Motives for Marijuana Use among Heavy-Using High School Students: An Analysis of Structure and Utility of the Comprehensive Marijuana Motives Questionnaire

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Abstract

Motives for marijuana use are important predictors of problematic outcomes associated with marijuana use. Most measures, to date, were developed by adapting alcohol motives measures. However, the Comprehensive Marijuana Motives Questionnaire (CMMQ) was created using a bottom-up approach to evaluate twelve distinct motives for use. The CMMQ was developed and validated in a normative college population. As such, no known study has evaluated the factor structure and utility of the CMMQ in a heavy-using, high school student population. The current study utilized a sample of 252 heavy marijuana-using high school students recruited for a combination motivational enhancement/cognitive behavioral intervention. Results from baseline measures indicated that the factor structure of the CMMQ was maintained in this population. Results from multiple regression analyses revealed distinct relationships with measures of negative consequences of use, including indices of marijuana use, marijuana-related problems, self-efficacy, and internalizing and externalizing symptoms. In particular, the coping motive was associated with several negative outcomes, which is consistent with previous marijuana and alcohol motives literature. Results suggest that the CMMQ may be useful in assessing marijuana motives among heavy marijuana-using adolescents.

Keywords

motives; coping; marijuana; cannabis

1. Introduction

Marijuana is the most commonly used illicit substance among high school students, with nearly 6% of youth reporting daily use (Substance Abuse and Mental Heath Services

Administration, 2014). Marijuana use among high school students has been associated with a variety of negative consequences, including endorsement of internalizing and externalizing disorders (Winters, Stinchfield, Latimer, & Stone, 2008), school problems (Silins et al., 2014), and psychosocial adjustment (Fergusson, Horwood, & Swain-Campbell, 2002). At least one report suggests that chronic heavy use among high school-age individuals may be related to enduring intellectual deficits (Meier et al., 2012).

Motives for marijuana use may predict problematic patterns of use. Seminal theoretical work on motives for substance use surrounded motives for alcohol use and discussed formation of motives as a process involving social cognitive constructs such as expectancies for the effects of use, previous experience with the substance, and situational variables (Cox & Klinger, 1988). Cooper and colleagues elaborated on the importance of motives by identifying a set of motives for alcohol use (Cooper, Russell, & George, 1988; Cooper, Russell, Skinner, & Windle, 1992), which led to the development of the Drinking Motives Questionnaire-Revised (DMQ-R; Cooper, 1994). The DMQ-R assessed four motives for alcohol use among high school-aged individuals based on valence and source: coping with negative affect (negative valence, internal source), enhancement of positive emotions (positive valence, internal source), to be social with others (positive valence, external source), and—for specific use in the adolescent/high school population—conformity with others (internal valence, external source). These motives have been found to be linked with distinct antecedents and consequences of use among the high school-aged population (e.g., Cooper, 1994; Kuntsche, Knibbe, Gmel, & Engels, 2005, 2006).

Since the development of the DMQ-R, hundreds of studies have evaluated the relationships between motives and drinking-related outcomes. The vast majority of studies have found that, among high school-aged samples and adults, the coping with negative affect motive is associated with the highest rates of problematic outcomes (e.g., Kuntsche et al., 2005; Merrill & Read, 2010; Merrill, Wardell, & Read, 2014). Results regarding other motives for drinking have found that social and enhancement motives are the most commonly-endorsed motives, and are generally less problematic than coping motives (e.g., Kuntsche et al., 2005).

The measurement of motives for marijuana use is less common and has largely been derived from the adaptation of the DMQ-R. Simons and colleagues (Simons, Correia, Carey, & Borsari, 1998) developed the Marijuana Motives Measure (MMM) for use among young adults, which retained the four factors from the DMQ-R and added a factor, expansion of the mind, to account for the psychedelic properties of marijuana. Thus, the MMM utilized subscales of coping, conformity, social, enhancement, and expansion. Findings have been generally consistent with alcohol studies in showing that using to cope is a problematic motive and that coping motives are associated with negative outcomes such as abuse/ dependence symptoms (e.g., Johnson, Mullin, Marshall, Bonn-Miller, & Zvolensky, 2010) and problems resulting from use (e.g., Simons, Gaher, Correia, Hansen, & Christopher, 2005; Buckner, 2013). Among high school-aged individuals, marijuana motives also have been found to predict treatment outcomes (Fox, Towe, Stephens, Walker, & Roffman, 2011) and to change significantly with treatment (Banes, Stephens, Blevins, Walker, & Roffman,

2014), suggesting that they may be ideal targets for interventions designed to reduce problematic use.

