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Utility of the comprehensive marijuana motives questionnaire among medical cannabis patients

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Abstract

Background—Little is known about motives for cannabis use among the population of adults using cannabis medically. Therefore, we evaluated the performance of the 12 factor, 36-item Comprehensive Marijuana Motives Questionnaire (CMMQ) among a sample of medical cannabis patients.

Methods—Study participants were adults ages 21 years or older with scheduled appointments to obtain new or renewed medical cannabis certification from clinics in one Midwestern state (n=1,116). Confirmatory factor analysis was used to evaluate properties of the CMMQ. Hierarchical multiple regressions were used to estimate associations between motives and cannabis use, physical health functioning, and mental health functioning.

Results—Fit indices were acceptable, and factor loadings ranged from 0.57 to 0.94. Based on regression analyses, motives accounted for 7% of the variance in recent cannabis use, and independent of cannabis use, accounted for 5% and 20% of physical and mental health functioning, respectively. Regression analyses also revealed that distinct motives were associated with cannabis use and physical and mental health functioning.

Conclusions—Among adults seeking medical cannabis certification, the factor structure of the CMMQ was supported, and consistent with prior studies of adolescents and young adults using

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cannabis recreationally. Thus, individuals who use cannabis medically may have diverse reasons for use that extend beyond the management of medical symptoms. In addition, coping and sleep-related motives may be particularly salient for this population. Findings support the utility of the CMMQ in future research on medical cannabis use; however, expansion of the scale may be needed to address medical motives for use.

Keywords

Cannabis; Marijuana; Medical Cannabis; Motives; Factor Analysis

1. Introduction

After alcohol and tobacco, cannabis is the most commonly used substance in the United States (US). Among adults ages 18 years or older, lifetime prevalence is an estimated 46.9%, past-year prevalence is an estimated 13.6%, and past-month prevalence is an estimated 8.4% (Center for Behavioral Health Statistics and Quality, 2016). According to federal law, cannabis use remains illegal; however, since 1996, over half of US states and the District of Columbia have passed legislation allowing for the use of cannabis by individuals with qualifying medical conditions (“State Medical Marijuana Laws,” 2017). As the policy landscape shifts allowing for increased access to cannabis, it is critical to gain a better understanding of the growing population of individuals who use cannabis for medical reasons. Recently published literature now provides data on the demographic, substance use, and other health characteristics of individuals who use cannabis medically (Bohnert, et al., 2014; Fischer, et al., 2017; Ilgen, et al., 2013; Lankenau, et al., 2017; Lin, Ilgen, Jannausch, & Bohnert, 2016). Despite this accumulating knowledge base, many gaps remain, including the absence of data on what motivates cannabis use among those who use medically.

Cannabis use motives are critical to understand because, in research on adolescents and young adults who use cannabis recreationally, motives are related to negative consequences, including the development of cannabis use disorder (Benschop, et al., 2015; Schlossarek, Kempkensteffen, Reimer, & Verthein, 2016). Furthermore, motives have been shown to change following cannabis-focused intervention, and such changes in motives are associated with intervention outcomes (Blevins, Banes, Stephens, Walker, & Roffman, 2016a). Thus, research examining motives among medical cannabis patients may inform harm reduction interventions in this population.

Early work on motivational models of substance use focused on reasons individuals consumed alcohol; these models were later adapted to cannabis. The initial motivational model posited that individuals used alcohol to either reduce negative affect or enhance positive affect, by way of four distinct motivations: enhancement (i.e., increasing positive mood), social (i.e., increasing enjoyment of a social event), conformity (i.e., fitting in with others), and coping (i.e., decreasing depression/anxiety) (Cooper, 1994; Cooper, Frone, Russell, & Mudar, 1995). When Simons and colleagues adapted the motivational model to cannabis use during the development of the Marijuana Motives Measure (MMM), they included a fifth motive, i.e., “expansion,” to account for the psychedelic properties of cannabis that may enhance perceptual or cognitive awareness (Simons, Correia, Carey, &

