Examining cannabis protective behavioral strategy use using multiple methods

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Abstract

Purpose ——Cannabis use among young adults is increasing, despite being associated with several negative consequences. Protective behavioral strategies (PBSs) are a potential mechanism of behavior change for reducing substance use, yet PBS use for cannabis is not well understood. The purpose of this paper is to further define and measure the PBS construct for cannabis.

Design/methodology/approach ——A community sample of cannabis users (n = 54) participated in eight focus groups discussing the use of PBSs. Participants completed surveys regarding demographics, cannabis use habits and cannabis problems. The authors also administered an existing measure of cannabis PBS and asked them to generate new or unique protective strategies that they had used or had heard of others using.

Findings ——Thematic analysis of qualitative focus group data provided information about cannabis users' reasons for regulating cannabis use (e.g. health or legal problems, interpersonal) as well as strategies to moderate cannabis use or attenuate their risk for experiencing adverse consequences (e.g. distraction, existential/spiritual strategies). Analyses of quantitative survey data revealed that use of PBSs was negatively correlated with cannabis outcomes. Perceived helpfulness of strategies was an important predictor of decreased cannabis use and adverse consequences.

Research limitations/implications ——Findings expand the understanding of the definition and measurement of strategies for regulating cannabis use and reducing related risk of experiencing adverse consequences.

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Originality/value ——This is the first study to examine cannabis-related PBS using both qualitative and quantitative methods, which provide insights into the definition of PBS and for future refinements of PBS measurement.

The legal status of cannabis is changing around the world. In the USA, medical cannabis is legal in most states and recreational use is legal in nine states (Choo and Emery, 2017; Klieger *et al.*, 2017). These changes have coincided with increasing cannabis use, with 59 percent of 19- to 28-year olds reporting having used marijuana at least once (Johnston *et al.*, 2016). Furthermore, young adults perceive cannabis as being the least harmful recreational drug (Johnston *et al.*, 2016). However, despite this perception, cannabis has been associated with several negative physical (e.g. respiratory symptoms, substance dependence, impairment in learning and memory) and psychological outcomes (e.g. social anxiety, psychosis) (NAS, 2017), as well as with increased risk of motor vehicle accidents when driving under the influence (NAS, 2017). The increasing prevalence and deleterious effects of excessive cannabis use drive the need to understand the circumstances under which cannabis users reduce their use and the strategies they use to achieve this reduction.

Protective behavioral strategies (PBSs) and substance use

PBSs for reducing substance use are defined as behavioral strategies one can use: before the substance use episode begins (e.g. setting a limit); during the substance use episode (e.g. refusing the substance); and/or instead of using (e.g. not going to a party) to avoid or reduce substance consumption and/or consequences (Martens *et al.*, 2004; Prince *et al.*, 2013). Research on PBS has generally been conducting on alcohol-related PBS. This literature suggests that PBS use is related to less alcohol use and fewer alcohol-related consequences (for reviews, see Pearson, 2013; Prince *et al.*, 2013). Given this, effective PBS use should also result in reductions in cannabis use and consequences. In that context, Pedersen *et al.* (2016) developed a measure of PBS for marijuana (PBSM). They demonstrated a direct negative relation between PBSM and cannabis outcomes (i.e. less frequent cannabis use, fewer adverse consequences).

However, there are several limitations in the way alcohol-related PBS has been assessed (Pearson, 2013; Prince *et al.*, 2013) and many of these limitations are relevant to the assessment of cannabis-related PBS, including the PBSM questionnaire. For one, assessments of alcohol-related PBS do not include perceived effectiveness ratings, which would provide useful information about which strategies are most effective. Second, these measures of PBS do not often allow participants to generate unique strategies not listed on a measure (Prince *et al.*, 2013). This is important because measures of PBS are typically limited in the types of strategies they examine. Specifically, they only focus on behavioral strategies (rather than social, cognitive or other types of strategies) and they usually assess alcohol use during the drinking episode, failing to assess the strategies used prior to, or following, the drinking episode or instead of drinking. To address these limitations and to

develop the definition of cannabis-related PBS, it is crucial to allow cannabis-user to generate their own PBS strategies and to describe how effective they believe these strategies to be in an open-ended manner. Thus, in addition to quantitative methods, it is also important to employ qualitative methodology to gather this information. This is the purpose of the present study.

