perception of harm, we should remain cognizant of the fact that we cannot discern whether such perceptions existed before initiating use of various drugs, or using such drugs recently or frequently.

Limitations

The NSDUH relies on self-report and is subject to recall and social-desirability bias and only non-institutionalized individuals are surveyed which may limit generalizability. The survey is cross-sectional; therefore temporality of associations could not be deduced. Perceived risk could have been interpreted differently by different individuals. Harm "physically or in other ways" may or may not be interpreted by individuals to include social or legal harm. Importantly, it is possible that some individuals interpreted the questions as heroin increasing risk of harm to themselves, but they may not have answered affirmatively if they felt they would not use heroin and such harms do not apply to them personally. Finally, even though <2% of respondents answered "don't know" to the questions about perceived risk associated with heroin use, these missing data potentially biased results. For example, supplemental bivariable tests suggest 41.2% of those who answered "don't know" regarding risk of trying heroin and 42.5% of those answering "don't know" regarding risk of heroin use reported no lifetime drug use. These percentages were significantly higher than the percentages of non-lifetime users reporting great risk (16.1%) and not great risk (28.3%) with regard to trying heroin, and significantly higher than the percentages of non-lifetime users reporting great risk (16.5%)) and not great risk (38.4%) regarding regular heroin use (*Ps*<.001).

Conclusion

This study attempts to determine those in the US who do perceive heroin use as not being a great risk—a potential risk factor for heroin initiation. "Drug-naïve" individuals in particular appear to be at high risk for not perceiving heroin to be very dangerous. It is unlikely that these individuals believe heroin is a "safe" drug per se, but they may simply not be greatly aware of the risks associated with heroin use. We do not believe these individuals are at high risk for initiating heroin as heroin users tend to use other drugs prior to initiation. Individuals who have used drugs—especially more drugs—may be more able to discern the different degrees of risk associated with different drugs. An important goal of prevention, then, should be an adequate level of education for all individuals about the differing degrees of harm stemming from use of heroin and other drugs, without having to have had first-hand experience with using multiple drugs.

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Table 1.

Sample Characteristics and Comparisons by Perception of Heroin Use Not Being a Great Risk (*N*=110,102)

	Full Sample %	Trying Heroin 1–2x is Not a Great Risk, %	Using Heroin 1–2x per Week is Not a Great Risk, %
Age			
12–17 years	9.3	34.8***	17.0***
18–25 years	13.0	16.8	5.9
26–34 years	14.3	15.3	5.1
35–49 years	22.6	11.4	4.4
≥ 50 years	40.8	10.0	4.2
Sex			
Male	48.1	16.2***	6.5***
Female	51.9	12.4	5.1
Race/Ethnicity			
White	63.7	14.1***	4.2***
Black	11.9	11.5	8.0
Hispanic	16.4	14.2	8.1
Asian/Other	8.0	20.0	9.9
Relationship Status			
Married	50.0	10.9***	3.9***
Widowed	5.8	10.0	6.1
Divorced	13.0	9.2	3.9
Never Married	31.3	17.9	6.8
Education			
Less than High School	21.2	21.4***	11.9***
High School or Higher	78.8	12.3	4.1
Annual Family Income			
< $20,000	16.9	14.3*	8.0***
$20,000-$49,999	29.7	13.6	6.8
$50,000-$74,999	16.3	14.4	5.1
≥ $75,000	37.2	14.7	4.2
Using Marijuana Once a Month is Not a Great Risk			
No	28.8	4.5***	2.4***
Yes	71.2	18.2	7.1
Trying LSD Once or Twice is a Not Great Risk			
No	70.5	3.1***	1.3***
Yes	29.5	40.3	16.1
Using Cocaine Once a Month is Not a Great Risk			
No	72.3	3.2***	0.9***
Yes	27.7	43.0	18.4

Note. Full sample descriptive statistics are column percentages. Chi-square was used to compute differences between each covariate and each heroin use variable. Descriptive statistics within the three heroin use variables are row percentages for those agreeing with the statement.

* $p < .05$,

*** $p < .001$

Table 2.