Borsari, 1998). Further research in this area indicated that additional factors may motivate cannabis use (Lee, Neighbors, & Woods, 2007). These motives included boredom, rebellion, and relaxation, as well as medical reasons (e.g., to alleviate pain), which were not specifically captured by the initial MMM (Lee, et al., 2007). Subsequently, Lee and colleagues developed a more extensive measure of cannabis use motives, namely, the Comprehensive Marijuana Motives Questionnaire (CMMQ)(Lee, Neighbors, Hendershot, & Grossbard, 2009).

The CMMQ was developed among a sample of 346 college students who had used cannabis at least once in the past year, and it encompassed 12 distinct factors: enjoyment, conformity, coping, experimentation, boredom, alcohol-related use, celebration, altered perception, social anxiety, relative low risk, sleep, and availability (Lee, et al., 2009). Of note, the initial item pool for the CMMQ included items in the domain of medical use; however, these items did not comprise a significant factor and were therefore not included in the final scale. In this original sample, motives were differentially related to frequency of cannabis use, with enjoyment, boredom, relative low risk, altered perceptions, and sleep motives related to higher use and experimentation and availability motives related to lower use (Lee, et al., 2009). In addition, coping and sleep-related motives were positively associated with cannabis use consequences; whereas, enjoyment was associated with fewer consequences (Lee, et al., 2009). Recently, Blevins and colleagues replicated the factor structure of the CMMQ among 252 high school students with relatively frequent cannabis use; however, they found somewhat different patterns in the relationships between motives and frequency of cannabis use and consequences (e.g., only alcohol and sleep motives were significantly associated with greater frequency of use), possibly reflecting unique characteristics of this younger sample (Blevins, Banes, Stephens, Walker, & Roffman, 2016b).

While these studies provide an important foundation for understanding cannabis use motives among adolescents and young adults who use cannabis recreationally, there has been little research examining motives for cannabis use among the population of adults using cannabis medically. In addition to using cannabis to manage medical complaints (Haug, et al., 2017), qualitative research suggests that adults who use cannabis for medical purposes also do so for other reasons such as stress relief, sleep, and relaxation (Pedersen & Sandberg, 2013). One prior study used the CMMQ in a sample of 217 patients receiving medical cannabis; however, it did not evaluate the psychometric structure of the scale (Bonn-Miller, Boden, Bucossi, & Babson, 2014). In the study, 9 of the 12 motives, excluding sleep, conformity, and relative low risk, were positively associated with cannabis use problems; however, social anxiety was the only motive associated with perceived helpfulness of cannabis (Bonn-Miller, et al., 2014). To extend this line of work, in present study, we test the performance and utility of the CMMQ among medical cannabis patients. Specifically, we examined the psychometric properties, including the factor structure, of the CMMQ among a large sample of patients seeking medical cannabis certification. We also evaluated relationships between motives and frequency of cannabis use and physical and mental health functioning.

2. Methods

2.1. Design and sample

Data come from the screening sample of an ongoing study of medical cannabis patients. Eligible study participants included adults ages 21 years or older with scheduled appointments for medical cannabis certification or recertification at participating medical cannabis clinics in Michigan. Patients were approached by research assistants (RAs) in clinic waiting areas. RAs provided a brief overview of the study and obtained written informed consent for screening. Consenting participants completed a 20–30 minute self-administered screening survey via touchscreen tablet computer or paper-and-pencil. The study was approved by the University of Michigan Medical School Institutional Review Board (IRB).

Of the 2,569 eligible adults who presented to the study sites during recruitment from February, 2014 to June, 2015, 1,485 (57.8%) completed the screening survey. For the present study, the sample included all participants who completed the screening survey, endorsed cannabis use in the past 6 months, and had complete data on cannabis motives, frequency of cannabis use, and functional health and well-being ($n=1,116$).