The current study

To develop the definition and to expand the measurement of PBS for cannabis use, we conducted focus groups with young adult cannabis users. We used the group discussions to generate qualitative information about the nature of cannabis PBS. Qualitative information related to: reasons for reducing cannabis use; reports of PBSM participants had used or had heard that others used; and perceptions about the effectiveness of PBSM. We also administered surveys to pilot test some new strategies for measuring cannabis PBS, and to assess the perceived effectiveness of PBS. The quantitative data from these surveys provided complementary information about: patterns of cannabis use; adverse consequences; and associations between PBSM use and cannabis-related outcomes.

Method

Participants

A community sample of 54 heavy cannabis users (use at least three times/week) from the Buffalo, NY metropolitan area, was recruited through targeted local Facebook advertisements. Although New York State has not legalized recreational cannabis use, access to cannabis is relatively easy and so our sample consisted of recreational users. A total of 123 individuals responded to recruitment materials. Of them, 65 persons participated in a 20-min phone interview to determine eligibility, and 58 persons could not be reached for eligibility screening. Eligibility criteria included: English-speaker; a high school diploma or GED; age 18–30 years ($M = 24.33$; standard deviation (SD) = 3.07); and heavy cannabis use. Exclusion criteria included: a history of serious or ongoing legal issues (e.g. parole); medical issues caused or exacerbated by cannabis use; diagnosed mental illness; and problems with alcohol or other drugs (e.g. misusing prescription drugs). A total of 11 people who completed the eligibility interview did not meet all the criteria.

Participants' characteristics are presented in Table I. All participants signed informed consent forms in which they agreed to be audio recorded. They received $50 for their effort. This research was approved by the Institutional Review Board of the University at Buffalo.

Procedure

We conducted a total of eight focus groups ($M = 6.75$ participants/group, range 3–10). We constituted two of the groups to include only same-sex participants and facilitators (i.e. one all-male and one all-female group). Focus groups were semi-structured and lasted approximately 90 min. Except for the all-female group, each group was co-led by the first author and another member of the research team. Facilitators prompted discussion by asking a series of questions, such as: Let us try to think of some situations when someone might want to cut down on their marijuana use, or quit altogether, either permanently or

temporarily; and, What are some ways you have tried or have heard others try to cut down on marijuana? All groups were audio recorded and transcribed by an electronic health records company (Inforia, Inc. www.inforiainc.com). After the focus group, participants completed the following computerized questionnaires.

Measures

The General Information Questionnaire (Collins et al., 1990).—This 37-item measure assessed demographics (e.g. gender, economic status), substance use (i.e. daily, weekly, current and lifetime use of substances other than cannabis) and typical use of alcohol with items from the Daily Drinking Questionnaire (Collins *et al.*, 1985).

Marijuana Use Questionnaire (MUQ; Collins et al., 2014).—The MUQ assesses typical aspects of cannabis use, including frequency, quantity, consumption methods (e.g. bong, blunt), context of use (alone vs with others) and symptoms of cannabis use disorder (e.g. "Did you continue to use marijuana, even though it caused problems with your family or other people?"). To assess quantity, participants were provided with images showing average-sized joints (1/2 gram) and asked to report cannabis use in terms of the number of joints. If participants did not ingest cannabis by smoking joints, they were directed to indicate the quantity of standard joints they could have rolled with the cannabis that they used by any other means.

Subjective intoxication.—Subjective intoxication was assessed with a single item, "During the past 30 days, on a scale of 1 (low) to 10 ("highest you have ever been"), how high did you typically get when you smoked marijuana?"

Self-administered timeline followback (S-TLFB; Collins et al., 2008).—This adaptation of the TLFB interview (Sobell and Sobell, 1992) consists of a calendar of the past 30 days and pictures of standard cannabis joints (1/2 gram). For each of the 30 days, participants indicated whether they used cannabis and the number of standard joints used (cf. Hjorthøj *et al.*, 2012).

