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Changing Motives for Use: Outcomes from a Cognitive-Behavioral Intervention for Marijuana-Dependent Adults

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Abstract

Background—Motives for use have been identified as important predictors of substance use and related problems; however, little is known about how motives for use change following an intervention and how this change may impact future substance use behaviors. The present study sought to describe change in motives following an intervention for marijuana-dependent adults. Furthermore, investigators examined change in motives as a predictor of treatment outcome.

Method—The study randomized 74 adults to one of two conditions: both of which received 9-session base treatment of cognitive behavioral therapy and motivational enhancement therapy and had access to additional sessions of cognitive behavioral treatment on an as needed basis. The experimental condition received two additional “check-ups” during the course of follow-up.

Results—Significant decreases in reported frequency of motives used were observed following treatment. Changes in Expansion and Coping were associated with differential treatment outcomes. Decreases in Expansion were associated with poorer treatment outcome, while decreases in Coping were associated with better treatment outcome.

Conclusions—The relationship between expansion motives and outcomes was paradoxical. Although there were some inconsistencies in the findings, the results regarding the coping motive were consistent with hypotheses and may have important implications for treatment.

Keywords

Motives; Cognitive Behavioral Therapy; Motivational Enhancement Therapy; Marijuana; Cannabis; Treatment Outcomes

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Conflict of Interest No conflict declared

1. INTRODUCTION

Cox and Klinger's (1988) model posits that individuals use substances to achieve desired outcomes and that these desires represent proximal determinants of substance use behaviors. Motives for use are based on previous experiences with a substance as well as expectancies regarding the future effects of the substance. The majority of studies examining motives have utilized general populations of substance users, and few have examined motives using a clinical sample. Furthermore, little is known about changes in motives, particularly among those with substance use disorders in treatment. Knowledge of how motives may change as a function of treatment may inform treatment development, particularly if such change is predictive of treatment outcomes.

Cooper (1994) categorized motives for alcohol use based on valence (positive or negative) and source (internal or external). The resulting Drinking Motives Questionnaire-Revised (DMQ-R) had four distinct motives for use: enhancement of positive emotions (*Enhancement*; positive valence, internal source), coping with negative emotions (*Coping*; negative valence, internal source), conformity with others (*Conformity*; negative valence, external source), and increasing social experience (*Social*; positive valence, external source). Motives for alcohol use have been found to have unique profiles of antecedents and consequences of use. For example, individuals who endorse social drinking motives are more likely to drink infrequently and have few problems associated with use (Cooper, 1994).

To examine marijuana-specific motives, Simons and colleagues (1998) adapted the DMQ-R. In addition to the four original motives measured by the DMQ-R, the Marijuana Motives Measure (MMM) added items to capture a motive more unique to cannabis use, namely the expansion of perceptual and cognitive experiences (*Expansion*). Expansion arises from knowledge and expectancies of the psychedelic properties of the drug. The MMM was originally validated for, and has been primarily used with, a non-treatment population of adolescents and college students (Johnson et al., 2010; Simons et al., 2005; Zvolensky et al., 2007).

Among alcohol and cannabis users alike, the most frequently endorsed motives are to be more social or for enhancement of enjoyable experiences (Simons et al., 2000). Using to cope with negative affect is one of the less common motives for use but is associated with the most problematic use. Studies of alcohol and marijuana users have found that individuals who use substances to cope with negative emotions report more negative consequences (i.e., a higher frequency of use, more problems related to use, abuse/dependence symptoms) than individuals who endorse other motives (e.g., Bonn-Miller et al., 2007; Cooper, et al., 1988; Cooper, 1994; Neighbors et al., 2007).

A few studies have examined motives in the context of substance use disorder treatment. Galen and colleagues (2001) assessed drinking motives among veterans in an inpatient substance use program and found that both coping and enhancement motives directly predicted frequency of use and substance-related problems. In a study of the effect of brief, school-based Motivational Enhancement Therapy (MET) intervention for frequent

marijuana-using adolescents, Fox and colleagues found that endorsement of the coping motive was associated with a greater number of marijuana dependence symptoms and marijuana-related problems (Fox et al., 2011). These results suggest that effective treatments for substance use disorders should decrease coping motives, by both decreasing maladaptive coping strategies and increasing adaptive coping strategies.