2.2. Measures

Cannabis Motives—Cannabis use motives were assessed via the Comprehensive Marijuana Motives Questionnaire (CMMQ) (Lee, et al., 2009). The measure comprises 36 items that assess 12 domains of motivations for cannabis use. Participants rated the frequency with which they used cannabis for each of the 36 items (i.e., “how often do you use marijuana for the following reasons?”) on a scale from 1 (almost never/never) to 5 (almost always/always).

Frequency of Cannabis Use—Using an item from the National Institute on Drug Abuse-Modified Alcohol, Smoking, and Substance Involvement Screening Test Version 2.0 (“NIDA-Modified ASSIST V2.0.”), participants were asked: “In the past 3 months, how often have you used Cannabis (marijuana, pot, grass, hash, etc.)?” Response options included: never; once or twice; monthly; weekly; daily or almost daily, which were recoded to reflect the number of days of use in the past 3 months (i.e., 0; 1; 3; 13; 90 days, respectively).

Functional Health and Well-being—The Short Form-12 Health Survey (SF-12) was used to measure general health status and functioning in the past 4 weeks (Ware, Kosinski, & Keller, 1996). The SF-12 assesses 8 domains: physical functioning, physical role functioning, bodily pain, general health, vitality, social functioning, emotional role functioning, and mental health. Per recommended scoring guidelines, t-scores were calculated for the Physical Component Summary (PCS) and the Mental Component Summary (MCS) (Ware, Kosinski, & Keller, 1998). The t-scores are linear transformations of the data, and have a mean of 50 and a standard deviation of 10 in the US general population. Higher scores indicate better health functioning; scores above 50 reflect higher

functioning compared to the general population, and scores below 50 reflect lower-than-average functioning.

Demographic and Other Characteristics—Standardized items assessed demographic information for all study participants (Cranford, Bohnert, Perron, Bourque, & Ilgen, 2016; Ilgen, et al., 2013). Age, race/ethnicity, education, marital status, employment status, reason for seeking medical cannabis certification, and whether the participant currently had a medical cannabis card.

2.3. Statistical analysis

We conducted confirmatory factor analysis (CFA) to determine the factor structure of the CMMQ, and then computed internal consistency reliabilities (Cronbach's alpha) for subscales. Next, we examined the utility of the CMMQ using pairwise correlations between motives, cannabis use, physical health functioning, and mental health functioning. We also conducted a series of hierarchical multiple regressions estimating associations between motives and cannabis use, physical health functioning, and mental health functioning. All analyses were conducted using Stata version 14 (StataCorp, 2015).

3. Results

3.1. Description of the sample

Table 1 provides a description of the sample on selected characteristics. The mean age of the sample was 43.7 years. A majority of the sample was white, male, had higher education than a high school diploma or equivalent, married or in a long-term relationship, seeking a medical cannabis card for pain, and currently possessed a medical cannabis card. With respect to frequency of cannabis use, the mean number of days of use in the past 3 months was 72.3 days. The mean PCS score was 35.2, which is approximately 1.5 standard deviations below the US general population; whereas, the mean MCS was 46.2, which is within 1 standard deviation of the general population (Ware, et al., 1996, 1998).

3.2. Confirmatory factor analysis of the CMMQ

CFA was conducted for the 12-factor structure of the CMMQ described by Lee et al. (2009). Several fit statistics were used to assess the CFA, namely, the comparative fit index (CFI), the standardized root mean square residual (SRMR), and the root mean square error of approximation (RMSEA). The CFA fit statistics were as follows: CFI=0.93; SRMR=0.056; RMSEA=0.053 (90% CI 0.051–0.056). Taken together, these fit statistics are indicative of acceptable fit (Hu & Bentler, 1999). Results from the CFA are depicted in Table 2. As shown in the table, factor loadings ranged from 0.57 to 0.94. The internal consistency of the motive subscales is also shown in Table 2, with alphas ranging from 0.69 for conformity to 0.92 for celebration.