Most studies of marijuana motives have utilized normative college-aged populations who are using marijuana at a relatively low rate (e.g., Buckner, 2013; Lee, Neighbors, Hendershot, & Grossbard, 2009; Zvolensky et al., 2007). Further, most of these studies have relied on the MMM adapted from the alcohol literature rather than investigate whether additional motives specific to marijuana may be important. Lee and colleagues (Lee et al., 2009; Lee, Neighbors, & Woods, 2007) developed the Comprehensive Marijuana Motives Questionnaire (CMMQ) from open-ended responses to questions regarding reasons for using marijuana. Their measure, refined through iterative psychometric processes, identified 12 motives for use: enjoyment, conformity, coping, experimentation, boredom, alcohol use, celebration, altered perception, social anxiety, relative low risk, sleep/rest, and availability. The motives of coping, conformity, enjoyment, celebration, and altered perception appear to be the most similar, on face value, to the MMM subscales. They showed that this larger set of motives accounted for more variance in marijuana use than the MMM subscales. Additionally, specific subscales were associated with rates of use and related outcomes. For example, the coping motive was related to marijuana use and marijuana problems. When controlling for frequency of use, using for enjoyment reasons was negatively associated with problems while using to cope with negative affect continued to be positively associated with marijuana problems. The CMMQ provides a promising direction for the study of marijuana motives. However, like the MMM, it was developed and tested in a college population and its utility for predicting patterns of use and negative outcomes in younger samples, among individuals with higher rates of marijuana use, and/or in a population with clinically significant levels of problems has not been studied.

The current study examined the psychometric properties and validity of the CMMQ in a frequent marijuana-using high school student population experiencing significant negative consequences stemming from their use. Confirmation of the factor structure of the CMMQ and its relationship to rates of use, use-related consequences, and self-efficacy for avoiding use were examined to inform the utility of the measure in clinical populations.

2. Methods and Materials

2.1 Study Design

The present study uses baseline data from a randomized controlled trial evaluating the efficacy of supplemental motivational enhancement treatment (MET) "check-ins" aimed at improving marijuana-related outcomes among frequent marijuana-using high school students (Walker, Stephens, Blevins, Banes, Matthews, & Roffman, under review). All procedures were approved by the Institutional Review Boards of the University of Washington and Virginia Tech. Eligible participants who consented to participate (n = 252) completed a baseline assessment before being randomized to one of two treatment conditions. Participants completed follow-up assessments at 6, 9, 12, and 15 months but only baseline data are used in the current paper.

2.2 Participants

Students enrolled in 9th, 10th, and 11th grades were recruited at 6 public high schools in Seattle, Washington. Among the 445 high school students who expressed interest in participating, 182 did not meet eligibility criteria. Reasons for ineligibility included: fewer than 9 days of marijuana use in the past 30 days ($n = 154$; 84.6%), indications of a serious medical or psychiatric condition ($n = 3$; 1.6%), and lack of availability for participation throughout the course of the study either due to potentially moving outside of the region ($n = 27$; 14.8%) or projected graduation from high school before the completion of the intervention phase ($n = 19$; 10.4%). An additional 11 participants were eligible for the study but declined to participate, leaving a final sample of 252 participants enrolled in the study. Participants were primarily male (68%), and fairly ethnically diverse: Caucasian (59%), multiracial (20%), African-American (6%), Asian (4%), other (11%). The mean age within the sample was 15.84 (SD=0.96). Participants were frequent marijuana users, reporting a mean of 37.07 days of use in the previous 60 days (SD=15.05).

