Is Pre-College Interpersonal Trauma Associated with Cannabis Use?

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Abstract

Objective: To examine the prevalence and correlates of lifetime cannabis use (i.e., experimental [use 1–5 times] and non-experimental [use 6 times]) in relation to interpersonal trauma (IPT) above and beyond relevant covariates.

Participants: A large ($n = 9,889$) representative sample of college students at an urban university in the southeastern part of the United States.

Methods: Participants were 4 cohorts of first-year college students who completed measures of demographics, cannabis, alcohol, nicotine, and IPT. Associations were estimated using multinomial logistic regressions.

Results: The prevalence of lifetime cannabis use was 28.1% and 17.4% for non-experimental and experimental cannabis use, respectively. IPT was significantly associated with experimental and non-experimental cannabis use above and beyond effects of sex, race, cohort, alcohol, and nicotine.

Conclusions: Results show that cannabis use is prevalent among college students and is associated with IPT above and beyond associations with sex, race, and other substance use.

Keywords

cannabis; substance use; trauma; college students

Introduction

Cannabis is the most frequently used illicit substance in the United States [1]. Individuals between ages 18- and 29-years old are at high risk of cannabis misuse, exhibiting usage rates of 21% [2], and college students are at an even greater risk for cannabis misuse, exhibiting

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usage rates of 42% [3]. In a sample of students from 11 colleges, Suerken and colleagues [4] found that 30% of students reported using cannabis before college and 8.5% of students who did not use cannabis before college reported initiating use during their first year. College students may be at an increased risk for adverse physical and mental health effects. Furthermore, cannabis use during college has been shown to negatively influence students' academic achievement [5], and thus, it is important to examine correlates of cannabis use to best inform intervention and prevention programming on college campuses.

Exposure to traumatic events is common among college students and is associated with cannabis use [6]. Among college students, the prevalence of trauma exposure ranges from 67% to 84% [7–9]. Furthermore, 39% of first-year college students have experienced at least one interpersonal trauma (IPT), or physical or sexual assault, in their lifetime [10]. Compared to accidental trauma (e.g., natural disaster, motor vehicle accident), IPT has the potential to be more problematic for college students due to the increased likelihood of developing PTSD following the trauma event [11–13], which in turn is associated and tends to co-occur with cannabis use [14–16]. However, a majority of research on cannabis use and trauma among college students has used convenience samples [7,17]. Thus, the primary aim of the current study is to examine the relationship between IPT and cannabis use in a representative sample of college students. Moreover, the present study also aims to extend the literature by examining relevant demographic factors and polysubstance variables.

Relevant demographic factors are important to consider when studying cannabis use and its relation to trauma due to their established relationships with each construct. Research shows that there are sex differences regarding cannabis use and trauma exposure. Johnston and colleagues [18] found that while lifetime prevalence for cannabis use was higher for males than for females. Epidemiologic research has shown that women are more likely to experience sexual violence compared to men, and men are more likely to experience interpersonal violence compared to women [19]. Research also shows that there are racial and ethnic differences regarding cannabis use. In a representative sample of high school students completing the National Youth Risk Behavior Survey, prevalence of current cannabis use was highest for African-American (29%), Hispanic (28%), American-Indian (36%) and Multi-Racial (29%) groups, with Caucasian (22%) and Asian-American (11%) groups exhibiting the lowest prevalence [20]. Thus, sex and race/ethnicity are critical demographic factors to include in studies investigating cannabis use and its association to trauma exposure.