3.3. Utility of the CMMQ motives

Means and standard deviations and pairwise correlations between motives are shown in Table 3. All motives were significantly and positively inter-correlated, with the exceptions

that conformity was not associated with relative low risk or sleep, and alcohol was not significantly correlated with sleep.

Table 4 presents results from the multiple regression analysis estimating the association between motives and frequency of cannabis use. Based on the model, motives accounted for 7% of the variance in frequency of use. Enjoyment and sleep were significantly associated with greater frequency of use; whereas, experimentation and altered perceptions were significantly associated with lower frequency of use.

Table 5 presents the hierarchical multiple regression models estimating associations between motives and SF-12 t-scores for the PCS and MCS. With respect to physical health functioning (i.e., SF-12 PCS as the outcome), frequency of cannabis use accounted for 0% of the variance, and motives accounted for 5% of the variance. Coping and boredom were significantly associated with greater physical health functioning; whereas, sleep-related motives were associated with lower physical health functioning. With respect to mental health functioning (i.e., SF-12 MCS as the outcome), frequency of cannabis use accounted for 1% of the variance, and motives accounted for 20% of the variance. Enjoyment and celebration were significantly associated with higher mental health functioning; whereas, coping, social anxiety, and sleep were significantly associated with poorer mental health functioning.

4. Discussion

In the present study, we examined the factor structure and internal consistency of the CMMQ in a large sample of patients seeking medical cannabis. We also assessed relationships between motives, frequency of cannabis use, and physical and mental health functioning, addressing critical gaps in the literature. Our findings replicated the original factor structure of the CMMQ among a novel sample of adults using medical cannabis. Specifically, factor loadings and measures of internal consistency were similar to those reported by Lee et al. (2009) when developing the scale among college students who reported relatively infrequent recreational cannabis use. Findings were also comparable to a recent study examining the CMMQ among adolescents with relatively frequent cannabis use (Blevins, et al., 2016b), suggesting that individuals who seek medical cannabis certification may share common motives for use with other populations who use cannabis recreationally.

We also found that, with three exceptions, inter-correlations between the 12 motive subscales were all significant, positive, and in the low-to-moderate range. Our findings are similar to those recently reported by Blevins et al. (2016b); however, the extent of agreement between subscales was not as strong as the correlations found by Lee et al. (2009), who reported that the majority ranged from .20 to .60. These differences may reflect the fact that the present sample was older, with more lifetime experience using cannabis, and used cannabis more frequently than the Lee et al. (2009) sample. Further research is necessary to determine whether longer duration of cannabis use and greater cannabis involvement might contribute to the development of preferred motives that are somewhat more distinct from one another (i.e., less overlapping). Furthermore, like Blevins et al. (2016b), conformity was not significantly correlated with relative low risk or sleep, and alcohol-related motives were not

significantly correlated with sleep in our study. Unlike Blevins et al. (2016b), however, we found significant correlations between many of the other motives subscales (e.g., alcohol was positively correlated with all of the other subscales, excluding sleep), which might reflect unique patterns of motivations among medical cannabis patients and requires further investigation. Alternatively, some of these significant findings are likely due to our ability to detect smaller correlations from our larger sample.

In the present study, motives accounted for 7% of the variance in recent cannabis use, and independent of cannabis use, accounted for 5% and 20% of physical and mental health functioning, respectively. Furthermore, some motives may be more important than others for use and functioning. Similar to Blevins et al. (2016b), who found that coping-related motives were positively associated with internalizing and externalizing symptoms in high school students, our analyses showed that coping was negatively associated with mental health functioning. In addition, the regression estimates between coping and mental health outcomes were strongest in the present study and the prior Blevins et al. (2016b) study. Nonetheless, coping was not significantly associated with frequency of cannabis use in either our study or Blevins et al. (2016b). In the present study, sleep-related motives were uniquely associated with greater frequency of cannabis use, as well as poorer physical and mental health functioning. Such sleep-related findings are similar to Lee and colleagues' study of college students (Lee, et al., 2009), and other previous studies of sleep and cannabis use in younger populations (Metrik, et al., 2016; Mike, Shaw, Forbes, Sitnick, & Hasler, 2016; Miller, Janssen, & Jackson, 2017). As such, the present results suggest that consuming cannabis for coping and sleep may be important factors influencing the health and well-being of patients seeking medical cannabis, and are key areas of future research.