2.3 Procedures

Participants learned about the Teen Marijuana Check-Up (TMCU) project via classroom-based *Marijuana Facts and Myths* presentations, lunchtime information tables, high school staff referrals, brochures, and word of mouth. The project was described as an opportunity for marijuana using teens to receive objective feedback on their use. They were told that this was not a treatment project and that they could use the feedback however they wanted. They were informed that participation would involve two initial sessions with a health educator and three check-ins and four follow-up assessments spaced over the subsequent 15 months. Participants earned $15 gift cards for completing each check-in session but no incentives were given for the baseline assessment or the initial two sessions involving MET-based feedback. Participants also could earn $25 for completing each follow-up assessment at 6, 9, 12, and 15 months after baseline and a $40 bonus for completing all three check-ins and four follow-up assessments. Interested students met individually with research staff to complete a brief screening interview. If eligible to participate, informed consent was obtained and the participant completed a computerized baseline assessment with research staff nearby to answer questions. All measures in the current paper were derived from the baseline computerized assessment.

2.4 Measures

2.4.1 Motives—The CMMQ was used to measure marijuana motives (Lee et al., 2009, 2007). The 36-item measure prompts participants to indicate the frequency with which they use marijuana for various reasons using a scale of 1 (Almost never or never) to 5 (Almost always or always). Previous psychometric properties of the 12 subscales revealed acceptable to excellent internal consistency estimates (Cronbach's alphas = .76–.90). Internal consistency reliabilities for the present study (alphas) for the 12 derived subscales are listed in Table 1.

2.4.2 Self-Efficacy—The Situational Self-Efficacy Scale (SSES), modified for a high school sample, was used to measure self-efficacy for avoiding marijuana use in specific

situations (Stephens, Wertz, & Roffman, 1995). Each of the 20 items was rated on a scale of 1 (Not at all confident) to 5 (Very confident). A mean of all items was used to create a total self-efficacy score (α = .93).

2.4.3 Marijuana Use—Marijuana use was measured using items from the Global Appraisal of Individual Needs (GAIN; Dennis, 1998). Participants were asked to report the number of days they used marijuana during the preceding 60 days. The measure demonstrated good reliability and validity and is comparable to other validated use measures (Dennis, Funk, Godley, Godley, & Waldron, 2004).

2.4.4 Marijuana Problems—The Marijuana Problems Index (Johnson & White, 1995) was used to assess negative consequences experienced as a result of marijuana use. The 23-item measure prompts participants to indicate the frequency with which they've experienced problems using a scale of 0 (Never) to 4 (More than 10 times). A sum of the items was used to create a single marijuana problem variable (α = .86).

2.4.5 Internalizing and Externalizing Symptoms—Items from the Global Appraisal of Individual Needs (GAIN; Dennis, 1998) were used to measure internalizing and externalizing symptoms of psychopathology. A total of 33 yes/no questions were used to determine whether participants had experienced a range of symptoms in the preceding 60 days. The internalizing scale was comprised of 17 items (α = .70) and the externalizing scale was comprised of 16 items (α = .81).

3. Results

3.1 Factor Structure and Internal Consistency

A confirmatory factor analysis (CFA) specifying the item-loading pattern for the 12 factors reported by Lee and colleagues was conducted. Results from CFA analyses indicated that items were significantly associated with their respective latent factors, with factor loadings ranging from .46–.92 (see Table 1). In order to determine model fit, several indices were used: chi-square values, degrees of freedom, *p*-values, the Comparative Fit Index (CFI) and the Root Mean Square Error of Approximation (RMSEA). Cut-offs of .05–.10 were used for the RMSEA and .90 to .95 for the CFI, based on previous suggestions by Hu and Bentler (1998, 1999) and Kline (2005). CFA analyses revealed the following fit statistics: χ^2 = 898.08, df = 528, *p* <.01; CFI = .91, RMSEA = .05, *p*=.22. CFI and RMSEA were indicative of adequate to good model fit. The χ^2 statistic was indicative of poor model fit; however, χ^2 statistics are nearly always significant in tests of large sample sizes (Hooper, Coughlan, & Mullen, 2008). Given the relatively robust results from the pattern of factor loadings, CFI, and RMSEA, there appeared to be support for scoring the CMMQ consistent with previous research. Mean subscale scores were computed and named consistent with those reported by Lee and colleagues as listed in Table 1. Coefficient alpha reliabilities revealed fair to good internal consistency for all subscales (see Table 1).