Multivariable Models Examining Sample Characteristics in Relation to Perception of Heroin Use Not Being a Great Risk (*N*=110,102)

	Trying Heroin 1–2x is Not a Great Risk, aOR, 95% CI	Using Heroin 1–2x per Week is Not a Great Risk, aOR, 95% CI
Age		
12–17 years	1.00	1.00
18–25 years	0.58 (0.50, 0.66) ***	0.84 (0.72, 0.99) *
26–34 years	0.61 (0.51, 0.72) ***	0.90 (0.74, 1.09)
35–49 years	0.62 (0.53, 0.73) ***	1.10 (0.89, 1.35)
≥50 years	0.69 (0.56, 0.84) ***	1.33 (1.08, 1.64) **
Sex		
Male	1.00	1.00
Female	1.07 (1.01, 1.12) *	1.00 (0.91, 1.10)
Race/Ethnicity		
White	1.00	1.00
Black	1.21 (1.10, 1.33) ***	3.00 (2.67, 3.37) ***
Hispanic	1.17 (1.06, 1.29) **	2.08 (1.87, 2.32) ***
Asian/Other	1.85 (1.61, 2.14) ***	2.86 (2.42, 3.37) ***
Relationship Status		
Married	1.00	1.00
Widowed	1.15 (0.93, 1.43)	1.49 (1.11, 2.00) **
Divorced	0.69 (0.60, 0.79) ***	0.74 (0.59, 0.92) **
Never Married	0.91 (0.83, 1.00)	0.83 (0.73, 0.94) **
Education		
High School or Higher	1.00	1.00
Less than High School	1.29 (1.15, 1.45) ***	2.31 (2.00, 2.67) ***
Annual Family Income		
<$20,000	1.00	1.00
$20,000-$49,999	0.93 (0.86, 1.01)	0.89 (0.79, 1.00) *
$50,000-$74,999	0.91 (0.82, 1.00)	0.61 (0.52, 0.73) ***
≥$75,000	0.83 (0.76, 0.91) ***	0.46 (0.39, 0.54) ***
Using Marijuana Once a Month is Not a Great Risk		
No	1.00	1.00
Yes	1.10 (0.96, 1.26)	0.86 (0.72, 1.02)
Trying LSD Once or Twice is Not a Great Risk		
No	1.00	1.00
Yes	8.31 (7.46, 9.25) ***	5.93 (5.12, 6.88) ***
Using Cocaine Once a Month is Not a Great Risk		
No	1.00	1.00

	Trying Heroin 1–2x is Not a Great Risk, aOR, 95% CI	Using Heroin 1–2x per Week is Not a Great Risk, aOR, 95% CI
Yes	9.51 (8.55, 10.59) ***	13.31 (11.49, 15.43) ***

Note. aOR = adjusted odds ratio; CI = confidence interval.

* p < .05,

** p < .01,

*** p < .001

Table 3.

Perception of Heroin Use Not Being a Great Risk According to Number of Drugs Used and Recency of Use

	Trying Heroin 1–2x is Not a Great Risk, %	Using Heroin 1–2x per Week is Not a Great Risk, %
Number of Drugs Used in Lifetime		
0 drugs	22.6***	12.3***
1–2 drugs	11.2	4.4
3–4 drugs	14.3	3.9
5+ drugs	19.7	4.9
Number of Drugs Used in Past Year		
0 drugs	16.9***	8.9***
1–2 drugs	12.5	4.2
3–4 drugs	19.2	5.5
5+ drugs	27.0	8.9
Number of Drugs Used in Past Month		
0 drugs	15.6***	7.9***
1–2 drugs	13.0	3.9
3–4 drugs	18.0	5.6
5+ drugs	39.5	6.6
Alcohol		
Never Used	22.4***	12.4***
Used in Lifetime, but not in Past Year	10.0	4.5
Used in Past Year, but not in Past Month	12.5	5.2
Used in Past Month	12.9	3.8
Marijuana		
Never Used	15.0***	7.4***
Used in Lifetime, but not in Past Year	11.7	3.1
Used in Past Year, but not in Past Month	17.1	4.7
Used in Past Month	17.0	5.0
Cocaine		
Never Used	14.0***	6.0***
Used in Lifetime, but not in Past Year	15.5	4.0
Used in Past Year, but not in Past Month	21.9	7.7
Used in Past Month	18.5	6.2
Crack		
Never Used	14.2*	5.7*
Used in Lifetime, but not in Past Year	16.2	6.5
Used in Past Year, but not in Past Month	26.5	15.9
Used in Past Month	9.9	5.6
LSD		
Never Used	13.8***	5.9***

