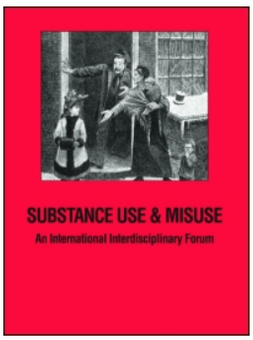

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ORIGINAL ARTICLE

Savoring Moderates the Link between Marijuana Use and Marijuana Problems

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ABSTRACT

Background: The changing legal landscape for marijuana requires concerted efforts toward minimizing the potential harms related to use of the plant. *Purpose/Objectives:* Identifying buffers against negative consequences in regular users could help researchers fashion prevention efforts that could appeal to those who are uninterested in messages related to abstinence. Savoring, a positively-focused, mindful approach to making the most of positive experiences, appears to overlap with facets of treatment that have proven successful with problem users. The present study examined the role of savoring in the development of marijuana-related problems. *Methods:* We examined the potential role of savoring as a buffer against marijuana problems in 195 participants (27.3% female). *Results:* Participants in this sample used cannabis 3.06 days per week on average. Correlations revealed that problems decreased as savoring increased. In addition, a significant interaction revealed that savoring moderated the impact of frequent use on problems. As savoring increased, the positive association between frequency of use and negative consequences decreased, suggesting that those who are high on savoring experience fewer negative consequences than those who are low on savoring even when they use marijuana as frequently. *Conclusions:* These data support the idea of incorporating savoring into the prevention of marijuana problems.

KEYWORDS
Savoring; marijuana; cannabis

Introduction

Marijuana remains the most commonly used psychoactive substance in the United States. Approximately 24 million Americans aged 12 or over are current marijuana users with 4 million qualifying for marijuana use disorder (Ahrnsbrak, Bose, Hedden, Lipari, & Park-Lee, 2017). While legislation and attitudes towards marijuana's potential medical utility and recreational use continue to shift, marijuana remains problematic for many users. In 2015, 138,000 users sought treatment (Bush & Lipari, 2015). Heavy, frequent marijuana use, especially use that begins in adolescence, is linked to respiratory problems, cognitive impairment, educational deficits, and memory impairment (Volkow, Baler, Compton, & Weiss, 2014). Thus, identifying buffers of marijuana problems could prove extremely helpful.

Savoring, a construct defined as an ability to recognize and appreciate positive experiences (Peterson & Seligman, 2004), might have the potential to keep marijuana problems to a minimum. Savoring involves a mindful, conscious experience of pleasure. In a sense, it is a form of mindfulness focused on positive affect (Bryant & Veroff, 2007). Broadly, savoring Marijuana's subjective effects can mimic savoring as well (Tart, 1971), potentially making it particularly relevant. Although mindfulness alone contributes to treatment outcomes for problematic marijuana use (de Dios et al., 2012; Paltun, Altunsoy, Özdemir, & Okay, 2017) and looks promising as a contributor to the prevention of problems (Reiman, 2018), meta-analytic results reveal that it does not seem to correlate with use in general (Karyadi, VanderVeen, & Cyders, 2014). No previous work has addressed the idea of how savoring might vary with problems directly or its potential to serve as a buffer against problems as frequency of use increases. Mindfulness-Oriented Recovery Enhancement (MORE) is an intervention that integrates mindfulness, cognitive restructuring and positive emotion regulation. In treating opioid abuse and chronic pain, MORE focuses on the hedonic dysregulation that underlies these conditions and aims to increase attention and processing of natural rewards in the environment. Previous work with MORE suggests that mindful savoring as a means of increasing responsiveness to natural rewards may decrease prescription opioid misuse and craving (Garland, Howard, Zubieta, & Froeliger, 2017; Garland,

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Froeliger, & Howard, 2014). Additional work with nicotine suggests that savoring significantly predicted increases in positive affect and reductions in nicotine use (Froeliger et al., 2017).

The addition of a focus on the positive might make savoring a reasonable protective factor against marijuana problems. The ability to relish any moment could make experiences generally more enjoyable, including marijuana intoxication. Those capable of savoring might use marijuana in a way less likely to create troubles, perhaps because they have alternative paths to positive experience or because they get more pleasure from their use. Thus, we would expect a negative association between savoring and problems. In addition, when use becomes problematic, attending to the moment in an effort to find the positive might actually prove aversive. Thus, those who are in the habit of savoring might take steps to avoid problems in an effort to escape a negative outcome associated with marijuana use. In contrast, users who are low in savoring might use problematically, fail to notice the costs, and lapse into a more automatic, troubled series of behaviors (Tiffany & Drobes, 1990). Detailed examinations of the mechanisms underlying the buffer could prove helpful once it is established. Thus, the present study examines how savoring, as measured by the savoring beliefs inventory, correlates with frequency of marijuana use and negative consequences as well as how it moderates the association between marijuana use frequency and marijuana-associated problems. We hypothesized that savoring would attenuate the relation between frequent marijuana use and marijuana-associated problems. An a priori power analysis revealed that a sample size of 200 could detect an interaction and two main effects that accounted for 95% of the variance, with an alpha level of .05 and power set to .95. We gathered data with the goal of exceeding 250 valid responses.