A limitation of the extant literature is that most studies investigating correlates and predictors of cannabis use are not controlling for polysubstance use. Traumatic events may be associated with cannabis use, but they are also associated with other common substance use outcomes, such as alcohol and nicotine use [6,17,21]. Among a random sample of first-year college students from two large public universities, 65.1% of students who reported past-month cannabis use also reported past-month alcohol use with some even reporting use of both substances on the same day [22]. Concurrent use of cannabis and alcohol is one of the most common forms of polysubstance use among college students [23]. Concurrent use of cannabis and nicotine is another common form of polysubstance use [24]. Among a large sample of young adults, 37% reported concurrent use of cannabis and

nicotine [25]. Additionally, individuals who reported concurrent use of cannabis and nicotine also reported more frequent use of both substances and poorer physical and mental health during emerging adulthood compared to those who used cannabis only or nicotine only [25]. Since cannabis use is often comorbid with other substance use (e.g., nicotine, alcohol) they are key variables to consider and potentially control for in cannabis use research.

The increasing prevalence rates of cannabis use and the elevated risk for trauma exposure among college students makes the greater than chance co-occurrence of cannabis use and trauma exposure an important area for future research in order to inform prevention and intervention efforts. To our knowledge, the majority of research has assessed the relationship between trauma exposure, cannabis use, and other substance use outcomes (i.e., alcohol, nicotine) in convenience samples of college students that may not be representative of the larger population. The purpose of our study is to investigate the prevalence of cannabis use in the context of IPT and their overlapping demographic and substance use correlates within a large and representative sample of college students. We hypothesized that lifetime IPT exposure will be associated with lifetime cannabis use after controlling for well-established correlates of both IPT exposure and cannabis use (i.e., alcohol, nicotine, sex, race).

Methods

Participants

Current study participants came from a large, ongoing study on college behavioral health at a mid-Atlantic public university with a diverse population [26]; notably, however, the present study only uses data from matriculating first-year college students (i.e., baseline survey). The parent study was approved by the university's institutional review board and informed consent was obtained from all study participants. All first-year students 18 years of age or older were invited to participate and nearly 70% of eligible participants that were representative of the university's diverse population enrolled in the project by completing an online survey during their first year at the university in Research Electronic Data Capture REDCap; [27]. REDCap is a secure, web-based application designed to support data capture for research studies, providing an intuitive interface for validated data entry. Baseline data were collected during the Fall of individuals' first year during college on a variety of factors including childhood experiences, personality, relationships, and behavior, with participants receiving $10 and a t-shirt as compensation. Detailed information concerning recruitment can be found in [26]. Additionally, a baseline survey was sent during the Spring of individuals' first year to individuals who did not participate in the Fall, giving them a second chance to become a part of the project. Their survey consisted of an abbreviated number of questions asking them to retrospectively report on items from the Fall baseline survey. Of these individuals, about 34% completed the survey, which corresponded to an overall 10% of the total sample [26]. The current study included only baseline data from the first four cohorts (cohort 1 entering college in 2011 [n = 2,707], cohort 2 entering college in 2012 [n = 2,481], cohort 3 entering college in 2013 [n = 2,391], cohort 4 entering college in 2014 [n = 2,310]) of Spit for Science (n = 9,889).

Measures

Independent Variable

Cannabis Use.: Lifetime use and total times used was measured using items adapted from the Semi-Structured Assessment for the Genetics of Alcoholism (SSAGA) [28]. Participants were asked if they had ever used (yes/no response options) and, if so, how many times (free response). Use 1–5 times was classified as "experimental" use and use 6 or more times was classified as "non-experimental" use, which will be referred to as the "cannabis use threshold" variable. Substance use frequency of use 6 or more times has been used as a threshold for non-medical (i.e., use without a prescription), non-experimental use of substances in other studies from the Spit for Science dataset [29].

Dependent Variable

Interpersonal Trauma Exposure (IPT).: Traumatic event (TE) exposure was assessed using an abbreviated version of the Life Events Checklist [30]. Participants were asked to report on the occurrence of five different stressful events: natural disasters, physical assaults, sexual assaults, other unwanted or uncomfortable sexual experiences, and transportation accidents. Response options were "yes" or "no" to items regarding whether each stressful event occurred "before the past 12 months", "during the past 12 months", or "never happened to me". If a participant endorsed that the event occurred either "before the past 12 months", or "during the past 12 months", it was considered a positive endorsement of TE exposure prior to college. If a participant did not endorse any of the aforementioned options or reported that the events "never happened to me", it was considered a negative endorsement of TE history. Stressful events were further grouped into interpersonal TEs (i.e., physical assaults, sexual assaults, other unwanted or uncomfortable sexual experiences) and accidental TEs (i.e., natural disasters and transportation accidents). This study used a lifetime IPT endorsement variable (i.e., yes/no), which was the only trauma-related variable included in this study.