3.2 Utility of Motives Scales

Table 2 contains bivariate correlations between motives subscales and relevant use-related variables. Notably, only Boredom, Altered Perception, Social Anxiety, and Relative Low Risk were correlated with days of marijuana use. In contrast, all subscales except for Altered Perception and Relative Low Risk were significantly positively correlated with marijuana-related problems. All motive scales, with the exception of Experimentation, Alcohol, Altered Perception, and Relative Low Risk, were negatively correlated with self-efficacy for avoiding use. Coping, Boredom, Alcohol, and Availability were correlated with internalizing and externalizing symptoms, while Social Anxiety and Sleep were correlated with internalizing symptoms only.

Table 3 contains results of multiple regression analyses predicting marijuana use and associated variables: days of use, marijuana-related problems, self-efficacy for avoiding use, and emotional and behavioral health risk scores. In the analysis predicting frequency of use, all 12 motives scales were entered simultaneously into the model. Results indicate that the 12 factors accounted for 13.8% of variance in use. Only Alcohol and Sleep subscales were significantly positively associated with frequency of marijuana use.

Analyses predicting marijuana-related problems, self-efficacy, internalizing, and externalizing symptoms were conducted, controlled for frequency of use in order to examine the relationships of motives above and beyond levels of marijuana use (Table 3). In step 1, frequency of use was entered to the equation predicting marijuana problems. Use accounted for 4.0% of variance in problems. In step 2, all 12 motives scales were entered, accounting for 34.4% of variance in use ($F = 9.54$, 12/236 df, $p < .001$). Results revealed that conformity, Coping, and Boredom were associated with marijuana-related problems.

These analyses were repeated predicting self-efficacy, internalizing, and externalizing symptoms as dependent variables. Marijuana use accounted for 2.7% of self-efficacy, while the motives scale accounted or 18.0% ($F = 3.95$, 12/234 df, $p < .001$). Both Coping and Boredom subscales were significantly related to lower self-efficacy for avoiding use. Frequency of use accounted for 1.9% of internalizing symptoms, while motives accounted for 32.8% use ($F = 8.86$, 12/236 df, $p < .001$). Coping, Alcohol, and Availability were associated with higher rates of internalizing symptoms, while Celebration predicted lower internalizing symptoms. Use accounted for 0.4% of externalizing symptoms, while motives accounted for 11.4% use ($F = 2.33$, 12/236 df, $p < .001$). Only Coping was related to higher rates of externalizing above and beyond frequency of use.

4. Discussion and Conclusions

Findings indicated the factor structure of the CMMQ was supported within a heavy marijuana-using adolescent population. Lee and colleagues (2009) developed the CMMQ using an inductive approach in a college student population that used marijuana infrequently: eligibility required only one day of marijuana use over the previous year at the 9-month follow-up and the mean days of use at baseline was less than 10 over the preceding 90 days. The present paper replicated the factor structure in a younger sample with much

greater marijuana use and related psychopathology suggesting its potential utility in clinical populations.

Using to cope with negative affect was more frequently endorsed in this sample of high school students attracted to a project offering feedback on marijuana use than in more normative samples of college students (Lee et al., 2009). Furthermore, the tendency to use to cope was clearly related to symptoms of behavior disorders in both bivariate and multivariate analyses. In particular, using to cope was associated with more marijuana-related problems, lower self-efficacy for avoiding use, and higher rates of internalizing and externalizing symptoms. These results contribute to a growing body of literature suggesting that the coping motive may be particularly problematic (e.g., Buckner, 2013; Fox et al., 2011) including previous research utilizing the CMMQ (Lee et al., 2009). However, the coping motive did not predict marijuana use frequency. Thus, the mechanism by which coping causes more problems is unclear. Using to cope with negative affect may be indicative of a lack of alternative coping skills which may lead to greater negative consequences for equivalent amounts of use (e.g., Blevins, Stephens, Walker, & Roffman, 2014; Merrill & Thomas, 2013). Additional research is needed to elucidate the pathways between coping motives and negative consequences of marijuana use.