While it is possible that treatment may change motives, it is generally assumed that motives for use remain stable in adulthood. A number of studies have, however, demonstrated change in motives, by examining them longitudinally among adolescent and young adult samples. Across such studies, researchers found that motives changed in a pattern that mimicked change in substance use and related problems (Cooper et al., 2008; Littlefield et al., 2010; Sher et al., 2004). Despite these prior investigations indicating that motives do indeed change, studies examining motive change in clinical populations following treatment are apparently absent from the literature. Theoretically, interventions that directly target antecedents to drug use, such as cognitive-behavioral therapy (CBT), may affect motives for use by identifying situations and internal states that trigger use (e.g., Marlatt and Gordon, 1985). Learning new coping skills for such situations may alleviate the motive for drug use. Thus, studies examining change in motives following treatment may elucidate one pathway of treatment effects. The present paper used data from a randomized, controlled treatment study for marijuana-dependent adults to examine the relationship of marijuana motives to treatment outcomes and to further examine change in motives and the relationship between motive change and treatment outcome. Consistent with previous motives literature using clinical samples, it was expected that baseline coping motives would be associated with poorer treatment outcomes. It was also hypothesized that motives, particularly coping motives, would be reduced following treatment and that greater reductions in coping motives would be associated with greater reductions in marijuana use and related consequences following treatment.

2. METHOD

2.1 Study Design

The parent treatment trial was designed to evaluate incremental effectiveness of adding post-treatment check-ups to a combination Motivational Enhancement Therapy (MET) and Cognitive Behavioral Therapy (CBT) treatment for marijuana-dependent adults. Procedures were approved by institutional review boards at the University of Washington and Virginia Tech. Participants (N=74) were randomly assigned to either the check-up condition (MCU; N=37) or a comparison condition without check-ups (COMP; N=37). Both conditions received 9-sessions of a combination treatment of MET and CBT. Participants were able to schedule additional CBT sessions on an as-needed basis following the initial 9-sessions. The MCU condition participants received two additional MET “check-up” sessions after the completion of initial treatment that were intended to address ongoing motivation for change and re-engage participants in CBT as needed. Participants were assessed at baseline and at follow-up assessments 3 months and 9 months after baseline.

2.2 Participants

Of the 224 individuals screened for eligibility, 75 met final eligibility criteria and consented to participate in the study. A total of 98 individuals were ineligible due to the following: not being dependent on marijuana (n=45), being dependent on alcohol or other drugs (n=38), recent participation in other substance treatment programs (n=34), lacking residential stability or access to transportation (n=19), living with someone already enrolled in the project (n=2), evidencing current psychosis (n=1), and being a minor (n=1). An additional 51 individuals met eligibility criteria but declined further study participation. One participant was derandomized due to a clerical error which caused the participant to receive the incorrect treatment for his or her condition, resulting in a final sample size of 74. Participants ranged in age from 18 to 66 (mean = 37.73; SD=12.08) and were frequent marijuana users, smoking an average of 6.14 days per week during the 90 days prior to baseline. The sample was predominantly male (66%) and Caucasian (78%).

2.3 Measures

2.3.1 Marijuana Use—An interviewer-administered Timeline Follow-Back (TLFB; Sobell and Sobell, 1992) assessed days of any marijuana use. The TLFB was administered at the initial baseline session and at each subsequent follow-up. Frequency of marijuana use was calculated by taking the percent days of marijuana use of the 90 days preceding the assessments.

2.3.2 Motives—Motives for marijuana use were assessed using the MMM (Simons et al., 1998), a 25-item scale with five subscales: Coping, Social, Enhancement, Expansion, and Conformity. Each item was rated on a five-point scale of 1 (never or almost never) to 5 (always or almost always) indicating how often the individual used for that reason. At follow-up, participants who abstained from marijuana during the entire follow-up window (5 participants at 3-months and 7 participants at 9-months) were instructed to choose 1 (never or almost never) for each item. Cronbach alpha reliabilities were generally good to excellent (Enhancement $\alpha=.79$, Coping=.84, Social $\alpha=.89$, Expansion=.93). However, the Conformity subscale exhibited considerably lower reliability ($\alpha=.58$). Internal consistency was similar at follow-up assessments, ranging from .65 to .92 across time points.

2.3.3 Marijuana Problems—The Marijuana Problems Scale (MPS) measures problems commonly associated with marijuana use (Stephens et al., 2000). The MPS assesses 19 negative consequences of use experienced over the past 90 days. Items endorsed as either a minor or major problem were counted to create a score of total problems. Alpha reliabilities were estimated at .87 at baseline and .94 at both follow-ups.