Cannabis Problems Questionnaire (CPQ; Copeland et al., 2005).—The CPQ is a dichotomous measure ("Yes/No") of cannabis-related problems. It contains 27 items divided into three subscales: acute/physical, psychological and social consequences. Sample items include "Have you been physically sick after smoking?" and "Have you been concerned about a lack of motivation?" In the current sample, the CPQ total score was multicollinear with each subscale (Acute/Physical, $r = 90$; Psychological, $r = 0.83$; Social, $r = 0.85$), thus we used the CPQ total score in our analyses. Internal reliability for this sample was excellent ($a = 0.88$).

Protective behavioral strategies for marijuana use (PBSM; Pedersen et al., 2016).—Participants rated the frequency with which they engaged in a pre-defined list of 39 behaviors when using cannabis (1 = never to 6 = always). Sample items included "Avoid using marijuana before work or school," and "Avoid using marijuana in concentrated forms." Internal consistency for this sample was excellent ($a = 0.96$).

Self-generated strategy use.—We developed a new measure in which we asked participants to generate up to three PBSs they had used to moderate cannabis use. They then rated the frequency with which they had used each of the strategies during the past two weeks (1 = never used, 5 = often), and the helpfulness of the strategy for moderating cannabis use (1 = not helpful, 5 = very helpful).

Overview of data analyses

Qualitative data were derived through analyzing transcripts of the eight focus groups. The first author and three research staff performed thematic analysis (Braun and Clarke, 2006; Krueger, 1994; Miles and Huberman, 1994), an inductive or bottom-up approach to identify common and recurring themes (Frith and Gleeson, 2004). Thematic analysis followed six phases (Braun and Clarke, 2006): becoming familiar with the data; generating initial codes; searching for themes; reviewing themes; defining and naming themes; and producing the report. There were no unique themes in the two gender-specific groups; therefore, we merged the data across all eight groups.

The quantitative data were analyzed using descriptive statistics and correlational analyses (i.e. means, SD, proportions and Pearson correlations). An advantage of focusing on descriptive statistics and correlations is that they provide an index of effect size that have known cutoffs for small, medium and large effects (0.1, 0.3. and 0.5, respectively; Cohen, 1988). Furthermore, Cumming (2013, 2014) noted that analyses that focus on effect size estimates have the advantage of supplementing dichotomous decision making with a focus on estimation and increased information about the magnitude and direction of the effects, as well as easing the integration of findings into meta-analytic strategies.

Results

Qualitative analyses: situations or reasons to moderate cannabis use

Qualitative analyses yielded eight types of situations in which regular cannabis users wished to cut back or abstain from using cannabis. These situations fell under two umbrella themes: intrinsic and extrinsic motivations to change. Themes are described below.

Work and school.—Participants described needing to cut back or quit cannabis use when it interfered with employment or schoolwork:

> It might affect your work ethic or school. You might be late on a couple of assignments, late to work because you were too busy getting high before you went to work or getting high on break and you don't want to go back to work.

Financial concerns.—Users expressed concerns that they were spending too much money on cannabis and had other financial obligations to consider:

> Spending too much money on it.

Physical health.—Users described needing to decrease cannabis use if experiencing negative physical symptoms or pregnancy:

Respiratory issues.

Being pregnant.

Psychological health.—Participants described cutting back if their psychological well-being was affected by using cannabis:

Some people get anxious when they smoke, too.

Interpersonal reasons.—Participants described situations in which they moderated their use because of other's reactions or because they acted inappropriately in the presence of others:

[…] if I'm around new people, I'd rather not be stoned […].

Whether it be family or relationships, could be negatively affected by your use, if they don't like it or if they notice it.

Intrapersonal reasons.—These reasons included wanting to prove that one could quit, or personal reasons not captured by other categories:

I've been smoking a long time. I quit once for 6 months and it was just to prove to everybody I don't need this […].

Legal issues.—Many participants reported that they feared legal repercussions of their cannabis use:

When you're on parole.