	Trying Heroin 1–2x is Not a Great Risk, %	Using Heroin 1–2x per Week is Not a Great Risk, %
Used in Lifetime, but not in Past Year	18.6	4.2
Used in Past Year, but not in Past Month	22.6	5.7
Used in Past Month	31.6	6.1
Ecstasy		
Never Used	13.9***	5.8**
Used in Lifetime, but not in Past Year	18.7	4.5
Used in Past Year, but not in Past Month	23.7	6.8
Used in Past Month	26.2	2.9
Ketamine		
Never Used	14.2***	5.8*
Used in Lifetime, but not in Past Year	23.2	0.8
Used in Past Year, but not in Past Month	35.3	15.2
Used in Past Month	38.7	13.4
Methamphetamine		
Never Used	14.1***	5.8***
Used in Lifetime, but not in Past Year	16.3	5.1
Used in Past Year, but not in Past Month	23.6	16.2
Used in Past Month	22.8	12.8
Prescription Opioids (Misuse)		
Never Misused	13.8***	5.6***
Misused in Lifetime, but not in Past Year	17.9	4.4
Misused in Past Year, but not in Past Month	19.2	7.7
Misused in Past Month	17.8	7.4
Prescription Stimulants (Misuse)		
Never Used	14.0***	5.8*
Used in Lifetime, but not in Past Year	20.8	4.4
Used in Past Year, but not in Past Month	18.8	4.2
Used in Past Month	24.1	6.2
Tranquilizers (Misuse)		
Never Misused	14.1***	5.8
Misused in Lifetime, but not in Past Year	19.5	4.9
Misused in Past Year, but not in Past Month	19.8	5.2
Misused in Past Month	17.4	4.9
Sedatives (Misuse)		
Never Used	14.1***	5.7
Used in Lifetime, but not in Past Year	20.5	4.1
Used in Past Year, but not in Past Month	19.2	6.2
Used in Past Month	21.9	3.4

Note. Chi-square was used to compute differences between each covariate and each heroin use variable. Descriptive statistics within the three heroin use variables are row percentages for those agreeing with the statement.

*
p < .05,

***
p < .001

Table 4.

Multivariable Models Examining Perception of Heroin Use Not Being a Great Risk According to Number of Drugs Used and Recency of Use

	Trying Heroin 1–2x is Not a Great Risk	Using Heroin 1–2x per Week is Not a Great Risk
	aOR (95% CI)	aOR (95% CI)
Number of Drugs Used in Lifetime		
1–2 drugs	1.00	1.00
0 drugs	1.93 (1.78, 2.09) ***	2.02 (1.78, 2.28) ***
3–4 drugs	0.57 (0.51, 0.64) ***	0.46 (0.40, 0.53) ***
5+ drugs	0.42 (0.37, 0.48) ***	0.35 (0.30, 0.41) ***
Number of Drugs Used in Past Year		
1–2 drugs	1.00	1.00
0 drugs	1.72 (1.59, 1.86) ***	1.94 (1.70, 2.23) ***
3–4 drugs	0.54 (0.46, 0.63) ***	0.53 (0.44, 0.62) ***
5+ drugs	0.56 (0.47, 0.66) ***	0.66 (0.46, 0.95) *
Number of Drugs Used in Past Month		
1–2 drugs	1.00	1.00
0 drugs	1.68 (1.56, 1.82) ***	2.02 (1.82, 2.25) ***
3–4 drugs	0.54 (0.45, 0.66) ***	0.67 (0.50, 0.89) **
5+ drugs	0.97 (0.66, 1.41)	0.61 (0.29, 1.29)
Alcohol		
Never Used	1.00	1.00
Used in Lifetime, but not in Past Year	1.07 (0.82, 1.39)	0.83 (0.64, 1.09)
Used in Past Year, but not in Past Month	0.98 (0.73, 1.34)	0.80 (0.58, 1.10)
Used in Past Month	0.83 (0.64, 1.07)	0.57 (0.43, 0.75) ***
Marijuana		
Never Used	1.00	1.00
Used in Lifetime, but not in Past Year	0.55 (0.49, 0.62) ***	0.46 (0.39, 0.53) ***
Used in Past Year, but not in Past Month	0.50 (0.41, 0.62) ***	0.45 (0.36, 0.56) ***
Used in Past Month	0.43 (0.36, 0.52) ***	0.43 (0.37, 0.51) ***
Cocaine		
Never Used	1.00	1.00
Used in Lifetime, but not in Past Year	0.70 (0.58, 0.84) ***	0.77 (0.60, 0.99) *
Used in Past Year, but not in Past Month	0.68 (0.55, 0.85) **	1.18 (0.78, 1.78)
Used in Past Month	0.55 (0.42, 0.73) ***	0.88 (0.53, 1.48)
Crack		
Never Used	1.00	1.00
Used in Lifetime, but not in Past Year	1.06 (0.81, 1.38)	1.49 (1.00, 2.22) *
Used in Past Year, but not in Past Month	2.73 (1.26, 5.93) *	3.96 (1.21, 12.94) *