2.3.4. Marijuana Dependence Symptoms—The Structured Clinical Interview for DSM-IV (SCID-I; First et al., 1996) was utilized at baseline and all follow-up assessments to assess dependence symptoms. The SCID-I assesses for seven symptoms of marijuana dependence. A dependence symptom score was calculated by counting the number of items coded as above threshold.

2.4 Procedure

Adult marijuana users were recruited from the Seattle, Washington metropolitan area using newspaper and radio advertisements offering treatment for marijuana use. After providing verbal consent to participate, interested participants were screened for eligibility criteria via phone and then invited to complete a baseline interview to determine final eligibility. At baseline, participants gave formal, written consent and completed an assessment (also conducted at follow-up assessments) consisting of selected modules of the SCID, a TLFB, and several self-report questionnaires including the MMM. Eligible participants who consented to participate were randomized to conditions, both of which received the standard treatment over 3 months and had access to weekly optional CBT sessions for 9 months. The “check-up” sessions for the MCU condition occurred 4 and 7 months following baseline. Check-up sessions consisted of completing a brief computerized assessment and then receiving feedback within the context of a MET session. Sessions were designed to promote change in marijuana use and increase motivation for participation in optional, as-needed, in-person CBT sessions.

3. RESULTS

3.1 Preliminary Analyses

One participant was excluded at baseline due to incomplete data on the MMM, resulting in a baseline sample of 73. Nine of these 73 participants did not attend the 3-month follow-up and one had incomplete motives data, resulting in 14% missing data at 3-months. At the 9-month follow-up, 10 participants did not attend, while two participants had incomplete motives data, resulting in 12 participants (16%) with missing data at the final timepoint. Although attrition was predicted by condition (participants in the MCU condition were more likely to attend follow-up sessions than individuals in the COMP condition), there were no differences at baseline between attriters and non-attriters on any variables used in the present analyses. Additionally, there were no baseline differences in any variables of interest when considering the interaction between attrition status and condition. Because data is not systematically missing on variables included in this paper, listwise deletion was used in presented analyses. After listwise deletion, the effective sample size was 63 at 3-months and 61 at 9-months.

Independent variables were generally positively skewed at baseline and negatively skewed at 3 months. Dependent variables exhibited the opposite pattern (negatively skewed at baseline, positively skewed at follow-up). Transformations were conducted to reduce skew and analyses were run with both transformed and original data. Because the same relationships between variables were obtained using the transformed and original data, the original data is presented here in order to aid interpretation of relationships between variables. Motives scales were moderately intercorrelated (range of .27 to .64). Therefore, variance inflation factors were examined in regression models employing multiple motive scales and the risk of multicollinearity was determined to be minimal.

To test the effectiveness of randomization, Analysis of Variance (ANOVA) was used to examine differences between conditions on baseline variables. There were no significant

differences at baseline between conditions on motives scales or other baseline variables included in this paper. Furthermore, in repeated measures analyses of change in motives, there were no significant time by condition interactions for any of the motives scales. As such, data were collapsed across conditions in the present analyses.

3.2 Motive Change

Means and standard deviations for motive scales and marijuana-use related variables at baseline and follow-ups are presented in Table 1. Enhancement was the most commonly endorsed motive, whereas Conformity was the least endorsed across assessment points. Repeated-measures ANOVAs examined whether motives changed significantly following treatment (see Table 1). Participants indicated a reduction in all motives, with the exception of Conformity at the 3-month follow-up. The Coping, Social, and Enhancement scales were associated with the largest magnitude changes, while Conformity and Expansion were associated with smaller changes.

3.3 Associations with Treatment Outcomes

3.3.1 Motives at Baseline—In order to examine whether baseline motives predicted change in marijuana use and related outcomes at follow-up, follow-up marijuana use variables were regressed simultaneously on all five baseline motive scales after controlling for the corresponding marijuana variable at baseline. The results of these analyses are presented in Table 2. With the exception of the Expansion scale, which was associated with a significant increase in dependence symptoms at the 3 and 9-month follow-up assessments, baseline motives did not predict change in marijuana use frequency, dependence symptoms, or problems. Additional analyses controlled for baseline frequency of use when predicting dependence symptoms and problems at follow-up and yielded similar results. Only the relationship between Expansion and dependence symptoms was significant at both 3-months ($\beta = .27$, $t(62) = 2.07$, $p = .04$) and 9-months ($\beta = .44$, $t(60) = 3.36$, $p < .01$).

