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Characterizing symptoms of cannabis use disorder in a sample of college students

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Abstract

Since legalization of marijuana in several U.S. states in 2012, there has been concern about increases in the development of cannabis use disorder (CUD). The current study examined rates of CUD in Colorado college students who reported regular marijuana use and assessed a range of factors associated with CUD symptoms, including coping motives, concentrate/dab use, mental health concerns (depression, anxiety), age of regular marijuana use, and alcohol use. College students were recruited from a mid-sized university and completed a baseline assessment that included a marijuana urine screen. Participants reported a median of five CUD symptoms and 90% met criteria for CUD. After adjusting for covariates, age of regular marijuana use was negatively associated with number of CUD symptoms, while average daily alcohol drinks was positively associated with number of symptoms. Prevention and intervention efforts at the university level should be increased to reduce negative outcomes associated with problem marijuana use.

Keywords

marijuana; cannabis; college students; cannabis use disorder; DSM-5; alcohol

Introduction

Marijuana is the most commonly used federally-illicit substance among young adults, including college students (Schulenberg et al., 2019). According to results from the Monitoring the Future Study, the rate of past 30-day marijuana use for young adults ages 19-28 was 24% in 2018, a significant increase from the previous five years and the highest

reported rate ever for this age group since the survey began in 1986 (Schulenberg et al., 2019). Similarly, there have been increases in the rate of daily or near-daily marijuana use, which is currently estimated at 1 in every 12 young adults (8% overall; Schulenberg et al., 2019). In 2012, Colorado was one of the first two U.S. states to legalize recreational marijuana for those 21 years or older, although commercial sales in retail stores did not become available until January 2014. A recent study by Pearson and colleagues (2017) found higher rates of past month marijuana use in college students living in states with legal recreational use (e.g., 39% in Colorado and Washington) compared to students in non-legal states (26%).

One concern associated with legalizing recreational marijuana is that accessibility and rates of use will increase, thus creating vulnerability for cannabis use disorder (CUD; Hopfer, 2014). Heavy and frequent marijuana use increase the potential for the development of negative consequences and subsequent addiction (Volkow et al., 2014). Findings from large surveys have shown that approximately 9% of marijuana users become dependent at some point in their life (Lopez-Quintero et al., 2011) and 12% of adults who began using marijuana at age 14 or younger met criteria for drug abuse or dependence (SAMHSA, 2013). In a study of first-year college students, nearly one out of every ten met criteria for CUD, with a higher prevalence rate (24.6%) among participants who reported past year marijuana use (Caldeira et al., 2008). Assessing the transition from heavy marijuana use to problem use (i.e., experiencing negative consequences) or CUD in select populations is of key importance in order to reduce negative outcomes.

As increasing numbers of U.S. states legalize marijuana for medical or recreational purposes, a number of new products and methods of ingestion have emerged on the market (Smart & Pacula, 2019). In the state of Colorado (2018), although the majority of recent marijuana users report smoking (84%), 40% describe some use of edibles, vaping (29%), and dabbing marijuana concentrates (21%). Past 30-day use via dabbing and vaping increased significantly from 2016 to 2017 (State of Colorado, 2018). Marijuana concentrates (e.g., dabs, shatter), growing in popularity, have a much higher potency compared to marijuana flower (Raber et al., 2015). Data prepared for the Colorado Department of Revenue (Orens et al., 2018) showed that the average flower/bud THC strength in the state is 19.6%, while average concentrate potency is 68.6%. Studies are just beginning to examine whether new products and methods of ingestion might contribute to increased harm (Smart & Pacula, 2019). Recent research (Arterberry et al., 2019) has shown that higher potency marijuana products can increase the likelihood of developing problems associated with one's use. Compared to non-concentrate users, frequent concentrate users have been known to endorse more symptoms of CUD (Bidwell et al., 2018).

