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Marijuana Use Motives: A Confirmatory Test and Evaluation among Young Adult Marijuana Users

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Abstract

The present investigation evaluated the measurement model and construct validity of marijuana use motives as measured by the Marijuana Motives Measure (MMM; Simons, Correia, Carey, & Borsari, 1998). Confirmatory factor analysis (CFA) and incremental tests of validity of marijuana use motives were conducted on a sample of young adult marijuana users ($n = 227$, 127 women; $M_{age} = 20.11$, $SD = 4.30$ years). As hypothesized, CFA analysis of marijuana use motives, as indexed by the MMM, demonstrated support for a multidimensional measurement model; specifically, a five-factor solution denoting Enhancement, Conformity, Expansion, Coping, and Social motives for marijuana use, each with satisfactory levels of internal consistency. Subsequent tests of incremental validity suggested that only certain motives were uniquely related to current substance use and cognitive-affective factors. Results are discussed in relation to refining the scientific understanding of marijuana use motives.

Keywords

Marijuana Motives Measure; confirmatory factory analysis

1. Introduction

Simons and colleagues (1998) developed the Marijuana Motives Measure (MMM; Simons, Correia, Carey, & Borsari, 1998) to assess marijuana use motives. Research using the 25-item MMM has thus far generally indicated that there are distinct, replicable, and internally consistent factors of marijuana use motives (Simons, Correia, & Carey, 2000) pertaining to Enhancement, Conformity, Expansion, Coping, and Social motives (Chabrol, Duconge, Casas, Roura, & Carey, 2005). Although extant work on the MMM is promising, there have only been two studies that have evaluated the factor structure of the instrument; one focused on young adults in the United States ($n = 161$; Simons et al., 1998) and the other on young adults and adolescents in France ($n = 114$; Chabrol et al., 2005). These investigations did not produce identical findings (i.e., inconsistent factor structures were reported across the two studies).

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Given the limited work on the MMM, there is a need to independently replicate the factor structure of the measure using confirmatory factor analysis (CFA).

There also is limited work on the relations between marijuana use motives and current marijuana use as well as other forms of substance use. For example, it is presently unclear whether specific marijuana use motives uniquely contribute to the prediction of marijuana use and other forms of commonly used substances (tobacco and alcohol). As another example, there has been little study of the relation between motives for marijuana use and cognitive-affective factors. It is therefore important to test the incremental (or relative) validity of motives: to what extent do motives predict clinically relevant phenomena above and beyond substance use, gender, and related variables? Such tests would explicate the incremental validity of marijuana use motives in terms of substance use and cognitive-affective vulnerability after accounting for the variance attributable to substance use factors common to marijuana users.

With this background, the present study addressed the limitations of past work using the MMM by (1) applying CFA analysis to test the latent structure and measurement model of marijuana use motives; and (2) testing the incremental validity of marijuana use motives in terms of (a) substance use and (b) cognitive-affective factors.

2. Method

2.1 Participants and Procedure

The sample consisted of 227 community and university recruited young adult marijuana smokers (127 women) with a mean age of 20.11 ($SD = 4.30$) years. For inclusion in the study, participants had to endorse current marijuana use (use in past 30 days). Upon arrival to the laboratory, participants provided verbal and written consent, and subsequently completed a battery of self-report questionnaires and were compensated \$25 for their efforts. Participants were excluded if they showed limited mental competency (failure to be oriented to person, place, and time) or were not able to give informed, written consent; no participants were excluded based upon these two criteria. The study was approved by the Institutional Review Board at the University of Vermont.

2.2. Measures

Participants completed a battery of self-report assessments including (1) *Marijuana Motives Measure* (MMM; Simons et al., 1998); (2) *Marijuana Smoking History Questionnaire* (MSHQ; Bonn-Miller & Zvolensky, 2005) to assess age of marijuana smoking onset and past 30-day use; (3) *Smoking History Questionnaire* (SHQ; Brown, Lejuez, Kahler, & Strong, 2002) to assess daily smoking; (4) *Alcohol Assessment* to assess the product of the weekly frequency of use by quantity of alcoholic beverages consumed (Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994); (5) *Positive Affect Negative Affect Scale* (Watson, Clark, & Tellegen, 1988) to assess negative affectivity; (6) *Anxiety Sensitivity Index* (ASI; Reiss, Peterson, Gursky, & McNally, 1986) to assess anxiety sensitivity; and (7) the *Mood and Anxiety Symptom Questionnaire* (MASQ; Watson et al., 1995) to assess anxiety and depressive symptoms.