The 12 motive subscales generally showed low to moderate intercorrelations, indicating that most of these high school students used for more than one reason. Somewhat surprising were the few modest correlations between motives and frequency of use. Other than using because marijuana was perceived as relatively safe, only using to cope with social anxiety or to help sleep were related to the number of days of marijuana use. It may be that the chronic nature of social anxiety and the daily need to sleep drive the relationship with days of marijuana use relative to motives that are more episodic in nature. In contrast, 9 subscales of the CMMQ were correlated with marijuana problems. However, only using to cope, using to deal with social pressure and using because of boredom showed unique relationships with problems in the multiple regression analyses. Several other scales demonstrated unique relationships to marijuana use and related variables. The alcohol motive was significantly, but weakly, associated with marijuana use frequency and internalizing symptoms suggesting that those experiencing negative affect may be somewhat more likely to use alcohol and marijuana simultaneously. Despite this relationship, the alcohol motive was not associated with greater problems related to marijuana use. The motive of sleep had the strongest association with frequency of use, suggesting that those who use marijuana as a means to sleep may be among the most consistent users, but this consistency of use was not associated with experiencing more problems. These results differ from those of Lee and colleagues (2009) who found that Sleep was positively associated with marijuana-related problems. In contrast to scales which were positively associated with indicators of risky use patterns, using marijuana for celebratory reasons was associated with lower internalizing symptoms; however, this relationship emerged only after controlling for days of marijuana use.

The purpose of this study was to evaluate the factor structure and utility of the CMMQ (Lee et al., 2009) in a younger population of more frequent and more problematic users. Confirmatory factor analyses replicated the published factor structure of the CMMQ showing adequate to good concordance. Consistent with previous research on marijuana and

alcohol, using to cope was associated with patterns of problematic use and was associated with both internalizing and externalizing behavior problems. However, few scales unique to the CMMQ and not encompassed by the MMM added significantly to prediction of negative consequences. There appeared to be few meaningful relationships between motive scales unique to the CMMQ and either negative outcomes of marijuana use or behavior disorders that may promote marijuana use. Scales unique to the CMMQ in comparison with the MMM include: Experimentation, Boredom, Alcohol, Relative Low Risk, Sleep, and Availability. Of these, only Boredom appears to add uniquely to the prediction of problems resulting from marijuana use. Using for sleep or as an adjunct to alcohol use may predict more frequent use, but not enough to add to the prediction offered by using to cope. Thus, for the purposes of intervention in clinical populations the added utility of assessing a wider range of motives is unclear. It may be that other motives are more important in populations of less frequent users because they indicate increased tendencies to use more often and thereby may predict an escalation of use over time that could lead to problems. Such information may better inform prevention rather than intervention efforts. Given the short history of the CMMQ, more research in different types of populations is needed to address these questions.

Several weaknesses of the present study should be acknowledged. First, the CMMQ represents a data-driven, rather than theory-driven, approach to measuring marijuana motives. As such, some of the motives assessed seem more like descriptive reasons for use rather than explanatory motives. For example, using marijuana because it is available or because it is perceived to have low risk may not be representative of a psychological motive for use and may not be an important predictor of problematic outcomes, particularly in a frequent using clinical population. The present study relied on self-reported marijuana use and related consequences. Thus, subsequent research should utilize a collateral measure, such as observer reports or biological verification in order to verify findings with more objective measures. Examination of the CMMQ in other populations may be beneficial to further address its clinical and predictive utility (e.g., in a clinical adult population). Future research may also examine the effects of treatments aimed specifically at altering motives to build a stronger causal argument for the role of motives in problematic use. Nevertheless, the present paper validates the psychometric properties and potential utility of the CMMQ in a heavier, more problematic sample of users and demonstrates the relationships between motive scales and theoretically relevant constructs.

References

Banes KE, Stephens RS, Blevins CE, Walker DD, Roffman RA. Changing motives for use: Outcomes from a cognitive-behavioral intervention for marijuana-dependent adults. Drug and Alcohol Dependence. 2014; 139:41–46. [PubMed: 24685559]

Blevins CE, Stephens RS, Walker DD, Roffman RA. Situational determinants of use and treatment outcomes in marijuana dependent adults. Addictive Behaviors. 2014; 39:546–552. [PubMed: 24321697]

Buckner JD. College cannabis use: The unique roles of social norms, motives, and expectancies. Journal of Studies on Alcohol and Drugs. 2013; 74(5):720–726. [PubMed: 23948531]

Cooper ML. Motivations for alcohol use among adolescents: Development and validation of a four-factor model. Psychological Assessment. 1994; 6(2):117–128.