Covariates

Demographics.: Data regarding demographics included self-reported sex, race, cohort, and age.

Alcohol Use Frequency.: Average frequency of alcohol use during the past year was assessed using the frequency items from the Alcohol Use Disorder Identification Test (AUDIT; [31]. Response options for frequency ("In the past year, how often did you have a drink containing alcohol?") were "never", "monthly or less", "2 to 4 times a month", "2 to 3 times a week", or "4 or more times a week." Response options were coded from 0 to 4, where higher responses were indicative of more frequent alcohol use.

Nicotine Use Frequency.: Nicotine use was assessed across 4 categories: cigarettes, cigars, smokeless tobacco, and hookah. Lifetime use and total quantity consumed was assessed using items adapted from the SSAGA [28]. Recent (i.e., past 30 days) frequency of use was measured using items adapted from SAMSHA [32]. For each nicotine category, participants were asked how frequently they used the product in the past 30 days. Answer options

were "I did not use," "Once or twice," "A few days (3 to 4 days a month)," "A couple of days a week (5 to 11 days a month)," "3 times a week (12 to 14 days a month)," "most days of the week (15 to 25 days a month)," and "daily or almost daily (26 to 30 days a month)." Response options specifically for nicotine use were coded from 0 to 6, where higher responses were indicative of more frequent nicotine use.

Data Analytic Plan

Multiple Imputation.—Primary variables, lifetime cannabis use and lifetime IPT exposure, had 5.8% and 2.0% missing data, respectively. Missing data was imputed using the R package "missForest" [33]. A non-parametric multiple imputation method was applied to estimate missing data in five binary variables of cannabis use from year 1 Fall, year 1 Spring, year 2 Spring, year 3 Spring, and year 4 Spring. Eight iterations of the imputation process were performed until reaching an optimal stopping point. The imputation was based on ten binary (5 cannabis, 5 alcohol) and fifteen categorical (5 cannabis, 5 nicotine, and 5 alcohol) variables from years 1 to 4. The overall estimate of imputation error was 0.1459 based on the proportion of falsely classified (PFC) entries, with the PFC of the five binary variables of cannabis use ranging between 0.00 and 0.0002. It is expected that good performance results of imputation with "missForest" will give a value close to 0, in contrast with inadequate results returning values close to 1 [33].

Determination of Statistical Significance.—Due to the large number of participants (n = 9,889) and research suggesting that p-values become less meaningful with very large samples [34], a more stringent significance level (i.e., $p < .001$) was set to determine statistical significance.

Data Analysis.—Chi-square analyses were employed to test for differences among lifetime IPT exposure categories based on lifetime cannabis use. Analyses also examined cross-sectional correlates of lifetime experimental and non-experimental cannabis use assessed at entry of college. Specifically, a multinomial logistic regression was employed to test the hypotheses that lifetime IPT exposure is associated with lifetime experimental and non-experimental cannabis use above and beyond covariates. Covariates included sex, race, cohort, past-year alcohol use frequency, and past-30-day nicotine use frequency. Data were analyzed using SPSS Version 24 [35].

Results

Participant Characteristics

Demographic data are presented in Table 1. Most participants reported they were White (n = 4,959, 50.1%) and female (n = 6,083, 61.5%). The remaining racial breakdown of the sample was Black (n = 1,900, 19.2%), Asian (n = 1,640, 16.6.%), and Other (n = 1,390, 14.1%). Sample size for each of the four cohorts was relatively equal (cohort 1: n = 2,707, 27.4%; cohort 2: n = 2,481, 25.1%; cohort 3: n = 2,391, 24.2%; cohort 4: n = 2,310, 23.4%).