With marijuana becoming increasingly more popular, the desire to understand why young adults are using marijuana has become prominent. Motivational models (Cooper, 1994; Cox & Klinger, 1988) emphasize the importance of individual differences in motivation as a contributing factor to substance use. Inherent in these theories is the assumption that substance use occurs to reach a particular outcome, with individual behavior serving different functions that are influenced by specific antecedents and consequences (Cooper, 1994; Cox & Klinger, 1988). Past research has applied these theories to better understand

and measure motives or reasons for using marijuana. Some common motives have included social facilitation and enhancement, conformity to fit in, boredom or using marijuana due to not having anything else to do, altered perception or expansion motives, and coping motives, which center on using marijuana to manage negative emotions (Lee et al., 2009). Much of the research on motives has worked to establish their relationship to marijuana use frequency and problems or negative consequences. Previous literature suggests that a subset of young adults may use marijuana to manage negative emotional states (Buckner et al., 2007) and endorsement of coping motives for marijuana use has been shown to be related to problem use, CUD, and psychological distress (Moitra et al., 2015). It is possible that coping motives may be related to more severe symptoms of CUD.

Marijuana use is also co-morbid with various psychological disorders. Although the direction of the effects is not definitive (e.g., does marijuana use contribute to mental health symptoms or vice versa), a number of past studies have shown relationships between marijuana use, CUD or problem use (defined as negative consequences assessed via self-report measures), and psychological symptoms in young adults. In a sample of Colorado college students, Phillips et al. (2018) found that male sex and greater impulsivity and depressive symptoms were associated with problem marijuana use. Additional studies with undergraduates have shown relationships between problem use and greater depressive symptoms, affect dysregulation, and social anxiety (Buckner, Bonn-Miller, et al., 2007; Buckner, Keough et al., 2007; Simons & Carey, 2002). In comparing students who used marijuana frequently to those who either used infrequently or not at all, past work has found that frequent users experience greater anxiety (Buckner et al., 2010), depressive symptoms (Buckner et al., 2010; Dumas et al., 2002), schizotypal symptoms (Dumas et al., 2002) and problem marijuana use (Buckner et al., 2010). In a study with adolescents and young adults, Farmer et al., (2015) found that externalizing disorders (i.e., alcohol and substance-related disorders, attention deficit/hyperactivity, oppositional defiant, and conduct disorder), within prime developmental periods, were strong risk factors for the development of CUD.

In addition to co-morbid psychological symptoms, co-use of marijuana with alcohol is common in young adults. A recent study (Patrick et al., 2019) found that 23% of emerging adults reported simultaneous marijuana-alcohol use within the last year. Lee et al. (2020) found that young adults reported greater alcohol use on days when they engaged in simultaneous marijuana-alcohol use compared to alcohol-only days. Similarly, a study with a sample of veterans showed that participants drank more heavily on days when they also used marijuana (Metrik et al., 2018). Additional research has suggested that the co-use of marijuana and alcohol may lead to more negative consequences than the use of either substance alone (Cummings et al., 2019; Egan et al., 2019; Lee et al., 2020; Mallett et al., 2017). Though research on co-use is still developing, it's important to understand how alcohol use may relate to CUD in young adults.

To contribute to the growing literature on marijuana use motives and psychological and other substance use correlates, the goal of the current study was to examine rates of CUD in a sample of regular marijuana users and how select variables, informed by the literature and motivational theory, might be associated with the number of CUD symptoms. We hypothesized that number of CUD symptoms endorsed would be negatively associated with

age of regular marijuana use and positively associated with marijuana coping motives, marijuana concentrate use, average daily drinks, and mental health problems (anxiety and depression).

Methods

Participants and Procedures

Undergraduate students were recruited from a mid-sized Colorado university via flyers, emails sent through the university email system, and announcements made in courses. Students who expressed interest in the study were directed to stop by an in-person screening session or call the lab to be screened by phone. Eligibility criteria included: age 18 or older, undergraduate student at the institution for at least one prior semester, not planning to transfer institutions or graduate the current semester, report use of marijuana in the last week, report weekly or greater marijuana use, test positive on a Tetrahydrocannabinol (THC) urine screen, and own a smartphone (utilized for the second phase of this project, not reported on in this study).

