HHS Public Access

Author manuscript

Am J Drug Alcohol Abuse. Author manuscript; available in PMC 2016 July 01.

Published in final edited form as:

Am J Drug Alcohol Abuse. 2015 July ; 41(4): 323–331. doi:10.3109/00952990.2015.1045977.

Reasons for Recent Marijuana Use in Relation to Use of Other Illicit Drugs among High School Seniors in the United States

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Abstract

Objectives—Studies show that illicit cannabis (marijuana) use is related to use of other illicit drugs and that reasons for use are related to frequency of marijuana use. However, research is needed to examine whether specific reasons for marijuana use are associated with use of other illicit drugs.

Methods—Data from recent-marijuana-using high school seniors were examined from 12 cohorts of Monitoring the Future (Weighted *N*=6,481) to examine whether reasons for recent marijuana use are associated with use of eight other illicit drugs.

Results—Using “to experiment” decreased odds of reporting use of each drug and using to decrease effects of other drugs increased odds of reporting use of each drug. In multivariable models, using marijuana “to experiment” decreased the odds for reporting use of hallucinogens other than LSD and narcotics other than heroin. Using marijuana for “insight” increased the odds for use of hallucinogens other than LSD, and use due to “boredom” increased the odds for reporting use of powder cocaine and hallucinogens other than LSD. Using marijuana to increase effects of other drugs increased odds of reporting each of the eight drugs, and using it to decrease other drug effects increased odds of reporting use of crack, hallucinogens other than LSD, and amphetamine/stimulants.

Conclusions—This study helped identify illicit marijuana users who are more likely to report use of other illicit drugs. Prevention efforts need to focus on students who report certain reasons for marijuana use as they may be at risk for use of other illicit drugs.

Keywords

marijuana; adolescents; reasons for drug use

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None of the authors have any declarations of interest to declare.

Introduction

Cannabis (marijuana) is the most prevalent drug in the US. Approximately 66% of the 2.9 million individuals who initiated use of illicit drugs in 2012 reported that their first drug was marijuana, with an average age of initiation at 17.9 years (1). According to Monitoring the Future (MTF), an annual representative survey of high school students in the US, in 2013, 45.5% of 12th graders reported lifetime use of marijuana, 36.4% reported past-year use, and 22.7% indicated 30-day use (2). In addition, 81.4% of 12th graders indicate that it is fairly easy or very easy to get marijuana, perceived risk of marijuana has been dropping over recent years (2), and support for legalization is on the rise (3,4). Illicit marijuana use is commonly seen as a risk factor for use of other potentially more dangerous illicit drugs (sometimes referred to as "harder" drugs), although adolescents usually use cigarettes and/or alcohol prior to marijuana (5–7). As attitudes toward marijuana are shifting with initiation and prevalence rates increasing, it is important to determine which illicit marijuana users are more likely to use other illicit drugs.

Various studies have determined that illicit marijuana use tends to precede use of other, "harder" illicit drugs, even though there is a lack of consistent evidence suggesting marijuana use within itself "causes" use of other drugs (8–25). However, there is an abundance of literature suggesting that most users of "harder" drugs use or have used illicit marijuana, and numerous nationally representative surveys of adolescents and young adults have found that at least one out of ten marijuana users have also used another illicit drug (22–25). However, the odds of using other drugs after marijuana differ based on the drug; for example, adolescents who have used marijuana once in the past month are reportedly 13 times more likely to use heroin, cocaine or methamphetamine, and 26 times more likely to use other drugs (26).

Despite extensive research on poly- and multi-drug use, the literature is currently lacking data regarding which illicit marijuana users are most likely to engage in use of other illicit drugs. Marijuana is used by youth for a variety of reasons (e.g., for fun, boredom, relaxation) (27–34), and studies have examined how reasons for use relate to frequency or severity of marijuana use in both a cross-sectional and longitudinal manner (29,35–36). Studies have also examined how reasons for marijuana use differ by key sociodemographic variables such as age, sex, and race/ethnicity (30). Although a few studies have examined how reasons for use of specific drugs relate to use and severity of use (of the same drugs) (29, 31–32), and one study examined how reasons for use relate to severity of combined use of alcohol and marijuana (33), to our knowledge, studies have not examined how reasons for illicit marijuana use relate to use of other drugs. Since most users of other illicit drugs have also used illicit marijuana, research is needed to help identify subtypes of illicit marijuana users who use other drugs as this may be able to inform prevention efforts. Since a wide range of drugs are prevalent, have different use patterns, and different effects and dangers associated with use (1–2,34), research is needed to examine how reasons for illicit marijuana use relate to use of various drugs individually, rather than grouping them into a single "illicit drug" group. This cross-sectional study of a large, nationally representative sample explores how reasons for recent marijuana use relate to use of other illicit drugs among recent-marijuana-using high school seniors in the US.

Methods

Design

Data were examined from MTF, an annual survey of high school students in approximately 130 public and private schools throughout 48 states in the US (2). Schools were selected through a multi-stage random sampling procedure: geographic areas were selected, then schools within geographic areas, and then classes within selected schools. Constructs assessed by MTF are divided into six questionnaire forms that are distributed randomly. This study focuses on data collected through Form 1, which assesses reasons for marijuana use in the last year in addition to drug use and demographics. Analyses focused on data collected from high school seniors (12^{th} graders) in 12 cohorts (2000–2011).