Cooper ML, Russell M, George WH. Coping, expectancies, and alcohol abuse: A test of social learning formulations. Journal of Abnormal Psychology. 1988; 97(2):218–230. [PubMed: 3385075]

Cooper ML, Russell M, Skinner JB, Windle M. Development and validation of a three-dimensional measure of drinking motives. Psychological Assessment. 1992; 4(2):123–132.

Cox WM, Klinger E. A motivational model of alcohol use. Journal of Abnormal Psychology. 1988; 97(2):168–180. [PubMed: 3290306]

Dennis, ML. Global Appraisal of Individual Needs (GAIN) manual: Administration, scoring and interpretation. Bloomington, IL: Lighthouse Publications; 1998.

Dennis ML, Funk R, Godley SH, Godley MD, Waldron H. Cross-validation of the alcohol and cannabis use measures in the Global Appraisal of Individual Needs (GAIN) 113 and Timeline Followback (TLFB; Form 90) among adolescents in substance abuse treatment. Addiction. 2004; 99(Suppl. 2):120–128. [PubMed: 15488110]

Fergusson DM, Horwood LJ, Swain-Campbell N. Cannabis use and psychosocial adjustment in adolescence and young adulthood. Addiction (Abingdon, England). 2002; 97(9):1123–1135. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/12199828.

Fox CL, Towe SL, Stephens RS, Walker DD, Roffman RA. Motives for cannabis use in high-risk adolescent users. Psychology of Addictive Behaviors. 2011; 25(3):492–500. http://doi.org/10.1037/a0024331. [PubMed: 21688873]

Hooper D, Coughlan J, Mullen M. Structural equation modeling: guidelines for determining model fit. Electronic Journal of Business Research Methods. 2008; 6(1):53–60.

Hu L, Bentler PM. Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. Psychological Methods. 1998; 3(4):424.

Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling: A Multidisciplinary Journal. 1999; 6(1):1–55.

Johnson K, Mullin JL, Marshall EC, Bonn-Miller MO, Zvolensky M. Exploring the mediational role of coping motives for marijuana use in terms of the relation between anxiety sensitivity and marijuana dependence. The American Journal on Addictions. 2010; 19(3):277–282. [PubMed: 20525036]

Johnson V, White HR. The relationship between work-specific and generalized stress and alcohol and marijuana use among recent entrants to the labor force. Journal of Drug Issues. 1995; 25(2):237–251.

Kline, R. Principles and practice of structural equation modeling. 2nd. New York, NY: Guilford Press; 2005.

Kuntsche E, Knibbe R, Gmel G, Engels R. Why do young people drink? A review of drinking motives. Clinical Psychology Review. 2005; 25(7):841–861. http://doi.org/10.1016/j.cpr.2005.06.002. [PubMed: 16095785]

Kuntsche E, Knibbe R, Gmel G, Engels R. Who drinks and why? A review of sociodemographic, personality, and contextual issues behind the drinking motives in young people. Addictive Behaviors. 2006; 31(10):1844–1857. http://doi.org/10.1016/j.addbeh.2005.12.028. [PubMed: 16460883]

Lee CM, Neighbors C, Hendershot CS, Grossbard JR. Development and preliminary validation of a comprehensive marijuana motives questionnaire. Journal of Studies on Alcohol and Drugs. 2009; 70(2):279–287. [PubMed: 19261240]

Lee CM, Neighbors C, Woods BA. Marijuana motives: Young adults' reasons for using marijuana. Addictive Behaviors. 2007; 32(7):1384–1394. http://doi.org/http://dx.doi.org/10.1016/j.addbeh.2006.09.010. [PubMed: 17097817]

Meier MH, Caspi A, Ambler A, Harrington H, Houts R, Keefe RSE, Moffitt TE. Persistent cannabis users show neuropsychological decline from childhood to midlife. Proceedings of the National Academy of Sciences. 2012 http://doi.org/10.1073/pnas.1206820109.