A total of 201 students were screened for eligibility and 99 met eligibility criteria for the current study and completed the baseline interview. Mean age was 20.32 years ($SD = 3.62$; range: 18–46), with approximately 95% between 18–23. The majority of participants were Caucasian (62.6%) and female (53.5%). Based on mean number of completed credits ($M = 42.11$), participants were second-year students, on average. Participants lived both on- (41.4%) and off-campus (57.6%).

A urine screen was used to verify eligibility and all participants were asked not to consume marijuana before their appointment. Eligible participants completed a 90 to 120-minute baseline assessment that included an interview and questionnaires administered through Qualtrics while in the lab. Though the current study focuses solely on baseline data collected for the first phase of the study, participants completed a subsequent ecological momentary assessment (EMA) phase of the study, which was time-intensive. All procedures were approved by the institution's IRB and participants were compensated between \$40–50, which was based on their overall responses rate for the two-week EMA portion of the study.

Measures

Demographics.—Participant age, sex, race/ethnicity, and living situation were assessed. With participant permission, we verified the number of completed college credits with the university registrar to indicate student status.

Marijuana Use, Frequency, Form, and Age of Regular Use.—Select items from the Daily Sessions, Frequency, Age of Onset, and Quantity of Cannabis Use Inventory (DFAQ-CU; Cuttler & Spradlin, 2017), a psychometrically validated measure, were used to assess marijuana use. To assess frequency, participants were asked the number of days they consumed marijuana in the past month. Participants were also asked to report the typical number of times they used marijuana each weekday vs weekend, the primary form of marijuana (flower/bud, concentrates, edibles, and other) typically used, and the age in which they began using marijuana regularly (defined as at least two or more times a month).

Concentrate use was dichotomized (yes/no) based on whether it was reported as the primary marijuana form used. For eligibility, a single panel marijuana urine dip test (Redwood Toxicology Laboratory; 50 ng/ml) was used to confirm presence of THC.

Alcohol Use.—A single item based on the validated Daily Drinking Questionnaire (DDQ; Collins et al., 1985), was used to assess alcohol frequency. Participants reported the average number of standard drinks they consumed on a typical drinking day in the last 30 days.

Beck Anxiety Inventory (BAI; Beck et al., 1988).—The BAI is a 21-item self-report inventory that assesses the severity of anxiety. Participants are asked to rate how much they have been bothered by each symptom over the past week on a 4-point rating scale ranging from 0 (not at all) to 3 (severely, it bothered me a lot). Example items include “unable to relax,” “fear of the worst happening,” and “difficulty breathing.” Individuals can receive an overall score ranging from 0 to 63. Internal consistency of the measure ($\alpha = .943$) for the current data was high.

Beck Depression Inventory-II (BDI-II; Beck et al., 1996).—The BDI-II is a 21-item self-report inventory used to assess the severity of depressive symptoms (e.g., “crying,” “loss of interest”) in adolescents and adults on a 4-point scale (0 – 3). Possible scores can range from 0 to 63 ($\alpha = .901$, current study).

Comprehensive Marijuana Motives Questionnaire (CMMQ) — Coping Subscale.—The CMMQ assesses reasons for using marijuana (Lee et al., 2009). The questionnaire includes 12 subscales, each with three items, resulting in 36 total items. The present study solely utilized the coping subscale based on the study hypothesis (sample item, “How often do you use marijuana to forget your problems”), with items rated on a 1 (almost never or never) to 5 (almost always or always) scale. Possible scores range from 3-15, with acceptable internal consistency ($\alpha = .781$, current study).