Prevalence Estimates of Lifetime Interpersonal Trauma Exposure, Cannabis, Nicotine, and Alcohol Use

Descriptive statistics, lifetime IPT exposure, and substance use prevalence estimates are presented in Table 1. Prevalence of lifetime IPT upon college entry was 48.5% (n = 4,684). Prevalence estimates of types of lifetime IPT exposure (i.e., physical and sexual assault, other unwanted sexual experience) by sex are presented in Table 2. Among those who reported lifetime cannabis use (n = 4,498, 45.5%), a majority reported non-experimental use (i.e., use 6 times) as opposed to experimental use (i.e., use 1–5 times). Specifically, 2,788 participants (28.3%) reported non-experimental cannabis use and 1,718 participants (17.4%) reported experimental cannabis use. Among those who reported past-year alcohol use (n = 8,134, 82.2%), most reported using monthly or less (41.0%). Among those who reported past-30-day nicotine use (n = 4,592, 46.4%), most reported using once or twice (19.9%).

Differences in Lifetime Cannabis Use between Lifetime Interpersonal Trauma Exposure Categories

Chi-Square tests of independence were performed to examine the relation between lifetime cannabis use and lifetime interpersonal trauma exposure categories (i.e., physical assault, sexual assault, and unwanted/uncomfortable sexual experience). The relation between cannabis use and physical assault [χ^2 (1, $N = 9224$) = 99.78, $p < .001$], sexual assault [χ^2 (1, $N = 9271$) = 191.84, $p < .001$], and unwanted/uncomfortable sexual experience [χ^2 (1, $N = 9164$) = 189.80, $p < .001$] were all significant. Individuals who reported lifetime cannabis use were more likely to report lifetime physical assault, sexual assault, and unwanted/uncomfortable sexual experiences compared to those who did not report lifetime cannabis use, respectively.

Correlates of Lifetime Experimental and Non-Experimental Cannabis Use

Multinomial logistic regression was used to examine whether lifetime IPT exposure was associated with increased odds of cannabis use above covariates: demographics, cohort, alcohol use, and nicotine use. All effect sizes are reported as odds ratios, which can be interpreted as the relative odds (compared to the reference group of no lifetime use) of reporting experimental (i.e., 1–5 times) and non-experimental (i.e., 6 times) cannabis use; see Table 3.

Experimental Cannabis Use.—Race, cohort, nicotine use, and lifetime IPT exposure were associated with experimental cannabis use, but sex and alcohol use were not. Specifically, White individuals were more likely to report experimental cannabis use compared to Black and Asian individuals; individuals from cohort four were more likely to report experimental cannabis use compared to individuals from cohort one; individuals who reported more frequent nicotine use during the past month were more likely to report experimental cannabis use; and individuals who reported lifetime IPT exposure were more likely to report experimental cannabis use compared to individuals who did not report lifetime IPT exposure.

Non-Experimental Cannabis Use.—Sex, race, cohort, nicotine use, alcohol use, and lifetime IPT exposure were all associated with non-experimental cannabis use. Specifically,

men were more likely to report non-experimental cannabis use compared to women; White individuals were more likely to report non-experimental cannabis use compared to Black and Asian individuals; individuals from cohort three were more likely to report non-experimental cannabis use compared to individuals from cohort one; individuals who reported more frequent nicotine use during the past month were more likely to report non-experimental cannabis use; individuals who reported more frequent alcohol consumption during the past year were more likely to report experimental cannabis use; and individuals who reported lifetime IPT exposure were more likely to report non-experimental cannabis use compared to individuals who did not report lifetime IPT exposure.