Variables

Students were asked about frequency of recent (12-month) use of marijuana, alcohol ("more than just a few sips"), and select illicit drugs. They were asked, "On how many occasions (if any) have you used marijuana (weed, pot) or hashish (hash, hash oil) during the last 12 months?" Possible responses for these questions were: 0 occasions, 1–2 occasions, 3–5 occasions, 6–9 occasions, 10–19 occasions, 20–39 occasions, and 40+ occasions. The same response options applied to use of alcohol and other illicit drugs. The illicit drugs assessed in this study were powder cocaine, crack, heroin, LSD, and hallucinogens other than LSD. With respect to nonmedical (illicit) use of prescription drugs, this study examined self-reported use of amphetamine/controlled stimulants, narcotics other than heroin (opioids), and tranquilizers/ benzodiazepines. Recent use of each of the eight illicit drugs was dichotomized into use: yes/no. We dichotomized use of each drug because use of some drugs was not very prevalent and it was not feasible to examine them in an ordinal manner. Recent alcohol use was categorized into use 0–2 times, 3–9 times, 10–39 times and ≥40 times. We collapsed categories for use of alcohol 0 times and use 1–2 times because only 2.6% of the sample said they used 0 times and this proportion was not large enough to serve as a comparison for more frequent alcohol use. Lifetime cigarette use was assessed via an ordinal item and responses were: never, 1–2 times, smoke occasionally, and smoke regularly. A category representing students who smoked regularly in the past was not included in the analyses because it was not endorsed by any of the students in this marijuana-using sample. Finally, students who indicated use of marijuana in the last 12 months were asked, "What have been the most important reasons for your using marijuana or hashish?" Students were asked to answer yes/no to 13 items.

We also controlled for select demographic variables in multivariable models (discussed in *Analyses*). Specifically, we controlled for student age (categorized by MTF as <18 vs. ≥18), sex, race (white vs. non-white) and population density. We also controlled for parents' educational attainment as an indicator of socioeconomic status (coding described in previous analyses) (3,4,17,37).

Analyses

Analyses focus on the 6,562 (weighted N = 6,481) students with complete drug data who reported use of marijuana in the last 12 months. Since only about 550 students per cohort

reported recent marijuana use, data from the most recent 12 cohorts were aggregated to increase sample size. First, eight multivariable logistic regression models were computed to examine associations between reasons for marijuana use and recent use of each illicit drug. These models did not control for demographics or other drug use, but reasons for use were entered simultaneously as reporting multiple reasons for use was common (M = 3.95, SD = 2.39, median = 4, range = 0–13). Next, similar models were computed, but controlling for demographic and drug use variables. All models were adjusted by cohort with indicators for each year (with year 2000 as the comparison) included (38). All analyses were design-based for complex survey data (39), weighted accorded to the study's sampling scheme, and conducted using SAS 9.3 software (40). We ensured that there was no serious multicollinearity; however, dependent variables (recent use of each drug) were not fully independent as multi-drug use was common among users. Specifically, 34.9% of the sample reported recent use of any of the 8 illicit drugs examined, and 56.5% of these users of other drugs reported use of more than one illicit drug (M = 2.30, SD = 1.63, range = 1–8; full sample M = 0.80, SD = 1.46). Phi correlations (φ) between recent use of each drug also ranged between .17 and .45 (ps < .001). Therefore, utilizing a Bonferroni correction (.05/8 = .006), alpha was set to .006 to reduce potential Type-I error. The authors' Institutional Review Board declared analyses exempt from review.

Results

Descriptive Statistics

Demographics, drug use and reasons for marijuana use are presented in Table 1. The majority of the sample were frequent marijuana users with a quarter of the sample using 40+ times. Reasons for use most commonly endorsed were "to feel good or get high" (72.0%), "to have a good time with my friends" (66.6%) and "to experiment—to see what it's like" (64.3%).

Logistic Regression Models

In the initial models (Table 2), without controlling for demographics or other drug use, there were two reasons for marijuana use that were consistently associated with use of each of the 8 drugs. Specifically, using marijuana to experiment consistently decreased the odds for reporting use of each drug and using marijuana to increase the effect(s) of another drug consistently increased the odds for reporting use of each drug.

We then examined these relationships in a conditional manner, controlling for demographics and other substance use. Many significant reasons-related associations found in the previous models diminished or disappeared in the adjusted models although direction remained consistent. As shown in Table 3, using marijuana because of boredom increased the odds for reporting powder cocaine use (adjusted odds ratio [AOR] = 1.43, p < .006) and using marijuana to increase effects of other drugs also increased odds of reporting use (AOR = 2.37, p < .0001). Use of marijuana to increase (AOR = 2.07, p < .001) or decrease (AOR = 1.70, p < .001) effects of other drugs increased the odds for reporting crack use, and using marijuana to increase effects of other drugs was also related to heroin use (AOR = 2.26, p < .006). Likewise, controlling for demographics and other substance use, use of marijuana to

increase effects of other drugs was the only significant reason increasing the odds of reporting LSD use (AOR = 3.38, $p < .0001$).