Methods

Participants

Two hundred and sixty-eight participants initially completed an online survey assessing marijuana use, self-perceptions of ability to savor positive outcomes, and problems associated with marijuana use. Data were collected through a snowball technique with advertisements posted on relevant websites such as the National Organization for the Reform of Marijuana Laws (NORML) and Facebook. Participants were queried about their prior and current marijuana use, their perceptions of problems caused by marijuana, and perceptions about their capacity to savor positive experiences through anticipation, present enjoyment, and reminiscence. Of the initial 268 responses, 31 were excluded for endorsing no lifetime marijuana use, and 32 were excluded for incorrect responses to two infrequency items included to screen for random responding. A remaining ten participants were excluded for failure to provide consent, age below 18, or indication that we should not include their data in our analyses due to intoxication or preference for data to be excluded. Data from the remaining 195 participants are included in the present analyses. Participants had a mean age of 27.73. The sample was 72.7% male and 27.3% female. Racial and ethnic makeup of the present sample was as follows: 68.7% white, 10.8% Hispanic, 6.2% black, 9.2% Asian or Pacific Islander, 1% American Indian, and 3.6% specified "other" or "more than one race".

Measures

Marijuana use

Participants reported the number of days per week (0-7) they typically used marijuana in the last year. Comparable measures have correlated with problems in other work (Lavender, Looby, & Earleywine, 2008; López-Pelayo, Batalla, Balcells, Colom, & Gual, 2015).

Marijuana problems

Participants answered the Cannabis-Associated Problems Scale (CAPS), a 19-item self-report assessment of negative effects of marijuana on social relationships, self-esteem, motivation and productivity, work and finances, physical health, withdrawal, blackouts, and legal problems (Lavender et al., 2008). Individuals rated their experience of each of these problems on a Likert scale from "no (0)" to "yes, very many times or a very serious problem (5)." Cronbach's alpha estimate for the CAPS in the present sample was .88, suggesting high internal consistency.

Savoring beliefs

The Savoring Beliefs Inventory (SBI) assessed participants' perceptions of their own ability to derive pleasure through anticipating upcoming positive events, savoring positive moments, and reminiscing about past positive experiences (Bryant, 2003). This 24-item scale instructs individuals to rate statements on a 7-point scale ranging from "strongly agree (1)" to "strongly disagree (7)." Cronbach's alpha estimate for the SBI in the present sample was .93, suggesting high internal consistency.

Results

Participants reported that they used marijuana an average of 3.06 (SD = 2.90) days per week. Skewness for marijuana use frequency in this sample was .284 (SE=.17). They had a mean score of 5.31 (SD=.79) on the SBI with an observed skewness of −.44 (SE=.17). Participants had a mean score of 1.21 (SD=.38) on the CAPS with a skewness of 3.52 (SE=.18). Log-transformation of the CAPS (skewness= 1.83, SE=.18) was utilized to reduce skew prior to moderation analyses. Independent samples t-tests demonstrated non-significant gender differences with regard to CAPS (t=.331, p = .74). Significant gender differences emerged for marijuana use frequency (t = 2.21, p < .05; Mean, Male: 3.81 (SD = 3.03); Mean, Female: 2.78 (SD = 2.82)) and savoring (t= −2.2, p < .05; Mean, Male: 5.18 (SD=.84); Mean, Female: 6.49 (SD=.76)). Gender was included as a covariate in moderation analyses.

Bivariate correlations revealed significant associations between frequency of marijuana use, marijuana associated problems, and savoring. As expected, frequency of marijuana use per week was positively associated with marijuana-associated problems (r = .32, p < .001). On the other hand, marijuana associated problems was negatively associated with level of savoring (r = −.23, p < .001). Frequency of marijuana use and savoring did not correlate significantly (r=−.15, p=.86). Correlations can be found in Table 1.

Table 1. Table of correlations.