3.3.2 Change in Motives from Baseline to 3-Months—In order to examine whether change in particular motives was associated with marijuana use outcomes, raw change scores were calculated by subtracting each motives scale at baseline from the corresponding motives scale at follow-up. Thus, smaller values indicated greater reductions in the motive between time points and larger values indicated either less reduction or possible increases in the motive.

We first examined whether change in motives between baseline and 3-months predicted change in outcomes by regressing each outcome variable at each follow-up onto all five motive change scores simultaneously after controlling for the corresponding baseline marijuana use variable. (see Model 1 in Table 3). Change in motive scales was not significantly associated with change frequency of use at follow-up. Change in Expansion between baseline and 3-months was the only motive with relationships to change in marijuana dependence symptoms and problems. Increases or relatively smaller reductions in Expansion between baseline and 3-month follow-up were associated with reduced dependence symptoms and problems at follow-up. Again, adding change in frequency of use to the models predicting dependence symptoms and problems yielded similar findings with

only change in Expansion significantly predicting outcomes at 3-months (Dependence symptoms $\beta = -.29$, $t(62) = -2.60$, $p = .01$; Problems $\beta = -.24$, $t(62) = -2.46$, $p = .02$) and 9-months (Dependence symptoms $\beta = -.39$, $t(60) = -3.80$, $p < .01$; Problems $\beta = -.31$, $t(60) = -2.59$, $p = .01$).

3.3.3 Change in Motives from Baseline to 9-Months—Model 2 in Table 3 displays the regression coefficients for change in motives between baseline and 9 months as predictors of outcomes at 9 months, controlling for the criterion variable at baseline. Again, higher Expansion change scores were associated with reduced symptoms of dependence and problems at the 9-month follow-up. The relationship between change in Expansion and dependence symptoms remained after controlling for change in frequency of marijuana use between baseline and 9-months ($B = -.32$, $t(60) = -2.60$, $p = .01$); however, the relationship between Expansion and problems was no longer significant ($B = -.20$, $t(60) = -1.65$, $p = .10$).

In addition, change in the Coping motive had a significantly positive relationship to outcomes such that greater reductions in using to cope between baseline and 9 months were associated with significant decreases in marijuana use frequency, dependence symptoms, and problems. After controlling for change in frequency of marijuana use between baseline and 9-months, the relationship between Coping and dependence symptoms was no longer significant ($B = .19$, $t(60) = 1.23$, $p = .22$), but the relationship between coping and marijuana-related problems remained significant ($B = .31$, $t(60) = 2.06$, $p = .04$).

3.3.4 Relationships with Treatment Utilization—In order to explore whether changes in motives during the follow-up period were related to utilization of the optional CBT treatment sessions, correlations between the number of optional sessions utilized and the motives changes scores were examined. There were no significant relationships between CBT utilization and motives change scores at either 3-months or 9-months.

4. DISCUSSION

The present paper provides an examination of motives for marijuana use and change in motives following treatment for marijuana dependence. Endorsements of all motives decreased significantly following treatment, with the exception of the Conformity scale. Baseline motives generally did not predict post-treatment outcomes with the exception of the expansion motive. Changes in motives were, however, predictive of outcomes in expected and unexpected ways. Reductions in the coping motive were associated with better treatment outcome whereas reductions in the expansion motive were associated with poorer treatment outcome.

The findings that baseline motives generally did not predict marijuana outcomes were somewhat inconsistent with previous literature (e.g., Bonn-Miller et al., 2007; Neighbors et al., 2007; Zvolensky et al., 2007). This lack of prediction was most surprising for the coping motive assessed at baseline, which was associated with outcomes in another marijuana treatment study (Fox et al., 2011). It is possible that the lack of replication may be attributed to differences in sample, as the present study included adult users all of whom met criteria

for dependence, whereas Fox and colleagues utilized a less severe sample of adolescent marijuana users. Furthermore, the participants in the present study received a 9-session intervention more likely to effect changes in motives, use, and related problems that rendered baseline motives less relevant to behavior at follow-up.