Discussion

The purpose of this study was to examine the prevalence of lifetime experimental and non-experimental cannabis use and its demographic and other substance use correlates among a large representative sample of college students at an urban university in the southeastern part of the United States. The sex and racial/ethnic breakdown of cohorts 1–4 of Spit for Science is 62% female, 50% White, 19% Black, 17% Asian, and 14% Other. Accordingly, the sample of participants closely maps onto the overall university's demographics in terms of sex and racial/ethnic distribution [26,36]. Thus, Spit for Science is generalizable to the university's student body and may generalize to other college-age populations based on comparisons of similar prior U.S. studies [26]. Overall, 17.4% and 28.3% of participants reported lifetime experimental and non-experimental cannabis use, respectively. These findings were consistent with previous prevalence estimates, which suggested that almost half (45%) of incoming college students report lifetime cannabis use [37]. Our study separated lifetime cannabis use into categories based on total number of times used (i.e., experimental = use 1–5 times, non-experimental = use 6 times), but combined, almost half (45.7%) of study participants reported a history of either category of cannabis use upon college entry.

Although results show similar lifetime prevalence rates of cannabis use to previous research among college students [37], results also show inconsistent racial differences in lifetime cannabis use based on previous research. Notably, adolescent research finds different racial/ethnic differences regarding cannabis use [20]. Results from our study demonstrate that White individuals were more likely to report lifetime cannabis use compared to Black and Asian individuals while previous research shows that racial minorities were more likely to use cannabis compared to White individuals among a nationally representative sample of adolescents [20]. Adolescent research shows that individual-, family-, and school-related factors influence substance use differently based on race/ethnicity [38], and these differences among influences may no longer apply in a college environment. For example, resistance self-efficacy may decrease among individuals in a college sample due to decreased parental monitoring and a potential increase in peer influence.

The study sample is generalizable in that it matches that of the university's general student body, as well as other college-age populations based on comparisons of similar prior U.S. studies, with regard to sex and race [26,36,39,40]. Therefore, it is unlikely that results are due to ascertainment bias. The legal landscape surrounding cannabis use in the United States has changed drastically during the past few years, which has led to increases in cannabis

use and decreases in perceptions of cannabis use as a risky behavior [41]. Legalization and risk perception changes regarding cannabis use combined with increased advertisements and availability of cannabis [42] may have caused an increased likelihood of individuals reporting their cannabis use and/or increased use among White individuals compared to their racial minority counterparts.

The purpose of this study was also to examine correlates of lifetime experimental and non-experimental cannabis use. Sex and alcohol use were the only two correlates that differed regarding their association with experimental and non-experimental cannabis use demonstrating that men and alcohol use were only associated with higher levels of cannabis use. Sex differences have been shown to exist among individuals with increased cannabis use and cannabis use problems, such as cannabis use disorder CUD; [43]. Additionally, individuals who report increased cannabis use are more likely to report simultaneous use of alcohol [44]. Lifetime IPT exposure was hypothesized to be associated with lifetime cannabis use above and beyond demographic and substance use covariates. Consistent with previous research [15,45,46], results show that individuals who reported lifetime IPT exposure were more likely to report lifetime experimental and non-experimental cannabis use. Although many people who experience accidental trauma where there is high trauma exposure develop symptoms of post-trauma psychopathology, IPT has been shown to be a stronger predictor of post-trauma psychopathology compared to accidental trauma [47,48]. Similar to Kevorkian and colleagues [15], alcohol, but not nicotine, was included as a correlate of cannabis use along with trauma exposure. However, a recent study investigating concurrent use of cannabis, cigarettes, and alcohol without trauma as a predictor found that the use of cannabis, cigarettes, or alcohol independently increased the probability of subsequent, concurrent use of one of the two remaining substances [49]. Therefore, our study expanded the literature by including both alcohol and nicotine as predictors of cannabis use in order to demonstrate that IPT is associated with increased risk over other established correlates.

There are multiple potential explanations for the association between cannabis use and IPT exposure. One possible explanation is the self-medication model [50], in which cannabis use may serve as an avoidance function for individuals struggling with symptoms of posttraumatic stress resulting from experiencing an IPT. Another possible explanation is the high-risk model, in which cannabis use may increase risk for IPT exposure by placing individuals in high-risk situations or by impairing recognition of danger cues in the environment [51,52]. Longitudinal research on how cannabis use and trauma exposure impact each other could help elucidate which model is more likely across different populations and situations.