	Mean (SD)	1.	2.	3.
1. Savoring	5.31 (.79)	1		
2. Frequency of Marijuana Use	3.06 (2.9)	−.15	1	
3. Marijuana-Associated Problems	1.21 (.38)	−.23*	.32*	1

Note. *correlation is significant at the 0.01 level.

We used multiple regression analyses to examine the potential moderator effect. SBI and frequency of marijuana use per week were standardized prior to analyses. In the first step, SBI and frequency of marijuana use per week accounted for a small but significant proportion of variance in marijuana problems (R^2= .13, F = 11.64, p < .001), the interaction of savoring and frequency of use accounted for a significant proportion of variance in CAPS scores (R^2=.165, F = 7.3, p < .001) with a significant change statistic observed (R^2 change = .022, p=.05). As predicted, as savoring decreases, the association between frequency of use and marijuana problems increases. Probing of the interaction effect revealed that at conditional values 1 SD above the mean in savoring, the relation between frequency of marijuana use and marijuana problems was non significant (B = .014, t = 1.35, p = .179), whereas at conditional values 1 SD below the mean on savoring, the relation between frequency of marijuana use and marijuana problems was significant (B = .045, t = 4.16, p < .01). Please see Figure 1. Given the significant gender differences observed for savoring and marijuana use frequency, gender was

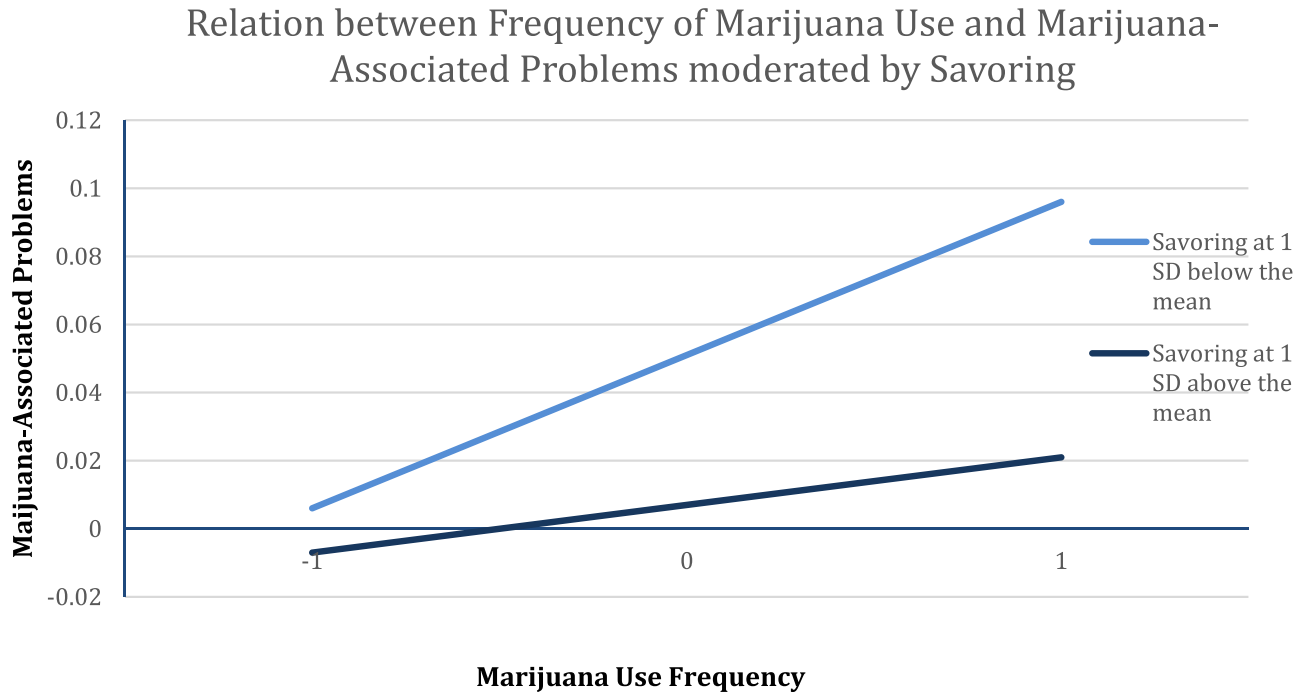

Figure 1. Standardized marijuana frequency of use per week vs. log of Marijuana-Associated Problems in those high and low in Savoring.

included as a covariate in the above moderation analysis. Gender did not emerge as a significant predictor of problems (R^2 change= .008, F = 1.43, p =.23). Further, the interaction of gender and SBI did not account for a significant proportion of variance in problems (R^2= .02, F = 2.62, p = .11), nor did the interaction of gender and frequency of use (R^2= .02, F = 3.69, p = .06).