As shown in Table 4, using marijuana to experiment decreased the odds for reporting other hallucinogen use (AOR = 0.62, $p < .0001$), and using marijuana because of boredom (AOR = 1.56, $p < .0001$), for insight or understanding (AOR = 1.51, $p < .006$), and to increase (AOR = 2.58, $p < .0001$) or decrease (AOR = 2.19, $p < .006$) effects of other drugs increased the odds for reporting use. Using marijuana to increase (AOR = 2.09, $p < .0001$) or decrease (AOR = 2.21, $p < .006$) effects of other drugs increased the odds for reporting amphetamine/stimulant use, and using marijuana to increase effects of other drugs was the only significant reason-related correlate of tranquilizer/benzodiazepine use (AOR = 2.53, $p < .001$). Finally, using marijuana to experiment decreased the odds for reporting use of narcotics other than heroin (AOR = 0.70, $p < .0001$) and using to increase effects of other drugs increased the odds for reporting use (AOR = 2.16, $p < .0001$).

Discussion

Numerous studies have examined how marijuana use may increase the risk of use of other, often “harder” illicit drugs. However, research was needed to examine how reasons for marijuana use may relate to use of other drugs. This study focused on high school seniors who reported recent marijuana use (within the last 12 months) and over a third (35%) reported recent use of any of the eight illicit drugs examined.

While there were numerous significant associations between various reasons for marijuana use and use of each illicit drug examined, many associations diminished when controlling for demographic and drug use variables. Results of multivariable models suggest that five reasons for marijuana use were still related to use of other illicit drugs when controlling for numerous sociodemographic and drug use variables. Boredom, which was a common reason for use (31.3%), was associated with increased odds for reporting use of powder cocaine or hallucinogens other than LSD. This adds to evidence from prior studies which have identified boredom as a risk factor for greater frequency of marijuana use among college students (36), and studies of high school seniors which found that use because of boredom increased risk for heavy marijuana use (41) and marijuana use disorder at age 35 (29). It appears that many students use marijuana as a form of sensation seeking to alleviate monotony, and our findings are somewhat consistent with other studies that have found that drugs such as cocaine and methamphetamine are also commonly used to alleviate boredom (42–44).

A fifth (19.8%) of the sample reporting using marijuana for insight or understanding and this reason was also positively related to use of hallucinogens other than LSD. A new study of recent-marijuana-using high school seniors in the MTF study also found that using marijuana to seek deeper insight and understanding increased the odds of reporting recent use of hashish, a more potent form of marijuana (45). Hallucinogens such as magic mushrooms are commonly used to seek insight and understanding (46) so more research is needed to determine if using marijuana for its introspective qualities serves as a risk factor for use of more hallucinogenic drugs or if use has a common cause.

About a tenth of the sample (11%) reported using marijuana to increase the effects of other drugs, and this was a consistent correlate of reporting use of each drug examined in this analysis, even when controlling for sociodemographic and substance use variables. Using to decrease effects of other drugs was the least common reason for use (endorsed by only 2.5% of the sample), and this was associated with increased odds for reporting recent use of crack, hallucinogens other than LSD, and amphetamine/stimulants. Polydrug use—when an individual uses more than one drug simultaneously or in tandem—is common among users of harder drugs; for example, powder cocaine is commonly used during heavy alcohol drinking (47) and ecstasy and drugs such as ketamine are commonly used together (48). We cannot deduce which drug(s)—licit or illicit—these teens were co-using with marijuana, but findings do delineate a link between poly-drug use involving marijuana and recent use of each of the eight drugs examined in this study. Regardless of whether any of the eight drugs assessed were directly combined with marijuana, these teens who engage in any form of marijuana-related poly-drug use are more likely to report using these drugs, so poly-drug users appear to have a more extensive repertoire of illicit drug use.

The one reason for use was found to be negatively associated with use of other drugs when controlling for demographics and other substance use. Specifically, using marijuana “to experiment” was negatively associated with reporting use of hallucinogens other than LSD and narcotics other than heroin. Use for this reason also approached significance in reducing odds for reporting powder cocaine use. This adds to evidence derived from previous MTF studies which have found that using marijuana to experiment was the only reason for use that was negatively associated with frequent marijuana use over time and through age 35 (29–30,33,49). Our findings relate to use of specific drugs also as they add to recent evidence that using marijuana, but not any other “hard” drugs, are not associated with decreased disapproval towards use of powder cocaine, crack or heroin as it does for drugs such as LSD, amphetamine and ecstasy (17). A study of college students also found that using marijuana to experiment was among the most common reasons for use and was negatively associated with frequency of marijuana use (27) as well as frequency of use of other drugs, before controlling for demographic and drug use variables. It should be noted that all students in this sample were recent marijuana users so while initiation may be associated with using other drugs in non-marijuana-using samples, among recent marijuana users, using for experimental reasons may serve a protective role as these students were less likely to report recent use each of the drugs examined. Regarding experimentation being negatively related to reporting use of other drugs, although temporality could not be deduced, using to experiment might have merely been a passive drug culture experience for some and others might have experienced unpleasant effects leading to decisions not to use other drugs (8).