Structured Clinical Interview for DSM-5 (SCID-5; First et al., 2015).—A modified version of the SCID-5 was used to assess the 11 core symptoms of CUD, as specified in the Diagnostic and Statistical Manual of Mental Disorders, 5th ed. (DSM-5; American Psychiatric Association, 2013), which focus on negative consequences surrounding one’s marijuana use. We used a sum count of the number of symptoms endorsed out of 11. In order to qualify for CUD diagnosis in the DSM-5, an individual must endorse two or more criteria. In assessing severity, two to three endorsed symptoms equate to mild CUD, four to five is moderate, and more than six is severe.

Data Analyses—Descriptive statistics and bivariate or point-biserial correlations were calculated for all variables (Table 1). We present tables (Tables 2-3) outlining the overall frequency of the number and specific DSM-5 CUD symptoms endorsed by participants. We examined whether marijuana use factors (age of regular use, marijuana coping motives), alcohol use (average daily drinks), as well as psychological factors (general anxiety and depression) were associated with the count of DSM-5 CUD symptoms, while controlling for frequency of marijuana use in the past 30 days, gender, and number of college credits earned. To investigate this question, we used a Poisson regression model, given the nature of

the outcome (count of diagnostic criteria endorsed). All analyses were conducted in R with package “stats” (R Core, 2013). Parameter estimates were exponentiated (e^B) and represent a standard effect size commonly reported in Poisson models, indicating the multiplicative change in the count of endorsed DSM-5 CUD criteria.

Results

Out of the 99 participants, the mean age of regular marijuana use (defined as at least two or more times a month) was 17.60 ($SD = 2.00$) and ranged between 13 and 26 years of age. Participants reported using marijuana an average of 23.04 days ($SD = 7.01$ days) out of the past 30 days (range = 4-30), using an average of 2.01 times ($SD = 1.41$, range 0-7) on a typical weekday and 3.56 times ($SD = 2.74$, range 1-15) on a typical weekend. The majority of participants identified flower as their primary form of marijuana ($n = 68$, 68.7%), followed by almost one-fourth ($n = 23$, 23.2%) who endorsed concentrates, 7 (7.1%) who used edibles, and one (1.1%) who noted other. Mean number of alcohol drinks reported on a standard drinking day in the last 30 days was 5.33 ($SD = 4.33$, *median* = 4, *mode* = 3).

In assessing DSM-5 CUD criteria, the mode number of symptoms endorsed was 4, with a mean of 4.81, median of 5, and range between 0 and 11 (see Table 2). Overall, 90.9% of participants met criteria for CUD (i.e., endorsed two or more symptoms). Out of the 90 participants who endorsed 2+ symptoms, 19.2% ($n = 19$) met criteria for mild CUD (2-3 symptoms), 33.3% ($n = 33$) for moderate CUD (4-5 symptoms), and 38.4% ($n = 38$) for severe CUD (6-11 symptoms). The most highly endorsed DSM-5 symptom was tolerance (71.7%), while “important social, occupational, or recreational activities are given up or reduced because of cannabis use” was endorsed the least (11.1%). See Table 3 for a list of all symptoms and their frequency.

A Poisson regression model was used to address the contribution of psychological factors (general anxiety, depression), marijuana use measures (age of regular use, coping motives, concentrate use), and average daily drinks on number of endorsed DSM-5 CUD criteria. Covariates included marijuana use frequency, number of completed college credits, and gender. Parameter estimates are presented in Table 4. Age of regular use was centered to aid with interpretation. In the model, age of regular use was negatively associated with number of CUD symptoms ($B = -0.106$, $e^B = 0.899$, $p = .041$), while average daily drinks ($B = 0.021$, $e^B = 1.021$, $p = .035$) and frequency of marijuana use ($B = 0.021$, $e^B = 1.021$, $p = .001$) were positively associated with number of CUD criteria. No other variables were significant.

Discussion

The goal of this study was to examine rates of CUD in college students engaging in regular marijuana use and various factors associated with number of CUD symptoms endorsed. In our sample, symptoms of CUD were common and 90% of all participants met criteria for DSM-5 CUD (i.e., had two+ symptoms). In addition to high rates of CUD, we also found that a substantial number ($n = 71$; 71.7%) of all participants met criteria for moderate or

severe CUD. After adjusting for frequency of marijuana use, we found age of regular use and average daily alcohol drinks were associated with number of CUD symptoms.