Lack of access.—Participants described having to cut back on cannabis use when it was not available:

The only time where I didn't smoke was when I was in Tennessee and I had no access to it.

Qualitative analyses: strategies to moderate cannabis use

Most relevant to our research questions, we identified the following seven themes related to behaviors and cognitions that participants thought were useful strategies for moderating use.

Scheduling and rationing.—This theme encompasses strategies for planning one's use of cannabis by scheduling times to use or finding ways to ration the substance:

Yeah, just a pill planner, like put some in for every day and know, since you know you gave that amount, you gotta [*sic.*] figure out when you're going to use it because you know eventually your high is going to go down.

This theme is consistent with Davis *et al.*'s (2014) finding that, among cannabis users, commonly endorsed strategies included "Do not use more than once per day" and "Increase the number of days between sessions" (p. 1753).

Distractions/alternatives.—This category consisted of the use of activities or alternative substances in order to divert one's attention away from cannabis:

> Yeah I've noticed that sometimes my drinking might […] I might have one or two more drinks rather than smoke.

Some distracting activities were adaptive (e.g. gardening), while others were maladaptive (e.g. drinking more alcohol). Finding a distracting activity or healthy alternative to using substances is congruent with harm reduction models of substance use treatment (Logan and Marlatt, 2010). Individuals who use maladaptive strategies present a complicated clinical challenge, as clinicians will need to validate the desire to decrease cannabis use while simultaneously encouraging the use of more adaptive strategies.

Focus on values and goals.—Strategies included turning one's attention and cognitions to the reasons, values and goals related to moderating cannabis use:

> I also saw things like comparing, so whenever you go and smoke, instead of thinking it's awesome and amazing, just put something else in your mind like, oh, it's going to give me social anxiety and just […] replacing your thoughts, you know.

Substance use can interfere with the pursuit of one's goals and impede the transition into adult roles (Brook *et al.*, 1999; Labouvie, 1996). New family roles (e.g. marriage, children) often begin during young adulthood, and many young adults stop or limit their cannabis use in light of these new roles and the increased salience of core goals and values (Kandel and Raveis, 1989; Leonard and Homish, 2005).

Seek help.—These strategies included gathering information through books or the internet, seeking help from friends and family, quitting with a friend or seeking help from professionals:

> They watched each other, kind of like I guess you would do with drinking or anything else. They watched each other, they watched their intake, they balanced each other because they knew they couldn't do it by themselves.

Avoiding high-risk situations.—These strategies involved avoiding cues related to cannabis use, including people, places, things, that may influence the desire to use.

> Yeah, if you're trying to quit, don't hang with smokers, you're just going to want to smoke.

Avoiding high-risk situations is consistent with harm reduction interventions (e.g. Logan and Marlatt, 2010). Furthermore, a number of avoidance strategies loaded onto the single component in Pedersen *et al.*'s (2016) PBSM measure.

Existential/spiritual strategies.—These were strategies using personally meaningful spiritual practices, or any type of moral code to resist the desire to use cannabis:

> Mindful meditation. That's a big thing. Like, I started doing yoga and it changed a lot because I kind of realized, that high you're chasing, whatever, with pot, with

> anything, like, you can organically get that going if you have the means, and I don't know, for me personally, yoga was a big transition into smoking a lot less.

There is a growing body of research that supports mindfulness-based interventions as effective for treating substance use disorders, and spirituality as a separate construct that is negatively associated with substance use (Leigh *et al.*, 2005). Though this theme emerged in a few focus groups, many participants had not considered existential or spiritual strategies.

Strategies to use while consuming.—These strategies included behaviors individuals could use before, during or after cannabis consumption to abstain from using, or to limit use:

> [Use] one bowl instead of two.

The theme is consistent with the literature on alcohol PBS, which has increasingly focused on strategies while drinking (e.g. setting a limit), and has found that strategy use is negatively associated with alcohol use (Pearson, 2013; Prince *et al.*, 2013). Pedersen *et al.* (2016) showed strong initial evidence for similar negative associations between strategies an individual could use while consuming cannabis and cannabis use and consequences.