Merrill JE, Read JP. Motivational pathways to unique types of alcohol consequences. Psychology of Addictive Behaviors. 2010; 24(4):705–711. http://doi.org/10.1037/a0020135. [PubMed: 20822194]

Merrill JE, Thomas SE. Interactions between adaptive coping and drinking to cope in predicting naturalistic drinking and drinking following a lab-based psychosocial stressor. Addictive

Behaviors. 2013; 38(3):1672–1678. http://doi.org/10.1016/j.addbeh.2012.10.003. [PubMed: 23254217]

Merrill JE, Wardell JD, Read JP. Drinking motives in the prospective prediction of unique alcohol-related consequences in college students. Journal of Studies on Alcohol and Drugs. 2014; 75:93–102. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/24411801. [PubMed: 24411801]

Silins E, Horwood LJ, Patton GC, Fergusson DM, Olsson Ca, Hutchinson DM, Mattick RP. Young adult sequelae of adolescent cannabis use: an integrative analysis. The Lancet Psychiatry. 2014; 1(4):286–293. http://doi.org/10.1016/S2215-0366(14)70307-4. [PubMed: 26360862]

Simons J, Correia CJ, Carey KB, Borsari BE. Validating a five-factor marijuana motives measure: Relations with use, problems, and alcohol motives. Journal of Counseling Psychology. 1998; 45(3):265–273. http://doi.org/10.1037/0022-0167.45.3.265.

Simons JS, Gaher RM, Correia CJ, Hansen CL, Christopher MS. An affective-motivational model of marijuana and alcohol problems among college students. Psychology of Addictive Behaviors. 2005; 19(3):326–334. [PubMed: 16187813]

Stephens RS, Wertz JS, Roffman Ra. Self-efficacy and marijuana cessation: a construct validity analysis. Journal of Consulting and Clinical Psychology. 1995; 63(6):1022–1031. [PubMed: 8543705]

Substance Abuse and Mental Heath Services Administration. The National Survey on Drug Use and Health 2013. Rockville, MD: 2014.

Walker DD, Stephens RS, Blevins CE, Banes KE, Matthews L, Roffman RA. Augmenting brief interventions for adolescent marijuana users: The impact of motivational check-ins. (n.d.).

Winters KC, Stinchfield RD, Latimer WW, Stone A. Internalizing and externalizing behaviors and their association with the treatment of adolescents with substance use disorder. Journal of Substance Abuse Treatment. 2008; 35(3):269–278. http://doi.org/10.1016/j.jsat.2007.11.002. [PubMed: 18328664]

Zvolensky MJ, Vujanovic AA, Bernstein A, Bonn-Miller MO, Marshall EC, Leyro TM. Marijuana use motives: A confirmatory test and evaluation among young adult marijuana users. Addictive Behaviors. 2007; 32(12):3122–3130. http://doi.org/10.1016/j.addbeh.2007.06.010. [PubMed: 17602842]

Highlights

- The factor structure of the Comprehensive Marijuana Motives Questionnaire (CMMQ) was replicated in a heavier-using population

- Using to cope was associated with negative outcomes, including more use-related problems, internalizing and externalizing symptoms, and lower self-efficacy

- Total motives had robust relationships with use and negative use-related consequences

- The CMMQ appears to have more preventative utility than treatment utility

Table 1

Item Factor Loadings and Subscale Reliabilities

Motive	Reliability	Factor loading
Enjoyment	0.79	
To enjoy the effects of it		0.87
Because it is fun		0.72
To feel good		0.68
Conformity	0.66	
Because you felt pressure from others who do it		0.78
Because you didn't want to be the only one not doing it		0.63
To be cool		0.51
Coping	0.85	
To forget your problems		0.86
Because you were depressed		0.77
To escape from your life		0.83
Experimentation	0.76	
Because you were experimenting		0.70
Because you were curious about marijuana		0.71
To see what it felt like		0.74
Boredom	0.82	
Because you had nothing better to do		0.84
To relieve boredom		0.68
Because you wanted something to do		0.81
Alcohol	0.77	
Because you were drunk		0.93
Because you were under the influence of alcohol		0.72
Because you had gotten drunk and weren't thinking about what you were doing		0.59
Celebration	0.88	
To celebrate		0.86
Because it was a special day		0.81
Because it was a special occasion		0.85
Altered Perceptions	0.86	
Because you want to alter your perspective		0.83
To allow you to think differently		0.79
So you can look at the world differently		0.85
Social Anxiety	0.76	
Because it makes you more comfortable in an unfamiliar situation		0.75
To make you feel more confident		0.56
Because it relaxes you when you are in an insecure situation		0.83
Relative Low Risk	0.71	
Because it is safer than drinking alcohol		0.61
Because it is not a dangerous drug		0.85