The increase in cannabis use among adults in the United States could be because almost half of adults believe that there is a way to safely use cannabis [41]. The association between cannabis use and IPT suggests the importance of providing psychoeducation about the potential dangers of cannabis misuse in prevention efforts aimed at reducing IPT exposure and cannabis use during adolescence (e.g., high school) and providing services to address trauma or treat trauma-related psychopathology and cannabis use on college campuses. Results from this study may also have policy implications in an era when cannabis is high on

the priority list regarding legalization across the United States and has been suggested as a potential treatment for PTSD and other mental health conditions.

Several limitations of the present study deserve mention. First, the cross-sectional analyses limit the ability to speak to directionality of the results since cannabis use and IPT exposure were simultaneously assessed. Therefore, there is no evidence of a temporal relationship between cannabis use and IPT exposure. Future research should use a longitudinal study design in order to show the patterns of cannabis use and IPT exposure over time to learn about cause-and-effect relationships. Second, although college students are at a high risk for trauma exposure [7,8,10,53] and cannabis use [4,18,54], they are a selected population, which may limit the generalizability of certain findings. Future research should investigate the relation between IPT exposure and cannabis use in an epidemiologic sample to see if the findings remain consistent. Third, self-reported answers may be subjected to "social desirability" bias (i.e., people respond in ways that they think will be viewed favorably), which could influence data collection in the areas of illicit and/or illegal substance use (i.e., cannabis, underage drinking). Although researchers generally assume that self-reported substance use will be characterized by systematic underreporting, research shows that self-report on cannabis [55] and alcohol [56] among college students is generally reliable and valid. Fourth, parental income was not assessed and although our sample is generalizable to the overall university population regarding sex and race [36,39,40], results could be due to socioeconomic differences and economic disparities or advantages. Lastly, future research should use similar measurement timeframes to assess substance use since one limitation of this study is the different measurement intervals used to assess cannabis, alcohol, and nicotine use.

Despite these limitations, the present study extends previous work by examining the prevalence and correlates of cannabis use among college students. It provides some of the first data on cannabis use in the college student population using a representative sample. More longitudinal work is needed to determine the causes and consequences of cannabis use in this population as the legal landscape of cannabis use continues to change.

Acknowledgments

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Table 1.

Sample Demographics, Interpersonal Trauma Exposure, and Substance Use

Characteristic	n (%)
Sex	
Men	3806 (38.5%)
Women	6083 (61.5%)
Race	
White	4959 (50.1%)
Black	1900 (19.2%)
Asian	1640 (16.6%)
Other	1390 (14.1%)
Cohort	
1	2707 (27.4%)
2	2481 (25.1%)
3	2391 (24.2%)
4	2310 (23.4%)
Lifetime Interpersonal Trauma Exposure	
No	4969 (51.5.%)
Yes	4684 (48.5%)
Lifetime Cannabis Use Threshold	
None	5393 (54.5%)
Experimental Use	1718 (17.4%)
Non-Experimental Use	2780 (28.1%)
Past-Year Alcohol Use Frequency	
0	1757 (17.8%)
1	4053 (41.0%)
2	2888 (29.2%)
3	1052 (10.6%)
4	141 (1.4%)
Past-30-Day Nicotine Use Frequency	
0	5299 (53.6%)
1	1969 (19.9%)
2	780 (7.9%)
3	464 (4.7%)
4	308 (3.1%)
5	289 (2.9%)
6	782 (7.9%)

Note: Experimental Use = Cannabis use 1–5 times; Non-Experimental Use = Cannabis use 6 or more times; Past-year alcohol use categories: 0 = No drinks, 1 = Drinks monthly or less, 2 = Drinks 2–4 times per month, 3 = Drinks 2–3 times per week, 4 = Drinks 4 or more times per week; Past-30-day nicotine use categories: 0 = No use, 1 = Use once or twice, 2 = A few days (3 to 4 days a month), 3 = A couple of days a week (5 to 11 days a month), 4 = 3 times a week (12 to 14 days a month), 5 = Most days of the week (15 to 25 days a month), 6 = Daily or almost daily (26 to 30 days a month)

Table 2.