While this study sheds light regarding reasons for marijuana use in relation to use of other drugs, the multivariable models used in this study also confirmed strong associations between use of cigarettes, alcohol, and frequency of marijuana, with use of various drugs. Frequency of marijuana use appears to be among the strongest factors related to use of other drugs and Fergusson and colleagues (50) reported similar findings. However, this study examined how frequency of use related to use of various other drugs, and results were not consistent for all drugs. Lower frequency of marijuana use (6+ times) was a positively

associated with reporting hallucinogen use (other than LSD), but for most other drugs (e.g., powder cocaine, LSD), more frequent use (10+ times) was needed to significantly increase the odds of reporting use. While increased frequency of marijuana use and use of other drugs does appear to have a dose-response relationship (50), these associations were not resistant when controlling for reasons for use. For example, this study confirmed that while controlling for various factors including reasons for use, one must report using marijuana 40+ times to be at increased odds for reporting crack use, and using marijuana this frequently still did not significantly increase the odds for reporting heroin use. Therefore, while frequent marijuana use is a significant correlate of reporting use of various drugs, such as hallucinogens, use is much less related to use of drugs that are perceived to be the most dangerous and addicting (e.g., crack, heroin). However, the reader should be reminded that use of other "hard" drugs tends to precede use of these more dangerous drugs (5–7). Although temporality could not be assessed in this cross-sectional study, results suggest that frequency of marijuana use does not appear to be consistently associated with use of these "harder" drugs.

Limitations

MTF only assessed reasons for use in recent marijuana users so this sample consisted of newer and/or continued lifetime users. This study only focused on high school seniors and students who dropped out of school were not assessed, which may have limited the generalizability of findings. Missing data was problematic (e.g., the 17.1% missing race), but missing data indicators were included in analyses in order to maintain power. Models were also computed using the case-complete sample and the results were comparable, although there was less power to detect associations. Students were asked to check off "yes" or "no" to reasons for use; however, assessing reasons for use through a variety of items and analyzing them as validated composite measures (27,51–52) would more adequately pick up on levels of each reason for use.

Because drug use outcomes were not completely independent, we utilized a strict Bonferroni correction to reduce potential Type I Error. While we interpreted results in terms of statistical significance, the reader should keep in mind that this is in fact a conservative correction so relatively large AORs that were not significant can still be interpreted by direction and help inform prevention. In addition, "recent" (12-month) use does not always mean that one is a current user; the variable includes those who might have used almost a year ago and also those who use every day. Likewise, the last ordinal option for frequency of use was 40+ times; however, some students may have used much more than 40 times. Trends in drug use also vary over time so cohort was controlled in all analyses. Finally, order of drug use and causality cannot be delineated as this study was cross-sectional. Although marijuana tends to be used before other illicit drugs (5–7), it is not known whether use or high frequency of use occurred before, after, or concurrently with use of other drugs. Adding to this limitation, reasons for marijuana use were only assessed among those who reported marijuana use in the last 12 months. Use of one "harder" drug might also depend on use of other "harder" drugs (5).

Conclusions

This study found that using marijuana “to experiment” decreased odds of reporting use of each of the eight drugs examined, and using marijuana to decrease effects of other drugs increased the odds of reporting use of each drug. However, in multivariable models, many associations disappeared or diminished. Controlling for other important covariates, using marijuana “to experiment” decreased the odds for reporting use of hallucinogens other than LSD and narcotics other than heroin. Using marijuana for “insight” increased the odds for use of hallucinogens other than LSD, and use due to “boredom” increased the odds for reporting use of powder cocaine and hallucinogens other than LSD. Using marijuana to increase effects of other drugs increased odds of reporting each of the eight drugs, and using it to decrease other drug effects increased odds of reporting use of crack, hallucinogens other than LSD, and amphetamine/stimulants.

This study adds to the literature in that certain marijuana users may be at risk for use of other illicit drugs and highlights different associations between reasons for marijuana use and use of other specific illicit drugs. Even though this study was only cross-sectional in nature, these results can inform preventive and education efforts in identifying and targeting specific risk factors in illicit marijuana users with aims to prevent the use of other drugs. However, results also highlight that some students who have recently used marijuana to experiment are at lower odds for reporting use of other illicit drugs than those who use marijuana for other reasons. These results can help tailor programs and identify marijuana-using adolescents and young adults who may be at risk for using specific illicit drugs because individuals use drugs (e.g., marijuana) for various reasons, and some reasons for use are associated with use of other, potentially more dangerous drugs. Programs and education efforts, for example, can benefit from knowing that marijuana users who use because they are bored are more likely to use cocaine or hallucinogens. Perhaps prevention programs can address ways of coping with factors such as boredom in order to decrease potential risk. Likewise, it is important for clinicians to understand that polydrug use involving marijuana is common, especially as it is used to increase effects of other drugs. Public health experts and clinicians should continue to seek to prevent and reduce marijuana use—and polydrug use involving marijuana—among adolescents to prevent potential adverse outcomes, with more attention paid to reasons for use.

Acknowledgments

The authors would like to thank the principal investigators (PIs: Johnston, Bachman, O’Malley, and Schulenberg) at The University of Michigan, Institute for Social Research, Survey Research Center, and the Inter-university Consortium for Political and Social Research for providing access to these data (http://www.icpsr.umich.edu/icpsrweb/landing.jsp).