Motive	Reliability	Factor loading
Because there are low health risks		0.56
Sleep	0.85	
To help you sleep		0.92
Because it helps make napping easier and enjoyable		0.67
Because you are having problems sleeping		0.85
Availability	0.69	
Because it is readily available		0.69
Because you can get it for free		0.46
Because it is there		0.82

Table 2

Means and Bivariate Correlations Between Motives Scales, Marijuana Use and Related Variables

	Mean(SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Enjoyment	4.00(.98)	-																
2. Conformity	1.16(.39)	.01	-															
3. Coping	1.95(1.07)	.01	.23**	-														
4. Experimentation	1.44(.70)	.10	.44**	.34**	-													
5. Boredom	2.45(1.04)	.25**	.26**	.20**	.29**	-												
6. Alcohol	1.43(.64)	.02	.13*	.07	.10	.13*	-											
7. Celebration	2.51(1.05)	.29**	.28**	.31**	.39**	.34**	.18**	-										
8. Alt. Perception	2.48(1.17)	.37**	.07	.17**	.17**	.12	.02	.20**	-									
9. Social Anxiety	2.11(1.02)	.19**	.16*	.45**	.37**	.29**	.12	.40**	.37**	-								
10. Rel. Low Risk	2.54(1.20)	.31**	.02	.18**	.22**	.23**	.03	.23**	.28**	.33**	-							
11. Sleep	2.56(1.22)	.20**	.07	.29**	.15*	.27**	.03	.29**	.27**	.44**	.33**	-						
12. Availability	2.82(1.05)	.12	.20**	.24**	.20**	.52**	.26**	.37**	.14*	.30**	.15*	.24**	-					
13. Days of Use	37.07(15.06)	.09	-.02	.12	.01	.12	.15*	.03	.10	.19**	.19**	.28**	.05	-				
14. Problems	1.61(.45)	.10	.31**	.49**	.27**	.31**	.16*	.26**	.09	.33**	.12	.22**	.26**	.20**	-			
15. Self-Efficacy	4.34(1.42)	-.14*	-.13*	-.31**	-.11	-.28**	-.05	-.17**	-.05	-.24**	-.08	-.16*	-.15*	-.17**	-.31**	-		
16. Internalizing	4.93(4.14)	-.08	.09	.47**	.09	.19**	.24**	.06	.08	.24**	.03	.17*	.29**	.14*	.45**	-.24**	-	
17. Externalizing	5.94(3.52)	.06	-.02	.26**	.02	.15*	.14*	.09	.06	.11	.01	.05	.19*	.07	.47**	-.24**	.46**	-

**
P-values indicate significance at the 0.01 level (2-tailed).

*
P-values indicate significance at the 0.05 level (2-tailed).

Table 3

Standardized Regression Coefficients for Motives Predicting Marijuana Use and Related Variables

	Days of Marijuana Use	Marijuana Problems	Self-Efficacy	Internalizing	Externalizing
Days of Marijuana Use	—	4.0**	2.7**	1.9*	.04
Enjoyment	.02	.07	-.10	-.09	.05
Conformity	-.03	.17**	-.06	-.03	-.05
Coping	.04	.38**	-.26**	.46**	.27**
Experimentation	-.05	.00	.09	-.07	-.09
Boredom	.07	.13*	-.21**	.08	.09
Alcohol	.18**	.06	-.01	.18**	.11
Celebration	-.11	-.01	.00	-.16*	-.02
Altered Perception	.00	-.06	.08	.04	.02
Social Anxiety	.09	.08	-.12	.03	-.00
Relative Low Risk	.11	-.05	.05	-.07	-.05
Sleep	.23**	.00	.01	.03	-.06
Availability	-.09	.03	.06	.16*	.09
R^2 (%)	13.8**	34.4**	18.0**	32.8**	11.4**

Note: analyses of problems, self-efficacy, internalizing, and externalizing symptoms statistically controlled for frequency of use

**
P-values indicate significance at the 0.01 level (2-tailed).

*
P-values indicate significance at the 0.05 level (2-tailed).