Need for personalization.—For every participant who reported using a particular strategy there was someone who indicated that such a strategy would not work for him or her. Thus, a secondary theme of a need for personalization emerged:

> But, you've got to find ultimately what works for you.

> You can't just pick one and say this one works for everybody.

In their review, Prince *et al.* (2013) argued for a personalized measure of alcohol PBS, and personalized intervention strategies aimed at increasing PBS use. Young adults may be receptive to personalized assessment and intervention strategies.

Quantitative analyses

Cannabis use.—Our community sample reported using cannabis on average 27.02 (SD = 6.50) days in the past month and nearly every day ($M = 6.71$, SD = 1.06) during the week. For comparison, Pearson *et al.* (2017) reported that 6 percent of college students surveyed across 11 universities reported using 20 or more days per month, and Johnston *et al.* (2016) reported that 7 percent of young adults ages 19–28 years reported daily use. Our participants used an average of 75.46 (SD = 47.96) standard joints in the past month; the equivalent to 20.37 (SD = 13.52) joints/week, 3.00 (SD = 1.88) joints/using day and 1.50 (SD 0.94) grams of cannabis/using day. Participants rated their average subjective intoxication at 6.70 (SD = 1.77) out of 10. Participants reported an average of 8.58 (SD = 5.62) out of a possible 27 cannabis-related problems during the past month.

Protective behavioral strategies for marijuana use (PBSM).—The frequency of PBSM use from the prompted list of 50 behaviors was reported near the middle of the scale ($M = 2.97$, SD = 0.98; 1 = never to 6 = always). In contrast, in the development sample of the PBSM, 1,500 college students reported a mean PBSM score of 4.15 (Pearson, 2013). On the newly created S-PBSM, our participants reported using their self-generated PBSM

moderately often (M = 3.25, SD = 1.18; 1 = never used to 5 = often) and finding those strategies moderately helpful *(M* = 3.79, SD = 1.20; 1 = not helpful to 5 = very helpful).

Associations among cannabis outcomes and PBSM.—A correlation matrix of key variables is presented in Table II. Cannabis quantity and frequency were significantly positively correlated, except for joints/using day, which was not significantly correlated with cannabis frequency. In both cases, the relation was positive with a small to moderate effect size. Of note, cannabis-related problems were positively associated with number of joints/week and joints/day, but not with the frequency of use or subjective intoxication. Overall, these effects are similar to the medium-sized correlations (r = 0.35) between cannabis use frequency and cannabis-related consequences reported previously (cf. Bravo, Prince, Pearson and Marijuana Outcomes Study Team, 2017; Bravo, Anthenien, Prince, Pearson and Marijuana Outcomes Study Team, 2017). PBSM average score was significantly negatively correlated with all cannabis use variables (e.g. joints/month), similar to the correlation between PBSM score and cannabis use frequency (r = –0.50, *p*<0.01) reported by Pedersen *et al.* (2016). It was not significantly associated with cannabis-related problems and subjective intoxication; in each case, the effect size was small and negative. PBSM average score was significantly positively associated with self-generated strategy use, and perceived helpfulness of self-generated strategies. Frequency of use of self-generated strategies (S-PBSM) was not significantly correlated with cannabis-related outcomes; all correlations were negative with small effect sizes. In contrast, the perceived helpfulness of S-PBSM was significantly negatively associated with cannabis-related problems, and with two out of three quantity measures, along with subjective intoxication. In sum, perceived helpfulness of S-PBSM was significantly negatively correlated with two key indices (i.e. cannabis-related problems and subjective intoxication) that were not associated with the PBSM.

Discussion

The current study used quantitative and qualitative data, from a sample of young adult community residents of heavy cannabis users, to examine cannabis use, consequences, reasons for moderating cannabis use and PBSs used for reducing cannabis use (PBSM). Additionally, we pilot tested two refinements to the measurement of PBS for cannabis, which involved asking users to S-PBS and assessing the perceived effectiveness of PBS. In the quantitative data, we found positive associations between cannabis use and consequences and negative associations between cannabis use/consequences and an existing measure of cannabis protective strategies (PBSM; Pedersen *et al.*, 2016). The summary score from the PBSM and our newly developed assessment of the perceived helpfulness of the self-generated strategies complemented one another.