Past studies with young adult samples have shown low to moderate rates of CUD. Data from the annual National Survey on Drug Use and Health (SAMHSA, 2017) demonstrates that around 5% of young adults generally meet criteria for CUD. In their longitudinal study, Hayatbakhsh and colleagues (2009) reported that 20% of young adults who had ever used marijuana met criteria for lifetime CUD, while Caldeira et al. (2008) found that almost 10% of all first-year college students and one-fourth of first-year students who reported past year marijuana use met criteria for CUD. Our sample included regular marijuana users who were using near-daily and had been at the university for at least one year on average. Considering recent increases in marijuana use across the country and our sample of young adults, there is potential to see higher rates of CUD; however, we did not expect to see as many moderate to severe diagnoses. We suspect that our rates may be higher than those found in past studies due to a range of contextual factors. For one, though recruitment focused on students using at least weekly, our final sample included persons using near-daily or daily, on average. Our sample also included students who were beyond their first-year at the university who may have transitioned to marijuana use during or after their first year. Furthermore, many studies using college samples do not assess marijuana-related problems using the SCID and DSM-5 criteria; rather, it is common to employ brief measures of marijuana-related problems (e.g., Brief Marijuana Consequences Questionnaire, Rutgers Marijuana Problem Index; Simons et al., 2012; White et al., 2005), which are not diagnostic. Lastly and importantly, the legal marijuana environment in Colorado may have contributed to our findings. Perceived risk of regular marijuana use has been decreasing in young adults (Schulenberg et al., 2019) and that is likely translating into new marijuana use patterns across the U.S., particularly in states with legal recreational use. With rates of marijuana use increasing in the U.S., it is possible that CUD diagnoses will also increase over time.

Results from this study demonstrated that age of regular marijuana use was negatively associated with number of CUD symptoms. Though the mean age of regular marijuana use was 17.6 in our sample, the youngest age reported for regular use was 13. Past studies (e.g., Fergusson et al., 2003) have found relationships between age of initiation (first ever use) and CUD. Marijuana use before age 15 has been shown to have the most substantial negative effects later in adulthood, with increased risk every year that marijuana use continues (Rioux et al., 2018). We chose to include age of regular use rather than age of first initiation in our model to better understand how a pre-established pattern of use might be related to severity of CUD. This allowed us to capture the distinction between an individual who tries marijuana once at an early age (e.g., age 14) and then delays regular use until much later (e.g., early 20s) compared to another who first uses in early adolescence but continues using through early adulthood. Though initiation of marijuana use is common during high school (Miech et al., 2019), Suerken and colleagues (2014) found that 8.5% of college students who had never used marijuana subsequently initiated use during their first year at the university. Future research could benefit from studies that evaluate unique risk associated with attending college and how some factors specific to the college environment may influence the development of CUD (e.g., social context, stress).

When evaluating the specific DSM-5 CUD symptoms that were endorsed by participants, interesting patterns emerged. The most highly reported symptom, tolerance, was endorsed by almost three-fourths of the sample. Tolerance is a key symptom of CUD and suggests that participants continue to increase the quantity of their use, thus possibly putting themselves at risk for future negative outcomes (e.g., health problems, employment difficulties). The second most highly endorsed symptom was spending a great deal of time in activities necessary to obtain marijuana, use marijuana, or recover from its effects. Craving was endorsed by over half of participants and is important to consider with college populations due to its potential to impact cognitive focus in the academic environment. In a previous EMA study (Phillips et al., 2015), momentary craving for marijuana was associated with low motivation to complete schoolwork and greater craving at one time point predicted less time spent studying at the next assessment point. Symptoms of CUD, such as craving, have the potential to impact student learning outcomes and should be examined in future work.