Funding

Monitoring the Future data were collected through a research grant (R01 DA-01411) from the National Institute on Drug Abuse (NIDA), National Institutes of Health (NIH). The content is solely the responsibility of the authors and does not necessarily represent the official views of the principal investigators, NIH or NIDA.

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Table 1

Characteristics of analytic sample (Weighted *N* = 6,481).

Variable	*N*	%
Age		
<18 years	2,874	44.3
≥18 years	3,462	53.4
Age Missing	145	2.2
Sex		
Male	3,110	48.0
Female	3,132	48.3
Sex Missing	239	3.7
Race		
White	4,407	68.0
Other Race	962	14.9
Race missing	1,111	17.1
Parent Educational Attainment		
Low Education	1,865	28.8
Middle Education	1,872	28.9
High Education	2,352	36.3
Education Missing	392	6.0
Population Density		
Non-MSA	1,298	20.0
MSA	5,183	80.0
Recent (12 Month) Marijuana Use		
1–2 Times	1,763	27.2
3–5 Times	1,120	17.3
6–9 Times	747	11.5
10–19 Times	690	10.6
20–39 Times	550	8.5
40+ Times	1,611	24.9
Recent (12 Month) Illicit Drug Use		
Powder Cocaine	627	6.7
Crack	236	3.6
Heroin	125	1.9
LSD	517	8.0
Other Hallucinogens	835	12.9
Amphetamine/Stimulants (nonmedical)	966	14.9
Tranquilizers/Benzodiazepines (nonmedical)	745	11.5
Narcotics (other than heroin, nonmedical)	1,158	17.9
Recent (12 Month) Alcohol Drug Use		
0–2 Times	883	13.6
3–9 Times	1,934	29.8

Variable	*N*	%
10–39 Times	2,416	37.3
40+ Times	1,248	19.3
Lifetime Cigarette Use		
0 Times	1,356	20.9
1–2 Times	1,682	26.0
Smoke Occasionally	1,644	25.4
Smoke Regularly	1,799	27.8
Reasons for Marijuana Use		
Social/Recreational		
“To experiment—to see what it’s like”	4,167	64.3
“To feel good or get high”	4,664	72.0
“To have a good time with my friends”	4,318	66.6
“To fit in with a group I like”	502	7.7
“Because of boredom, nothing else to do”	2,029	31.3
Coping with Negative Affect		
“To relax or relieve tension”	3,869	59.7
“To get away from my problems or troubles”	1,706	26.3
“Because of anger or frustration”	1,200	18.5
Compulsive Use		
“To get through the day”	732	11.3
“Because I am ‘hooked’—I have to have it”	253	3.9
Drug Effect		
“To increase the effects of some other drug(s)”	711	11.0
“To decrease (offset) the effects of some other drug(s)”	162	2.5
Miscellaneous		
“To seek deeper insights and understanding”	1,283	19.8

Note. MSA = metropolitan statistical area.

Am J Drug Alcohol Abuse. Author manuscript; available in PMC 2016 July 01.

Table 2

Multivariable logistic regression models explaining recent use of each drug (without controlling for demographics or other drug use).

	Powder Cocaine		Crack		Heroin		LSD	
	AOR	**(99% CI)**	**AOR**	**(99% CI)**	**AOR**	**(99% CI)**	**AOR**	**(99% CI)**
Social/Recreational								
To Experiment	0.41***	(0.31, 0.54)	0.37***	(0.24, 0.57)	0.44**	(0.24, 0.79)	0.49***	(0.36, 0.67)
To Feel Good or get High	1.66*	(1.10, 2.51)	2.06*	(1.05, 4.04)	1.30	(0.49, 3.47)	1.70**	(1.04, 2.78)
For a Good Time with Friends	0.76	(0.54, 1.07)	0.88	(0.50, 1.52)	0.80	(0.36, 1.74)	1.01	(0.67, 1.52)
To Fit in with A Group I Like	0.76	(0.42, 1.35)	1.19	(0.61, 2.33)	1.30	(0.51, 3.37)	0.62	(0.31, 1.24)
Because of Boredom	1.63***	(1.20, 2.21)	1.37	(0.85, 2.23)	1.37	(0.66, 2.82)	1.57**	(1.11, 2.22)
Coping with Negative Affect								
To Relax or Relieve Tension	1.42	(1.00, 2.02)	0.97	(0.55, 1.71)	1.23	(0.54, 2.80)	1.06	(0.71, 1.57)
To Get Away from Problems	0.99	(0.67, 1.46)	1.28	(0.66, 2.46)	1.75	(0.91, 3.38)	1.43	(0.95, 2.17)
Because of Anger or Frustration	0.77	(0.53, 1.10)	0.71	(0.39, 1.28)	1.20	(0.59, 2.43)	0.76	(0.51, 1.14)
Compulsive Use								
To Get Through the Day	1.64*	(1.05, 2.56)	2.16*	(1.15, 4.08)	1.25	(0.55, 2.84)	0.99	(0.61, 1.60)
Because “Hooked”/ Must Have It	1.35	(0.77, 2.36)	1.71	(0.85, 3.44)	1.74	(0.74, 4.12)	2.00*	(1.12, 3.58)
Drug Effect								
To Increase Effect of Other Drug	3.24***	(2.28, 4.59)	2.58***	(1.43, 4.31)	2.84***	(1.43, 5.65)	4.53***	(3.12, 6.60)
To Decrease Effect of Other Drug	2.17**	(1.18, 3.99)	3.21**	(1.42, 7.24)	2.03	(0.84, 4.90)	1.70	(0.82, 3.51)
Miscellaneous								
For Insight and Understanding	1.09	(0.77, 1.55)	0.73	(0.42, 1.25)	0.75	(0.39, 1.46)	1.52*	(1.04, 2.21)
	Other Hallucinogens		Amphetamine/ Stimulants		Tranquilizers/ Benzodiazepines		Narcotics (Other than Heroin)	
	AOR	(99% CI)	AOR	(99% CI)	AOR	(99% CI)	AOR	(99% CI)
Social/Recreational								
To Experiment	0.39***	(0.31, 0.51)	0.61***	(0.49, 0.77)	0.55***	(0.43, 0.70)	0.51***	(0.41, 0.63)
To Feel Good or get High	1.35	(0.93, 1.96)	1.59**	(1.14, 2.22)	1.46	(0.99, 2.16)	1.72***	(1.26, 2.35)
For a Good Time with Friends	1.01	(0.73, 1.40)	0.99	(0.75, 1.31)	0.88	(0.63, 1.23)	1.20	(0.92, 1.57)