Reductions in all motives were observed following treatment and throughout the 9-month follow-up period. These changes in motives are notable given that the sample consisted exclusively of marijuana-dependent adults who might be expected to be more resistant to change (Cooper et al., 2008; Littlefield et al., 2010; Sher et al., 2004). However, participation in treatments of the type studied here are known to reduce frequency of use and associated problems (e.g., Stephens et al., 2004; Marijuana Treatment Project Research Group, 2004) and change in motives may partially mediate the effects of treatment.

Notably, changes in coping and expansion motives were associated with differential treatment outcomes. Further, these relationships generally remained significant when controlling for frequency of use, indicating that specific types of motives convey information beyond overall level of use. Consistent with hypotheses, decreases in using to cope with negative affect from baseline to the 9-month follow-up were uniquely associated with decreased marijuana use and related pathology. Although the relationship between change in coping and dependence symptoms at 9 months was no longer significant after controlling for change in marijuana use, the finding would be consistent with a model in which changes in frequency of use may mediate the relationship between coping motives and outcomes.

It is unclear why similar relationships between changes in the coping motive and marijuana outcomes were not observed at the 3 month follow-up. Inspection of means in Table 1 indicates additional reduction in the coping motive scale between 3 and 9 months, whereas frequency of marijuana use is relatively stable or increasing during the same period. Thus, it seems likely that changes in the coping motive after 3-months explain the differential prediction of 3 and 9-month outcomes. The mechanisms fostering continued change in motives between 3 and 9 months are unclear as motives were not significantly associated with optional CBT session utilization. Some participants may have gained additional coping skills through participating in CBT sessions following treatment or may have continued to change on their own by utilizing skills learned during the initial treatment. Understanding why this effect was delayed and whether it was related specifically to treatment is not possible given the design of the present study. All participants received a 9-session intervention demonstrated to reduce marijuana related outcomes in previous trials and thus it is not possible to link treatment directly to change in motives.

In contrast to the hypothesized findings for the coping motive, the findings for the expansion motive were paradoxical. Measured at baseline, frequently endorsed expansion motives were associated with greater symptoms of dependence at follow-up. Similarly, Expansion motives have been positively associated with frequency of use in other studies (Bonn-Miller et al., 2007; Chabrol et al., 2005; Simons et al., 2000), but the results were not replicated in at least one (Zvolensky et al., 2007). However, the observed decrease in expansion motives from pre- to post-treatment was unexpectedly associated with an increase in marijuana

dependence symptoms and marijuana-associated problems at follow-up, yet showed no relationship to frequency of use. It is possible that marijuana users who reduce their use may continue using for expansion purposes in ways that are not as pathological. Alternatively, users who report higher level of expansion motives following treatment may interpret their use as less problematic given that dependence symptoms and marijuana-related problems are more subjective and subject to the bias of the reporter. Additionally, when change between baseline and 9-months was considered, change in expansion motives was no longer a significant predictor of problems after controlling for change in frequency of use between baseline and the last follow-up. Therefore, it should be noted that at least some of the relationship between change in expansion motives and treatment outcome may be explained by concurrent change in use. Replication and explication of these findings are needed.

There are several limitations of the present study. First, the DMQ-R and MMM were developed in adolescent and young adult populations of users who varied in level of use and, thus, may not adequately capture all relevant motives for this clinical sample of dependent users. In particular, the motive of conformity seems to be less relevant to this sample of heavy marijuana using adults, as evidenced by low reliability and low endorsement. Second, current motives measures operationalize motives by asking participants to indicate how *often* they use marijuana for various reasons. Thus, individuals who use a substance more frequently may be more likely to endorse higher levels of all motives. This covariance between frequency of use and rate of endorsement for items on the DMQ-R and MMM (particularly the coping and/or enhancement motives) has been observed in various studies (Bonn-Miller et al., 2007; Kuntsche et al., 2008; Zvolensky et al., 2007). As such, the measure is likely to conflate frequency of use with motives for use, making it difficult to determine whether changes in motives reflect changes to specific motivational drives rather than general levels of use. Further, the measure may not be meaningful for current abstainers who by one definition have no current motives. Quantifying motives with methods that do not rely on frequency of use may help elucidate effects of motives and motives change, independent of patterns of use. However, it is noteworthy that most results in the present study remained significant after controlling for frequency of use.