We found a positive association between average daily alcohol drinks and number of CUD symptoms. Past work has found co-morbidity between marijuana and alcohol dependence (Agosti et al., 2002). Within our sample, the mean number of standard drinks reported on an average drinking day was 5.33, with significant variability ($SD = 4.33$). This meets the definition of binge-drinking (4 or more drinks for females or 5 or more drinks for males) and is concerning due to research that has shown greater negative consequences from marijuana-alcohol co-use compared to use of either substance alone (Cummings et al., 2019; Egan et al., 2019; Mallett et al., 2017). Though work in this area is still emerging, alcohol-marijuana co-use has been associated with increased risks and poor outcomes, including lower GPA, higher depression scores, and higher state-trait anxiety (Mallett et al., 2017; Meda et al., 2017). There is a need to continue monitoring the relationship between marijuana and alcohol in college populations.

We did not find associations between CUD symptoms and anxiety and depression, though coping motives approached significance. A meta-analysis of 31 studies (Kedzior & Laeber, 2014) found a positive association between anxiety and CUD, as well as between comorbid anxiety-depression and marijuana use, but other literature examining relations between CUD and anxiety/depression has been mixed (Danielsson et al., 2016; Blanco et al., 2016). Past research has found associations between coping motives and marijuana use (Moitra et al., 2015; Fox et al., 2011) and theoretical models of coping (Wills & Shiffman, 1985) suggest that using substances to deal with stress is common. It may be useful for future research to examine how specific stressful and contextual circumstances (e.g., finals week, working too many hours, family history of substance use) impact the use of marijuana as a coping strategy in college students and if such motives mediate the relation between anxiety/depression and CUD.

Use of marijuana concentrates was not associated with number of CUD symptoms. Though previous studies (Arterberry et al., 2019; Bidwell et al., 2018) have shown that higher potency and concentrate products are associated with problem use, our data did not support this. Our sample included a small number of participants who were using concentrates (23.2%) as their primary form of ingestion, all of whom were university students and many under the legal age to access retail marijuana stores (21 and older in Colorado). Because

marijuana can impact the developing brain (Volkow et al., 2014), future research should further examine high potency product use in emerging adults.

While some of the findings in this study are not entirely new, they do reiterate the point that intervention needs to begin sooner than college years. Determining key high-risk times when marijuana users transition into CUD (e.g., first semester of first-year of college) would be beneficial. Though our eligibility targeted more regular users, the number of participants who met criteria for CUD should be alarming to university officials and illustrates a need to increase awareness and education to incoming university students. Though a host of prevention and harm reduction programs exist (e.g., Marijuana E-CHECKUP TO GO; Riggs et al., 2018) and are often delivered during orientation, the intensity may not be enough for those with underlying susceptibility to substance use disorder. Past work has shown that many adolescents and young adults who use marijuana heavily are not motivated to quit despite experiencing negative consequences related to their use (Fernández-Artamendi et al., 2013). To address low readiness or ambivalence about change, motivational interviewing is a promising option (Miller & Rollnick, 2013). This approach, with its motivational underpinnings and non-confrontational features, is effective in reducing cannabis use in young adults (DiClemente et al., 2017).

This study has limitations. Participants were college students and may not generalize to other young adults. The sample was small, participants used marijuana near-daily (on average), and all data collection took place at one university. The measures used in this study were all from a baseline appointment, which required participants to self-report on their past use, which may include recall bias.

Conclusions

Learning about common symptoms of and various factors associated with CUD in the college population can provide needed information for the development of novel interventions and prevention programming to reduce marijuana-related problems. Future research should explore contextual factors that impact stress and use of marijuana to cope with the college environment. Halting the development of CUD during key times can improve outcomes for college students as they transition out of emerging adulthood.