	Powder Cocaine		Crack		Heroin		LSD	
	AOR	**(99% CI)**	**AOR**	**(99% CI)**	**AOR**	**(99% CI)**	**AOR**	**(99% CI)**
To Fit in with A Group I Like	0.55*	(0.33, 0.89)	0.82	(0.50, 1.35)	0.83	(0.47, 1.47)	0.92	(0.59, 1.44)
Because of Boredom	1.85***	(1.42, 2.42)	1.41***	(1.08, 1.83)	1.22	(0.92, 1.62)	1.37**	(1.08, 1.74)
Coping with Negative Affect								
To Relax or Relieve Tension	1.66***	(1.21, 2.30)	1.27	(0.94, 1.73)	1.54**	(1.10, 2.16)	1.36*	(1.03, 1.79)
To Get Away from Problems	0.88	(0.62, 1.25)	1.10	(0.79, 1.53)	1.43	(1.00, 2.05)	1.28	(0.95, 1.73)
Because of Anger or Frustration	0.75	(0.54, 1.04)	0.95	(0.70, 1.29)	0.82	(0.58, 1.16)	0.89	(0.67, 1.18)
Compulsive Use								
To Get Through the Day	1.31	(0.90, 1.91)	1.27	(0.86, 1.86)	1.42	(0.96, 2.09)	1.14	(0.80, 1.62)
Because “Hooked”/ Must Have It	1.54	(0.93, 2.53)	1.22	(0.73, 2.03)	1.39	(0.81, 2.37)	1.17	(0.73, 1.86)
Drug Effect								
To Increase Effect of Other Drug	3.54***	(2.59, 4.84)	2.66**	(1.95, 3.61)	3.19***	(2.30, 4.41)	2.75***	(2.07, 3.66)
To Decrease Effect of Other Drug	2.37**	(1.29, 4.33)	2.53**	(1.40, 4.57)	1.64	(0.92, 2.95)	1.62	(0.91, 2.89)
Miscellaneous								
For Insight and Understanding	2.10***	(1.57, 2.80)	1.26	(0.93, 1.69)	1.22	(0.90, 1.66)	1.12	(0.87, 1.45)

Note. All adjusted odds ratios (AORs) are adjusted by cohort, but are loosely considered “unadjusted” as no other covariates were controlled in models.

+ $p < .01$,

* $p < .006$,

** $p < .001$,

*** $p < .0001$

Table 3

Multivariable logistic regression models explaining recent use of powder cocaine, crack, heroin and LSD.