It should also be noted that coping and boredom motives had significant, albeit relatively small, positive associations with physical health functioning, which suggests that for some medical cannabis patients, using to forget problems, escape from life, and/or relieve boredom might offer a distraction that allows them to engage in greater physical activity. However, it is important to note that physical functioning was relatively low in this sample compared with the general population. In addition, enjoyment and celebration motives were positively associated with mental health functioning. Blevins et al. (2016b) similarly found that celebration was associated with lower internalizing symptoms, and their standardized regression estimate was of comparable magnitude to the corresponding one found in the present study. Nonetheless, further longitudinal studies are needed to better understand the direction and nature of these associations.

Notably, a specific subscale assessing medical motives for cannabis use is absent from the current version of the CMMQ. During the scale's initial development among incoming college students with relatively infrequent use, medical use was one of the 19 domains identified; however, only 1.3% of the study participants endorsed medical motivations for use (Lee, et al., 2007). In further refinement of the CMMQ, the medical motivations subscale did not emerge as a significant factor (Lee, et al., 2009). It should be noted, however, that motives to address some medical concerns may already be reflected by specific items contained within certain CMMQ subscales. For example, social anxiety (e.g., to relax in an insecure situation) and/or sleep motives might reflect attempts to alleviate

symptoms of PTSD (e.g., hyperarousal) (Bohnert, et al., 2014). Given increased medical cannabis legislation in the US since the scale's development, future studies might reexamine the initial medical motives items (Lee, et al., 2009) or develop new ones to broaden the potential scope of motives measures applicable to medical cannabis patients. In particular, pain is a common qualifying condition for medical cannabis certification; therefore, a subscale assessing pain reduction as a motivation for use may be valuable (Ilgen, et al., 2013). Additional medically-relevant motivations for cannabis use to consider in future research might reflect specific symptoms of a condition (e.g., seizures) and/or attempts to manage side effects of treatment (e.g., poor appetite). Some patients report that they use medical cannabis to reduce reliance on other prescription medications (Piper, et al., 2017), which might comprise a unique motive among this population. Without items covering such domains, it is not possible to know the extent to which reasons related to the management of medical conditions are distinct from the other motivations that were developed and tested in samples of recreational cannabis users.

The results of this investigation should be interpreted within the context of several additional study limitations. First, the sample comprised individuals presenting to medical cannabis clinics in a single state, and may not generalize to other individuals using medical cannabis across the US, those using for medical reasons in states where medical cannabis is not available, or recreational users. Thus, findings require replication. In particular, future research that includes individuals who use cannabis only recreationally, those who use solely for medical reasons, and those who use both medically and recreationally may help to further clarify understanding of motivations for cannabis use. Second, measures were based on self-report, which are subject to recall and social desirability biases. Third, data are cross-sectional, precluding temporality and causal inferences. Thus, longitudinal, event-based research is required to untangle the temporal relationships between motives, cannabis use, and functioning; especially given that prior research has identified that motives can vary across cannabis use events (Buckner, et al., 2015; Shrier, Walls, Rhoads, & Blood, 2013), and that specific motives on a given day may be linked with greater same-day cannabis consumption (Bonar, et al., 2017).

Despite these limitations, this study provides novel information regarding motives for cannabis use among adults using medically. Broadly, our analyses lend support for the utility of the CMMQ among those using cannabis for medical reasons; however, adaptation of the scale to include assessment of medical motives for use (e.g., pain) may be warranted. Individuals using cannabis for medical purposes appear to have diverse reasons for use, and future research could further elucidate how coping and sleep-related motives, in particular, influence patterns of use and functioning.