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Table 1.Descriptive statistics and correlations of variables ($N = 96$)^a

Variable	M(SD)	1	2	3	4	5	6	7	8	9
1. CMMQ Coping ^b	6.62 (2.87)									
2. BAI ^c	14.30 (12.68)	.56**								
3. BDI-II ^d	8.60 (2.87)	.57**	.69**							
4. Age of regular marijuana use	17.60 (2.00)	.14	.06	.01						
5. Frequency of marijuana use ^e	23.04 (7.01)	.13	.07	.15	−0.09					
6. Average daily alcohol drinks ^f	5.33 (4.33)	−.07	−.06	.04	−.11	.04				
7. Number of completed credits	42.11 (29.40)	−.01	.04	−.02	.32**	.09	−.15			
8. Gender (pt) ^g		.14	.26*	.22*	.12	−.21*	−.29**	−.02		
9. Concentrates vs. Others (pt)		.03	.09	.10	−.05	.24*	.08	−.08	−.03	
10. Number of DSM-5 CUD Criteria		.29**	.25*	.27**	−0.20*	.37**	.24*	.04	−.18	.14

Notes

*
 $p < .05$ **
 $p < .01$; pt = point-biserial correlation^aThree participants excluded due to missing data^bCMMQ Coping = Comprehensive Marijuana Motives Questionnaire, Coping Subscale^cBAI = Beck Anxiety Inventory^dBDI-II = Beck Depression Inventory^eDays used marijuana in the past 30 days^fReported for a typical drinking day in the last 30 days^gReferent group was male

Table 2.Number of DSM-5 CUD symptoms endorsed by participants ($N = 99$)

Number of DSM-5 CUD symptoms endorsed	N (%)
0	1 (1%)
1	8 (8.1%)
2	8 (8.1%)
3	11 (11.1%)
4	17 (17.2%)
5	16 (16.2%)
6	14 (14.1%)
7	14 (14.1%)
8	4 (4%)
9	3 (3%)
10	2 (2%)
11	1 (1%)

Table 3.DSM-5 CUD symptoms endorsed by participants ($N=99$)

DSM-5 CUD Criteria	N (%)
Cannabis is often taken in larger amounts or over a longer period than was intended.	62 (62.6%)
There is a persistent desire or unsuccessful efforts to cut down or control cannabis use.	56 (56.6%)
A great deal of time is spent in activities necessary to obtain cannabis, use cannabis, or recover from its effects.	70 (70.7%)
Craving, or a strong desire or urge to use cannabis.	57 (57.6%)
Recurrent cannabis use resulting in a failure to fulfill major role obligations at work, school, or home.	18 (18.2 %)
Continued cannabis use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of cannabis.	23 (23.2%)
Important social, occupational, or recreational activities are given up or reduced because of cannabis use.	11 (11.1%)
Recurrent cannabis use in situations in which it is physically hazardous.	62 (62.6%)
Cannabis use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by cannabis.	24 (24.2%)
Tolerance	71 (71.7%)
Withdrawal	23 (23.2%)

Table 4.Poisson regression model assessing predictors of number of DSM-5 CUD symptoms ($n = 96$)^a

Variable	B	SE	e ^B	p
Intercept	0.589	0.245	1.801	.016
Age of regular marijuana use	−0.106	0.052	0.899	.041
CMMQ Coping ^b	0.038	0.020	1.039	.060
Average daily alcohol drinks ^c	0.021	0.010	1.021	.035
BDI-II ^d	0.001	0.008	1.001	.874
BAI ^e	0.006	0.006	1.006	.298
Concentrates vs. Others	0.033	0.110	1.033	.764
Frequency of marijuana use ^f	0.021	0.008	1.021	.001
Females vs. Males	−0.121	0.105	0.886	.250
Number of completed credits	0.002	0.002	1.002	.260

Notes: B = beta; SE = standard error; e^B = parameter estimate (standard effect size, rate ratio)^aThree participants excluded due to missing data^bCMMQ Coping = Comprehensive Marijuana Motives Questionnaire, Coping Subscale^cReported for a typical drinking day in the last 30 days^dBDI-II = Beck Depression Inventory^eBAI = Beck Anxiety Inventory^fDays used marijuana in the past 30 days