Our results indicated that cannabis-related consequences were associated with quantity of cannabis used, but not with frequency of cannabis use or with participant ratings of subjective intoxication. The findings for quantity of cannabis suggest that this might be a useful focus of moderation efforts. It is possible that a person can use cannabis daily, in small quantities, and not experience negative cannabis-related consequences. Moreover, there may be unmeasured variables beyond quantity and frequency such as the timing of use that contribute to experiencing cannabis-related consequences. For example, a person who

has problems at work due to cannabis use could reduce or resolve work problems by waiting until after work to use cannabis, even if he or she continued to use the same quantity per day.

Participants endorsed scheduling or rationing cannabis use as a highly effective PBSM. Use of this PBSM may result in decreasing quantity of use as well as the appropriate timing of use. One other interpretation for this finding is that there was limited variability in frequency measures, which, combined with the small sample, may have impacted the significance tests of the correlations tested.

Thematic analysis of focus groups data provided information about reasons for regulating cannabis use, themes related to types of situations in which regular cannabis users attempt to reduce their use, as well as the self-generated PBSMs (S-PBSMs) they implemented to reduce cannabis use and consequences. We identified eight themes regarding situations in which participants reported wanting to, or needing to, regulate their cannabis use. We also identified seven types of S-PBSM.

Situations inevitably arise in which cannabis users want/need to moderate use, yet there is heterogeneity in their efforts. In this study, the eight cannabis use regulation themes broadly fit into two categories, each of which could have clinical implications. The first, which consists of extrinsic factors, includes situations such as needing to take a drug test, legal issues and lack of access to cannabis. The second, which consists of intrinsic factors, included concerns about finances, physical or psychological health, and inter- and intra-personal reasons (e.g. to avoid embarrassment or having a desire to quit, respectively). Use of these strategies could have implications for clinical interventions.

A common set of strategies focused on finding a distracting activity or alternative to using cannabis. These strategies ranged from healthy distractions (e.g. doing yoga), to harmful alternatives (e.g. using alcohol). Given this, clinicians should encourage clients to select healthy alternatives and to be creative when selecting activities that could serve as positive alternatives to cannabis use.

Many participants focused on strategies that could be used in the moment (e.g. just passing the joint), while others reported avoiding high-risk situations altogether. Clinicians may want to reflect on the success of previous moderation efforts to use or assist clients in imagining and planning for any difficulties that could arise when trying to moderate cannabis use. Last, the themes of focusing on one's values and goals as well as using existential and spiritual strategies could be used both in the moment and prior to encountering risky situations. Clinicians can encourage their clients to use "meaning making" strategies and mindfulness techniques to bring their attention to their values and to assess whether their cannabis use behaviors are in line with their beliefs. All of this could help reduce cannabis use and negative consequences associated with this use.

We found that consequences of cannabis use were only negatively associated with self-generated strategies that were perceived to be helpful, not with strategy use in general. This provides initial support for the two new measurement refinements we pilot tested in the current study. This finding is consistent with the secondary theme regarding the need to personalize PBSM. Thus, clinicians might more effectively work with clients by helping

them to find a few effective strategies that they can practice in multiple situations rather than using many potentially ineffective strategies. Furthermore, thinking beyond the face-to-face intervention approaches, population-based prevention and intervention efforts could be developed for delivery in schools or online (e.g. media-based messaging) that promote the use of helpful strategies. No previous research has examined self-generated strategies or the perceived helpfulness of strategies.