Discussion

The present study examined potential associations among savoring (a present-focused, mindful appreciation of positive experiences), marijuana use, and marijuana problems in a cross-sectional analysis. Data revealed that higher scores on a measure of savoring were associated with fewer marijuana problems. In addition, as savoring increases, the association between frequency of use and marijuana problems weakens. Thus, savoring might prove protective in the development of marijuana-associated problems among frequent marijuana users. The exact mechanism underlying the buffering effect remains unclear. Users may have a threshold of positivity they wish to experience in a day and might reach it through use of the plant, savoring its effects, or savoring other experiences. In addition, the mindfulness inherent in the savoring process might make problematic use more salient, leading users to intervene on their own.

Interventions that increase savoring might have a positive impact on treatment outcome for problematic users, much in the way that mindfulness training has (e.g. de Dios et al., 2012). Existing savoring interventions encourage active consideration and appreciation of the positive, pleasurable aspects of a situation (Bryant & Veroff, 2007). Encouraging users to more purposefully attend to the enjoyable aspects of everyday life may improve treatment outcomes and contribute to less risky patterns of cannabis use. Future work may also examine the role of savoring specifically in the context of cannabis use on the development of problems. Savoring might also keep the chances of developing problems in the first place to a minimum. Those who savor appear to develop fewer problems even when they use marijuana frequently. This approach to preventing marijuana problems has considerable appeal. Problem users are often reluctant to enter formal treatment, and few want to set abstinence as a goal. Users might add simple cues for savoring into their day in an effort to keep positive experiences accessible. Practicing savoring in the presence of paraphernalia might also have potential to prevent problems.

The present findings suggest that savoring might help reduce negative effects of heavy marijuana use. Such findings are particularly useful as marijuana prevalence rates continue to rise and interest turns towards effective intervention and harm reduction strategies. Interventions that encourage marijuana users to practice savoring appear to have potential. First, savoring experiences might decrease the frequency of marijuana use, which in turn decreases related problems. In addition, savoring appears to weaken the association between use and problems. The mechanisms behind these associations still remain unclear, but these data suggest they might prove worthy of investigation. Given the significant negative correlation between weekly use and savoring, increasing positive experiences could decrease frequency of use directly. Perhaps those who savor have enough positive experiences in their week to keep their frequency of marijuana use down. In addition, the significant moderator suggests that frequent marijuana use need not lead to problems. Perhaps those who are accustomed to savoring notice when marijuana use is starting to generate negative consequences, inspiring them to intervene.

The present findings are not without limitations related to its cross-sectional approach and homogeneous sample. Further work can help confirm the effect, reveal how well it generalizes, and suggest underlying mechanisms. These data are limited due to a relatively small, homogeneous sample. A replication with participants who range more in age, ethnicity, and national origin, for example, could reveal how well the effects generalize. The present study also represents a sample of cannabis users who endorse a low level of cannabis-associated problems. Further work should examine whether the current findings persist in a samples with more severe cannabis-associated problems and in clinical populations. A longitudinal approach would also provide distinct advantages for both correlational and experimental work. Randomly assigning marijuana users to receive a savoring intervention or a credible control intervention and following up with multiple measures for lengthy times afterwards will help reveal if savoring can keep marijuana problems to a minimum. A detailed analysis of associated cognitions could also help uncover underlying mechanisms.

In addition, some correlate of savoring might be the true source of the observed effect. A thorough assessment of potential correlates might reveal a stronger buffer that accounts for more variance. Potential correlates include trait mindfulness, and the use of protective behavioral strategies for marijuana. Moderate correlations have been observed between mindfulness and

savoring (Bryant & Smith, 2015), and savoring requires an ability to mindfully attend to the positive, enjoyable aspects of a situation. Therefore, underlying trait mindfulness might help explain the effects of savoring in the development of marijuana problems. Another potential correlate might include the use of protective behavioral strategies. Protective behavioral strategies (PBS) for marijuana include behaviors that are used before, during, or after marijuana use to reduce problematic outcomes. Recent studies have suggested that PBS are protective in the development of marijuana associated problems (Bravo, Prince, Pearson, & Marijuana Outcomes Study Team, 2017; Pearson & Bravo, 2019). Individuals who tend to engage in savoring might also practice PBS to avoid or reduce the negative consequences of marijuana use. Further work should examine these potential correlates and their association with marijuana problems. Despite these limitations and the need for further work, the current findings do support savoring's potential role in the development of marijuana problems that might appeal to many users.

Declaration of interests

We have no conflicts of interest to disclose.

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