	Trying Heroin 1–2x is Not a Great Risk	Using Heroin 1–2x per Week is Not a Great Risk
	aOR (95% CI)	aOR (95% CI)
Used in Past Month	0.88 (0.33, 2.37)	1.58 (0.45, 5.52)
LSD		
Never Used	1.00	1.00
Used in Lifetime, but not in Past Year	0.92 (0.78, 1.08)	0.77 (0.56, 1.07)
Used in Past Year, but not in Past Month	0.71 (0.53, 0.95) *	0.79 (0.53, 1.17)
Used in Past Month	1.06 (0.61, 1.83)	0.62 (0.31, 1.27)
Ecstasy		
Never Used	1.00	1.00
Used in Lifetime, but not in Past Year	0.97 (0.83, 1.13)	0.94 (0.76, 1.18)
Used in Past Year, but not in Past Month	0.85 (0.66, 1.09)	1.10 (0.75, 1.61)
Used in Past Month	1.03 (0.65, 1.65)	0.39 (0.18, 0.84) *
Ketamine		
Never Used	1.00	1.00
Used in Lifetime, but not in Past Year	1.15 (0.87, 1.52)	1.14 (0.71, 1.81)
Used in Past Year, but not in Past Month	1.40 (0.69, 2.85)	2.76 (0.93, 8.16)
Used in Past Month	1.86 (0.65, 5.29)	2.13 (0.51, 8.94)
Methamphetamine		
Never Used	1.00	1.00
Used in Lifetime, but not in Past Year	1.09 (0.91, 1.31)	1.59 (1.22, 2.07) **
Used in Past Year, but not in Past Month	1.55 (0.84, 2.84)	4.97 (2.58, 9.59) ***
Used in Past Month	1.59 (0.97, 2.59)	3.30 (1.86, 5.86) ***
Prescription Opioids (Misuse)		
Never Misused	1.00	1.00
Misused in Lifetime, but not in Past Year	1.32 (1.12, 1.55) **	1.20 (0.97, 1.48)
Misused in Past Year, but not in Past Month	1.38 (1.21, 1.58) ***	1.87 (1.44, 2.42) ***
Misused in Past Month	1.37 (1.12, 1.69) **	2.14 (1.50, 3.05) ***
Prescription Stimulants (Misuse)		
Never Used	1.00	1.00
Used in Lifetime, but not in Past Year	1.05 (0.84, 1.31)	0.96 (0.69, 1.33)
Used in Past Year, but not in Past Month	0.76 (0.63, 0.92) **	0.80 (0.57, 1.11)
Used in Past Month	1.19 (0.90, 1.55)	1.33 (0.81, 2.20)
Tranquilizers (Misuse)		
Never Misused	1.00	1.00
Misused in Lifetime, but not in Past Year	1.22 (0.99, 1.51)	1.18 (0.80, 1.74)
Misused in Past Year, but not in Past Month	1.14 (0.88, 1.48)	1.18 (0.90, 1.56)
Misused in Past Month	0.91 (0.69, 1.20)	1.11 (0.59, 2.12)
Sedatives (Misuse)		
Never Used	1.00	1.00
Used in Lifetime, but not in Past Year	1.35 (1.07, 1.72) *	0.94 (0.61, 1.43)

	Trying Heroin 1–2x is Not a Great Risk	Using Heroin 1–2x per Week is Not a Great Risk
	aOR (95% CI)	aOR (95% CI)
Used in Past Year, but not in Past Month	1.25 (0.84, 1.85)	1.59 (1.03, 2.47) *
Used in Past Month	2.40 (1.36, 4.26) **	1.07 (0.43, 2.70)

Note. aOR = adjusted odds ratio, CI = confidence interval. Estimates derived from multivariable models control for all covariates in Table 1. Each drug use variable was examined in a separate multivariable model.

* p < .05,

** p < .01,

*** p < .001