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Highlights

- We examined the factor structure of the CMMQ among medical cannabis patients.
- We also evaluated relationships between motives and cannabis use and functioning.
- Findings support the utility of the CMMQ among those using cannabis medically.
- Adults using cannabis for medical purposes appear to have diverse reasons for use.

Table 1

Characteristics of the sample (n=1,116)

	n (%) / Mean (SD)
Age (years)	43.7 (12.9)
Race	
White	942 (84%)
African-American	87 (8%)
Asian	2 (0.2%)
American Indian	13 (1%)
More than one race	55 (5%)
Unknown	17 (2%)
Hispanic Ethnicity	
Yes	29 (3%)
No	1087 (97%)
Gender	
Male	647 (58%)
Female	468 (41.9%)
Transgender	1 (0.1%)
Education	
HS/GED or Less	366 (33%)
Some College	441 (39%)
College Graduate or Greater	304 (27%)
Unknown	5 (0.5%)
Domestic status	
Never Married	248 (22%)
Married/In Long-Term Relationship	620 (56%)
Divorced/Separated	212 (19%)
Widowed	28 (3%)
Unknown	8 (1%)
Reason for Seeking Medical Cannabis Card	
Severe/Chronic Pain	1,040 (93%)
Non-pain Reasons	76 (7%)
Current Medical Cannabis Cardholder	
Yes	781 (70%)
No	335 (30%)
Frequency of Cannabis Use (Number of Days Used in the Past 3 Months)	72.3 (33.7)
SF-12 PCS Score	35.2 (8.3)
SF-12 MCS Score	46.2 (11.3)

Note. SD= Standard Deviation. HS/GED = High School or General Education Diploma. SF-12 PCS = Short Form-12 Health Survey Physical Component Summary. SF-12 MCS = Short Form-12 Mental Component Summary. PCS and MCS scores are transformed t-scores.

Table 2

Confirmatory factor analysis of the comprehensive marijuana motives questionnaire (n=1,116)

Motive	Factor loading
Enjoyment ($\alpha = 0.79$)	
To enjoy the effects of it	0.83
Because it is fun	0.75
To feel good	0.69
Conformity ($\alpha = .69$)	
Because you felt pressure from others who do it	0.59
Because you didn't want to be the only one not doing it	0.76
To be cool	0.64
Coping ($\alpha = .77$)	
To forget your problems	0.79
Because you were depressed	0.66
To escape from your life	0.73
Experimentation ($\alpha = .81$)	
Because you were experimenting	0.57
Because you were curious about marijuana	0.90
To see what it felt like	0.86
Boredom ($\alpha = .86$)	
Because you had nothing better to do	0.78
To relieve boredom	0.83
Because you wanted something to do	0.85
Alcohol ($\alpha = .90$)	
Because you were drunk	0.93
Because you were under the influence of alcohol	0.92
Because you had gotten drunk and weren't thinking about what you were doing	0.77
Celebration ($\alpha = .92$)	
To celebrate	0.90
Because it was a special day	0.92
Because it was a special occasion	0.85
Altered Perceptions ($\alpha = .88$)	
Because you want to alter your perspective	0.78
To allow you to think differently	0.88
So you can look at the world differently	0.88
Social Anxiety ($\alpha = .85$)	
Because it makes you more comfortable in an unfamiliar situation	0.86
To make you feel more confident	0.79
Because it relaxes you when you are in an insecure situation	0.79
Relative Low Risk ($\alpha = .85$)	

Motive	Factor loading
Because it is safer than drinking alcohol	0.65
Because it is not a dangerous drug	0.94
Because there are low health risks	0.86
Sleep ($\alpha = .82$)	
To help you sleep	0.92
Because it helps make napping easier and enjoyable	0.57
Because you are having problems sleeping	0.86
Availability ($\alpha = .80$)	
Because it is readily available	0.80
Because you can get it for free	0.76
Because it is there	0.71