Attrition at follow-up and the use of listwise deletion of missing data in analyses may have biased results and limited the generalizability of the findings. The computation of change scores necessitated that only participants with complete data were used. However, there was no evidence that attrition was systematically related to the variables studied in this paper.

An additional limitation results from the design of the parent trial, which randomized participants to two active treatment conditions, both of which received MET and CBT treatment. A design in which participants were randomized to either a CBT condition or to a no-treatment control or non-CBT comparison condition would improve the ability to make causal attributions that the observed changes in motives were a result of treatment participation. Such a design would allow a clearer test of the hypothesis that changes in motives at least partially mediates the effect of treatment on outcome. Future studies should also include a measure of negative affect in order to determine whether relationships between outcomes and changes in coping motive are due to reductions in negative affect following treatment. Nevertheless, this study contributes to the literature by showing that

motives for marijuana use change following treatment and that these changes are associated with outcomes following treatment. As such, the results support further developing treatments that target motives for use.

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Table 1

Means and Standard Deviations of Motives Scales and Marijuana Use Variables

	Baseline (n=73)	3-Months (n=63)	9-Months (n=61)
Motives			
Coping	2.91 (1.06)	2.61 (1.13)**	2.22 (1.09)**
Conformity	1.29 (.44)	1.25 (.44)	1.14 (.23)*
Expansion	2.17 (1.16)	1.99 (1.02)*	1.71 (.87)**
Social	2.64 (1.10)	2.31 (1.15)*	2.31(1.15)**
Enhancement	3.72 (.85)	3.46 (1.07)*	3.09 (1.23)**
Marijuana Use Variables			
% Days Marijuana	.88 (.17)	.39 (.36)**	.45 (.37)**
Dependence Symptoms	5.78 (1.16)	3.34 (2.36)**	3.33 (2.58)**
Marijuana Problems	10.12 (4.00)	5.58 (5.06)**	5.98 (5.24)**

Note: Asterisks represent significant change in variable from baseline to follow-up

**
p<.01,*
p<.05

Table 2

Change in Marijuana Use and Consequences Regressed onto Baseline Motives

Baseline Predictor	3-Months (n=63)			9-Months (n=61)		
	% Days Marijuana	Dependence Symptoms	Marijuana Problems	% Days Marijuana	Dependence Symptoms	Marijuana Problems
Criterion	.41**	.18	.44**	.27*	.29*	.45**
Coping	-.13	.08	.15	-.23	-.03	.02
Conformity	.08	-.14	-.03	-.04	-.17	-.15
Expansion	.14	.30*	.16	.28	.50**	.23
Social	-.05	.06	.09	-.05	-.01	.10
Enhancement	.07	-.04	.01	.06	.03	.09

Note: Criterion= corresponding outcome variable (% days marijuana, dependence symptoms, marijuana problems) measured at baseline.

**

p<.01,

*

p<.05

Table 3

Change in Marijuana Use and Consequences Regressed onto Change in Motives

Model 1 Baseline to 3-Month	3-Months (n=63)			9-Months (n=61)		
	% Days Marijuana	Dependence Symptoms	Marijuana Problems	% Days Marijuana	Dependence Symptoms	Marijuana Problems
Baseline Criterion	.36**	.22	.56**	.21	.32**	.40**
Coping	.03	-.07	-.16	.17	-.03	.04
Conformity	-.16	-.06	.03	-.05	.10	.11
Expansion	-.18	-.34*	-.31*	-.20	-.45**	-.34**
Social	.08	.15	.09	.05	.14	-.11
Enhancement	.13	.08	.04	.06	.07	.03
Model 2 Baseline to 9-Month						
	% Days Marijuana	Dependence Symptoms	Marijuana Problems	% Days Marijuana	Dependence Symptoms	Marijuana Problems
Baseline Criterion	.24*	.27*		.24*	.27*	.40**
Coping	.38**	.28*		.38**	.28*	.36**
Conformity	.01	.05		.01	.05	<.01
Expansion	-.15	-.35**		-.15	-.35**	-.25*
Social	.12	.08		.12	.08	-.07
Enhancement	.16	.20		.16	.20	.17

Note: Criterion= outcome variable (% days marijuana, dependence symptoms, marijuana problems) measured at baseline. Model 1 shows outcome variables at 3-months and 9-months regressed onto motives change from baseline to 3-months. Model 2 shows outcome variables at 9-months regressed onto motives change from baseline to 9-months.

**
p<.01,

*
p<.05