	Powder Cocaine		Crack		Heroin		LSD	
Covariates	**AOR**	**(99% CI)**	**AOR**	**(99% CI)**	**AOR**	**(99% CI)**	**AOR**	**(99% CI)**
Reasons for Marijuana Use								
Social/Recreational								
To Experiment	0.73^{+}	(0.54, 0.98)	0.65	(0.41, 1.03)	0.63	(0.33, 1.22)	0.80	(0.58, 1.11)
To Feel Good or get High	1.08	(0.70, 1.68)	1.41	(0.71, 2.81)	0.92	(0.34, 2.51)	1.16	(0.67, 2.00)
For a Good Time with Friends	0.68^{+}	(0.47, 0.99)	0.89	(0.50, 1.61)	0.82	(0.37, 1.80)	0.93	(0.60, 1.45)
To Fit in with A Group I Like	0.87	(0.45, 1.66)	1.42	(0.71, 2.84)	1.33	(0.49, 3.63)	0.65	(0.30, 1.39)
Because of Boredom	1.43*	(1.04, 1.96)	1.24	(0.77, 2.01)	1.27	(0.62, 2.60)	1.38	(0.96, 1.98)
Coping with Negative Affect								
To Relax or Relieve Tension	0.98	(0.67, 1.43)	0.71	(0.40, 1.29)	1.07	(0.45, 2.58)	0.76	(0.50, 1.16)
Because of Anger or Frustration	0.92	(0.62, 1.38)	1.08	(0.55, 2.14)	1.62	(0.84, 3.16)	1.36	(0.89, 2.08)
To Get Away from Problems	0.80	(0.55, 1.16)	0.75	(0.42, 1.36)	1.39	(0.70, 2.76)	0.82	(0.54, 1.24)
Compulsive Use								
To Get Through the Day	1.35	(0.88, 2.07)	1.66	(0.92, 3.00)	1.05	(0.48, 2.30)	0.88	(0.55, 1.41)
Because “Hooked”/ Must Have It	0.97	(0.56, 1.69)	1.27	(0.64, 2.54)	1.23	(0.52, 2.94)	1.39	(0.78, 2.47)
Drug Effect								
To Increase Effect of Other Drug	2.37***	(1.67, 3.37)	2.07**	(1.21, 3.53)	2.26*	(1.11, 4.60)	3.38***	(2.28, 5.00)
To Decrease Effect of Other Drug	1.80	(0.99, 3.26)	1.70**	(1.30, 5.64)	1.89	(0.77, 4.63)	1.58	(0.76, 3.28)
Miscellaneous								
For Insight and Understanding	0.84	(0.59, 1.21)	0.64	(0.37, 1.09)	0.64	(0.33, 1.28)	1.15	(0.79, 1.67)
Frequency of 12 Month Alcohol Use								
3–9 Times	2.45*	(1.13, 5.34)	2.29	(0.66, 7.96)	2.76	(0.33, 22.85)	1.41	(0.64, 3.10)
10–39 Times	3.64***	(1.73, 7.67)	3.65*	(1.12, 11.90)	7.56	(0.95, 60.26)	1.73	(0.80, 3.74)
40+ Times	5.64***	(2.63, 12.08)	6.25**	(1.87, 20.84)	11.57*	(1.45, 92.32)	2.35*	(1.08, 5.14)
Frequency of Lifetime Cigarette Use								
1–2 Times	1.40	(0.72, 2.70)	1.82	(0.61, 5.49)	1.67	(0.54, 5.18)	1.31	(0.67, 2.57)

	Powder Cocaine		Crack		Heroin		LSD	
Covariates	**AOR**	**(99% CI)**	**AOR**	**(99% CI)**	**AOR**	**(99% CI)**	**AOR**	**(99% CI)**
Smoke Occasionally	2.59***	(1.41, 4.75)	2.44	(0.83, 7.12)	1.06	(0.31, 3.54)	1.43	(0.75, 2.72)
Smoke Regularly	4.48***	(2.46, 8.15)	3.38*	(1.21, 9.41)	1.76	(0.58, 5.39)	2.24*	(1.19, 4.24)
Frequency of 12 Month Marijuana Use								
3–5 Times	1.34	(0.64, 2.79)	2.82	(0.74, 10.68)	0.71	(0.16, 3.18)	2.10	(0.88, 5.04)
6–9 Times	1.88	(0.90, 3.95)	2.16	(0.50, 9.36)	0.42	(0.08, 2.25)	2.26	(0.86, 5.93)
10–19 Times	3.02***	(1.49, 6.11)	3.02	(0.78, 11.64)	2.00	(0.51, 7.86)	3.43**	(1.40, 8.37)
20–39 Times	3.13***	(1.50, 6.53)	3.19	(0.80, 12.71)	0.36	(0.06, 2.19)	3.24**	(1.23, 8.52)
40+ Times	6.33***	(3.27, 12.24)	7.10***	(2.06, 24.44)	1.93	(0.50, 7.47)	7.20***	(3.12, 16.62)
Mean (SD) number of reasons	5.17	(2.75)	5.42	(3.09)	5.77	(2.94)	5.52	(2.95)
Correct Classification Rate	91%		97%		98%		92%	
Nagelkerke R^2	31%		26%		21%		29%	

Note. All models are adjusted by cohort, age, sex, race/ethnicity, parent education, and MSA, and included missing data indicators. AOR = adjusted odds ratio. Comparison groups for alcohol, cigarette and marijuana use were 0–2 times using alcohol, 0 times smoking cigarettes, and 1–2 times using marijuana, respectively.

+ $p < .009$,

* $p < .006$,

** $p < .001$,

*** $p < .0001$

Table 4

Multivariable logistic regression models explaining recent use of other psychedelics, amphetamine/stimulants, tranquilizers/benzodiazepines, and narcotics (other than heroin).