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Table 3
Means and pairwise correlations between motives and related variables (n=1,116)

	Mean	(SD)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12
1. Employment	2.62	(1.20)	-											
2. Conformity	1.03	(0.26)	0.09 *	-										
3. Coping	1.46	(0.74)	0.33 *	0.23 *	-									
4. Experimentation	1.09	(0.40)	0.17 *	0.42 *	0.19 *	-								
5. Boredom	1.12	(0.43)	0.29 *	0.32 *	0.29 *	0.26 *	-							
6. Alcohol	1.04	(0.26)	0.12 *	0.31 *	0.19 *	0.24 *	0.34 *	-						
7. Celebration	1.46	(0.90)	0.43 *	0.15 *	0.25 *	0.25 *	0.47 *	0.23 *	-					
8. Altered Perceptions	1.37	(0.75)	0.36 *	0.12 *	0.41 *	0.20 *	0.30 *	0.18 *	0.40 *	-				
9. Social Anxiety	1.55	(0.88)	0.34 *	0.17 *	0.43 *	0.18 *	0.31 *	0.12 *	0.45 *	0.44 *	-			
10. Relative Low Risk	2.50	(1.45)	0.41 *	0.05	0.27 *	0.09 *	0.20 *	0.06 *	0.36 *	0.32 *	0.42 *	-		
11. Sleep	3.07	(1.29)	0.28 *	0.04	0.25 *	0.09 *	0.14 *	0.03	0.21 *	0.20 *	0.31 *	0.42 *	-	
12. Availability	1.47	(0.89)	0.35 *	0.06 *	0.21 *	0.16 *	0.29 *	0.11 *	0.35 *	0.27 *	0.32 *	0.43 *	0.35 *	-

Note. Possible range on motives subscales is 1 (almost never/never) to 5 (almost always/always).

* $P < 0.05$

Table 4

Multiple regression model estimating the association between motives and frequency of cannabis use (n=1,116)

Motive	R ²	β	<i>p</i>
	0.07		
Enjoyment		0.15	<0.001
Conformity		0.02	0.54
Coping		0.02	0.59
Experimentation		-0.15	<0.001
Boredom		0.07	0.06
Alcohol		-0.01	0.66
Celebration		0.00	0.94
Altered Perceptions		-0.09	0.01
Social Anxiety		0.00	0.94
Relative Low Risk		0.04	0.24
Sleep		0.09	0.01
Availability		0.04	0.27

Note. β = Standardized Regression Coefficient

Table 5

Hierarchical multiple regression models estimating associations between motives and SF-12 scores, controlling for cannabis use (n=1,116)

	SF-12 PCS			SF-12 MCS		
	R ²	β	p	R ²	β	p
Step 1	0.00			0.01		
Cannabis use		0.00	0.95		0.11	<0.001
Step 2	0.05			0.20		
Cannabis use		-0.01	0.63		0.13	<0.001
Enjoyment		0.01	0.69		0.07	0.04
Conformity		0.02	0.65		0.06	0.05
Coping		0.09	0.01		-0.40	<0.001
Experimentation		-0.02	0.48		0.01	0.83
Boredom		0.09	0.01		0.01	0.66
Alcohol		0.00	0.99		0.00	0.99
Celebration		0.03	0.50		0.13	<0.001
Altered Perceptions		0.06	0.10		0.00	0.99
Social Anxiety		-0.01	0.81		-0.09	0.01
Relative Low Risk		0.07	0.05		-0.01	0.88
Sleep		-0.11	<0.001		-0.11	<0.001
Availability		-0.01	0.83		0.03	0.30

Note. SF-12 PCS = Short Form-12 Health Survey Physical Component Summary, SF-12 MCS = Short Form-12 Mental Component Summary, β = Standardized Regression Coefficient