Interestingly, the perceived helpfulness of strategies and the PBSM each negatively correlated with different outcomes. Most critically, perceived helpfulness was the only strategy use variable directly and significantly negatively related to cannabis-related problems. Moreover, perceived helpfulness was negatively related to cannabis use quantity measures, which were the only use indicators that significantly predicted problems. There are two ways to think about perceived helpfulness. The first is that individuals select strategies they perceived to be helpful *a priori*. The second is that individuals make *post hoc* evaluations of the helpfulness of strategies after using them. Given the retrospective self-report nature of our survey, we must assume the latter. In this case, a possible rationale for the stronger relation between perceptions of the helpfulness of the behavior and outcomes compared to the relation between the actual behaviors and outcomes is due to the study design. In effect, participants used the perceived helpfulness items to provide insights into how effectively they employed PBSMs. In contrast, the pure PBSM frequency items included effective and ineffective strategy use. Future studies should consider adding perceived helpfulness ratings to measures of the use of cannabis protective strategies, to supplement the assessment of the frequency with which each strategy is used. Intervention efforts should use perceived helpfulness ratings to bolster efforts to moderate cannabis use.

The current study has several strengths. First, we collected complementary qualitative focus group and quantitative survey data from a community sample of heavy cannabis using young adults. This group is at high risk for experiencing negative cannabis use consequences. Second, our results add to understanding both regular cannabis users' reasons for moderating their use and the strategies they use to moderate their cannabis use. Third, our results provide suggestions for clinical interventions and the refinement of measures of cannabis protective strategies. These strengths should be considered in light of the study's limitations. The current sample was from a state where cannabis use has been decriminalized and approved for medical use. Thus, the results may not generalize to states that have either legalized recreational cannabis or where cannabis use remains illegal. Next, focus groups were conducted prior to questionnaire completion, which may have influenced responses on self-report measures. Furthermore, our cross-sectional design limits the ability to draw causal inferences about the associations among survey variables. Additionally, though sufficient for reaching saturation in the qualitative data, our modest sample size may have influenced the significance tests of some of our quantitative results. Finally, there are many potential mediators and moderators of cannabis use, consequences and PBSM that were not assessed. Future research should examine mediators and moderators of cannabis use (e.g. cannabis use motives, personality factors). Last, we do not have the ability to correlate individuals' comments in the focus group with their quantitative data. Future studies, using larger samples in experimental or longitudinal designs, should make efforts to

assess for latent subgroups of cannabis users who make efforts to moderate their intake, potentially due to extrinsic vs intrinsic motivations.

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Table I

Demographic characteristics of our sample of regular cannabis users

Characteristics	n	%
Gender		
Men	34	63
Women	20	37
Background		
European American	24	44
African American	15	28
More than one group	9	17
Unknown/Other/No answer	6	11
Ethnicity		
Hispanic or Latino	9	17
Non-Hispanic or Latino	40	74
Unknown/No answer	5	9
College student status		
Student	8	15
Nonstudent	45	83
No answer	1	2
Employment		
Employed	41	76
Unemployed	12	22
No answer	1	2
Marital status		
Single	46	85
Married	7	13
Divorced/Separated	1	2

Note: $n = 54$

Table II

Correlations among cannabis use and protective behavioral strategies variables

	1	2	3	4	5	6	7	8	9	10
1. Cannabis Problems Questionnaire total score										
2. Standard joints used in past month	0.16									
3. Standard joints used in past week	0.37**	0.81**								
4. Typical joints on using days	0.38**	0.79**	1.00**							
5. Using days in past month	0.03	0.46**	0.36**	0.26						
6. Using days in past week	0.01	0.34*	0.31*	0.21	0.80**					
7. Subjective intoxication	−0.07	0.21	0.27*	0.22	0.24	0.35**				
8. Self-generated strategy use	−0.18	−0.23	−0.22	−0.20	−0.19	−0.12	−0.25			
9. Self-generated perceived helpfulness	−0.30*	−0.27*	−0.30*	−0.27	−0.20	−0.18	−0.36**	0.61**		
10. PBSM average	−0.15	−0.56**	−0.48**	−0.45**	−0.48**	−0.28*	−0.16	0.55**	0.50**	
M(SD)	8.58 (5.62)	75.46 (47.96)	20.38 (13.52)	3.01 (1.88)	27.02 (6.50)	6.72 (1.06)	6.70 (1.77)	3.26 (1.19)	3.79 (1.20)	2.98 (0.98)

Notes: PBSM, protective behavioral strategies for marijuana scale average score.

*
$p < 0.05$;

**
$p < 0.01$