	Other Hallucinogens		Amphetamine/ Stimulants		Tranquilizers/ Benzodiazepines		Narcotics (Other than Heroin)	
Covariates	**AOR**	**(99% CI)**	**AOR**	**(99% CI)**	**AOR**	**(99% CI)**	**AOR**	**(99% CI)**
Reasons for Marijuana Use								
Social/Recreational								
To Experiment	0.62***	(0.47, 0.81)	0.89	(0.69, 1.13)	0.82	(0.62, 1.08)	0.70***	(0.55, 0.88)
To Feel Good or get High	0.91	(0.60, 1.37)	1.19	(0.84, 1.69)	1.12	(0.75, 1.68)	1.37	(0.99, 1.90)
For a Good Time with Friends	0.90	(0.63, 1.28)	0.87	(0.65, 1.18)	0.81	(0.57, 1.14)	1.10	(0.83, 1.45)
To Fit in with A Group I Like	0.59	(0.33, 1.03)	0.93	(0.55, 1.56)	0.91	(0.50, 1.65)	1.02	(0.64, 1.63)
Because of Boredom	1.56***	(1.18, 2.07)	1.27	(0.97, 1.66)	1.09	(0.81, 1.46)	1.20	(0.94, 1.53)
Coping with Negative Affect								
To Relax or Relieve Tension	1.20	(0.84, 1.70)	1.00	(0.72, 1.37)	1.21	(0.85, 1.73)	1.11	(0.83, 1.49)
Because of Anger or Frustration	0.93	(0.64, 1.35)	1.02	(0.73, 1.44)	1.34	(0.92, 1.95)	1.25	(0.91, 1.70)
To Get Away from Problems	0.83	(0.59, 1.18)	1.01	(0.74, 1.40)	0.86	(0.60, 1.23)	0.96	(0.72, 1.28)
Compulsive Use								
To Get Through the Day	1.10	(0.75, 1.61)	1.09	(0.74, 1.60)	1.21	(0.81, 1.81)	1.02	(0.71, 1.48)
Because “Hooked”/ Must Have It	1.08	(0.66, 1.76)	0.93	(0.56, 1.56)	1.00	(0.60, 1.68)	0.88	(0.55, 1.42)
Drug Effect								
To Increase Effect of Other Drug	2.58***	(1.86, 3.57)	2.09***	(1.51, 2.89)	2.53***	(1.79, 3.58)	2.16***	(1.60, 2.91)
To Decrease Effect of Other Drug	2.19**	(1.21, 3.98)	2.21**	(1.23, 3.99)	1.41	(0.78, 2.54)	1.44	(0.80, 2.61)
Miscellaneous								
For Insight and Understanding	1.51**	(1.13, 2.02)	1.11	(0.82, 1.51)	1.06	(0.76, 1.46)	0.96	(0.74, 1.26)
Frequency of 12 Month Alcohol Use								
3–9 Times	1.17	(0.65, 2.11)	2.24**	(1.26, 4.00)	1.33	(0.73, 2.41)	1.71*	(1.05, 2.80)
10–39 Times	1.29	(0.74, 2.27)	2.96***	(1.69, 5.17)	1.74	(0.99, 3.06)	2.19***	(1.36, 3.51)
40+ Times	1.98*	(1.11, 3.53)	4.06***	(2.28, 7.24)	2.29***	(1.26, 4.16)	2.60***	(1.58, 4.29)
Frequency of Lifetime Cigarette Use								
1–2 Times	1.32	(0.82, 2.14)	1.22	(0.78, 1.91)	1.08	(0.66, 1.75)	1.15	(0.78, 1.68)

	Other Hallucinogens		Amphetamine/ Stimulants		Tranquilizers/ Benzodiazepines		Narcotics (Other than Heroin)	
Covariates	**AOR**	**(99% CI)**	**AOR**	**(99% CI)**	**AOR**	**(99% CI)**	**AOR**	**(99% CI)**
Smoke Occasionally	1.47	(0.92, 2.33)	1.49	(0.98, 2.27)	1.51	(0.96, 2.40)	1.50*	(1.05, 2.15)
Smoke Regularly	1.64+	(1.03, 2.62)	2.09***	(1.36, 3.20)	2.35***	(1.48, 3.71)	1.78***	(1.22, 2.59)
Frequency of 12 Month Marijuana Use								
3–5 Times	1.76	(0.86, 3.59)	1.73*	(1.05, 2.84)	1.32	(0.76, 2.27)	1.10	(0.72, 1.68)
6–9 Times	2.78**	(1.33, 5.79)	1.41	(0.82, 2.43)	1.02	(0.56, 1.86)	1.40	(0.88, 2.23)
10–19 Times	3.74***	(1.87, 7.49)	2.44***	(1.45, 4.13)	2.27**	(1.30, 4.00)	1.77*	(1.13, 2.76)
20–39 Times	3.86***	(1.87, 7.99)	2.02**	(1.13, 3.60)	1.42	(0.77, 2.62)	1.51	(0.93, 2.44)
40+ Times	9.48***	(5.01, 17.91)	3.98***	(2.43, 6.52)	3.50***	(2.08, 5.88)	2.87***	(1.90, 4.35)
Mean (SD) number of reasons	5.42	(2.78)	5.15	(2.67)	5.31	(2.80)	5.07	(2.59)
Correct Classification Rate	89%		86%		89%		83%	
Nagelkerke R^2	33%		24%		24%		23%	

Note. All models are adjusted by cohort, age, sex, race/ethnicity, parent education, and MSA, and included missing data indicators. AOR = adjusted odds ratio. Comparison groups for alcohol, cigarette and marijuana use were 0–2 times using alcohol, 0 times smoking cigarettes, and 1–2 times using marijuana, respectively.

+ p = .006,

* $p < .006$,

** $p < .001$,

*** $p < .0001$