Lifetime Interpersonal Trauma and Types of Interpersonal Trauma Exposure by Sex

Sex	Any Interpersonal Trauma		Physical Assault		Sexual Assault		Other Unwanted or Uncomfortable Sexual Experience	
	No	Yes	No	Yes	No	Yes	No	Yes
Men	2092 (57.0%)	1575 (43.0%)	2353 (64.9%)	1270 (35.1%)	2925 (80.3%)	718 (19.7%)	2934 (81.6%)	661 (18.4%)
Women	2877 (48.1%)	3109 (51.9%)	4345 (73.5%)	1569 (26.5%)	3350 (56.4%)	2592 (43.6%)	3423 (58.3%)	2448 (41.7%)

Table 3.

Demographics, IPT, and Substance Use Association with Lifetime Experimental and Non-Experimental Cannabis Use

R^2	Lifetime Cannabis Use	Variable	β	Std. Error	Wald's χ2	df	p	OR	95% CI
	Experimental[a]	Nicotine	.08	.02	20.82	1	<.001	1.08*	1.05–1.12
		Alcohol	.10	.03	9.76	1	.002	1.11	1.04–1.18
		Sex (M vs. W)	.07	.06	1.19	1	.28	1.07	.95–1.20
		Race (W vs. B)	.31	.08	16.74	1	<.001	1.36*	1.17–1.57
		Race (W vs. A)	1.06	.09	134.51	1	<.001	2.90*	2.42–3.47
		Race (W vs. O)	.25	.09	8.30	1	.004	1.28	1.08–1.51
		Cohort (1 vs. 2)	.02	.08	.07	1	.80	1.02	.87–1.19
		Cohort (1 vs. 3)	−.02	.08	.06	1	.81	.98	.84–1.15
		Cohort (1 vs. 4)	−.28	.08	13.19	1	<.001	.75*	.65–.88
		IPT (No vs. Yes)	−.51	.06	76.95	1	<.001	.60*	.54–.68
.20	Non-Experimental[b]	Nicotine	.22	.01	247.17	1	<.001	1.24*	1.21–1.27
		Alcohol	.66	.03	517.02	1	<.001	1.93*	1.82–2.04
		Sex (M vs. W)	.36	.05	47.14	1	<.001	1.44*	1.30–1.59
		Race (W vs. B)	.47	.07	43.80	1	<.001	1.60*	1.39–1.84
		Race (W vs. A)	1.19	.08	205.47	1	<.001	3.29*	2.79–3.87
		Race (W vs. O)	.12	.07	2.55	1	.11	1.13	.97–1.30
		Cohort (1 vs. 2)	−.10	.07	2.07	1	.15	.90	.79–1.04
		Cohort (1 vs. 3)	−.28	.07	15.80	1	<.001	.75*	.66–.87
		Cohort (1 vs. 4)	−.12	.07	2.86	1	.09	.88	.76–1.02
		IPT (No vs. Yes)	−.64	.05	152.22	1	<.001	.53*	.47–.58

Note: No lifetime cannabis use is the reference group for lifetime experimental and non-experimental cannabis use comparisons;

*
= $p < .001$;

[a]
= use 1–5 times,

[b]
= use 6 times;

Coding: M = men = 0, W = women = 1; W = White = 0, B = Black = 1, A = Asian = 1, O = Other = 1; cohort 1 = 0, cohort 2 = 1, cohort 3 = 1, cohort 4 = 1; IPT = interpersonal trauma, no = 0, yes = 1; Nicotine = Past-30-day nicotine use frequency; Alcohol = Past-year alcohol use frequency; Nicotine and alcohol use frequencies were treated as continuous variables