3. Results

3.1 Confirmatory Factor Analysis and Internal Consistency

Table 1 presents the measurement model with standardized path coefficients. First, suggesting good estimation of all 5 motive variables consistent with good simple structure and overall good model fit, all indicator variables were strongly associated (i.e., $>.40$) with their respective

latent factors. Collectively, indices of fit indicated adequate to good overall model fit (please see Table 1), $X^2 = 510.4$ ($df = 245$), $NFI = .849$, $CFI = .915$, $TLI = .904$, $SRMR = .086$, $RMSEA = .069$ (90% CI .061 to .078). Indicative of poor fit, the X^2 statistic was significant but must be interpreted cautiously in light of convergence across multiple other fit indices (Bollen, 1989). To assess internal consistency, coefficient alpha was then computed for each of these factors. Observed alpha were as follows: Enhancement ($\alpha = .86$), Conformity ($\alpha = .70$) Expansion ($\alpha = .91$), Coping ($\alpha = .88$), and Social ($\alpha = .84$).

3. 2 Incremental Validity for Substance Use and Affect-relevant Factors

Please see Table 2 for a summary of zero-order correlations; Table 3 for a summary of incremental validity findings relevant to substance use; and Table 4 and Table 5 for a comprehensive summary of the incremental validity findings relevant to cognitive-affective factors. In terms of substance use-related outcomes, partially consistent with prediction, Enhancement but not Coping, motives were a significant predictor of past 30-day marijuana use. Conformity motives were a significant negative predictor of marijuana use. In contrast to prediction, Coping motives were a significant predictor of tobacco use; no other motives evidenced significant tobacco-relevant effects. Finally, none of the marijuana use motives incrementally predicted alcohol use volume. In terms of the cognitive-affective outcomes, marijuana use motives significantly predicted positive affectivity, with Enhancement positively and Coping negatively being significant individual predictors. Marijuana use motives also significantly predicted negative affectivity. As hypothesized, Coping motives were the only significant predictor. In terms of anxiety sensitivity, as hypothesized, the Coping factor was the only significant predictor. Marijuana use motives also significantly predicted anxious arousal symptoms and anhedonic depressive symptoms, with Enhancement negatively and Coping positively being significant predictors of both outcomes.

4. Discussion

CFA analyses of marijuana use motives indexed by the MMM demonstrated support for a multidimensional measurement model. Specifically, there was unambiguous empirical evidence for a five-factor solution denoting Enhancement, Conformity, Expansion, Coping, and Social marijuana use motives (see Table 1). The internal consistency of the subscales was good to excellent, ranging from .70 (Conformity motives) to .91 (Expansion motives).

Marijuana use motives collectively explained a large amount of variance in the prediction of marijuana use (30%), after accounting for effects attributable to gender, age at onset of marijuana use, tobacco use and alcohol consumption. However, not all marijuana use motives were incrementally (positively) related to current marijuana use levels. Specifically, Enhancement (9% of unique variance) and Social (3% of unique variance) motives were related to increased use, whereas Conformity motives (5% of unique variance) were negatively related to such use. In contrast to expectation, Coping motives only accounted for a non-significant 2% of unique variance (see Table 3). Further analyses indicated marijuana use motives were generally not a significant predictor of tobacco or alcohol use, after accounting for theoretically-relevant variables. The one exception to this pattern of findings was that marijuana use - Coping motives demonstrated a small incremental association (3% of unique variance) with tobacco use.

Coping motives for marijuana use significantly predicted negative affect, anxiety sensitivity, anxious arousal, and anhedonic depressive symptoms. These significant effects, ranging in effect size from 7% to 12% of unique variance, were above and beyond the variance accounted for by the other theoretically-relevant factors of gender, age at onset of marijuana use, past 30-day marijuana use, and tobacco and alcohol use, as well as shared variance with other marijuana use motives. Also, there was a significant negative relation found between Coping motives and

positive affectivity. Overall, these data suggest that Coping motives for marijuana use are consistently and relatively robustly related to negative cognitive-affective factors.

Future work can build from the present study by extending the current results to more diverse populations from distinct developmental age ranges (e.g., adolescents, older adults) and clinical service centers. Additionally, it would be useful to extend future work on motives in terms of their relation to marijuana use, abuse, and dependence using structured interview-based diagnostic classification. This line of work may ultimately be instrumental in informing treatment for marijuana abuse and dependence by elucidating the specific motives that may serve to maintain marijuana use as well as the associations between such motives and relevant cognitive-affective factors.

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Table 1
Standardized Item Loadings for the Marijuana Motives Five-Factor Model (N = 227)

Item	Enhancement	Conformity	Expansion	Coping	Social
7. Because I like the feeling	.90				
9. Because it's exciting	.45				
10. To get high	.77				
13. Because it gives me a pleasant feeling	.87				
18. Because it's fun	.80				
2. Because my friends pressure me to use marijuana		.46			
8. So that others won't kid me about not using marijuana		.50			
12. To fit in with the group I like		.59			
19. To be liked		.76			
20. So I won't feel left out		.69			
21. To know myself better			.68		
22. Because it helps me be more creative and original			.79		
23. To understand things differently			.91		
24. To expand my awareness			.89		
25. To be more open to experiences			.84		
1. To forget my worries				.88	
4. Because it helps me when I feel depressed or nervous				.83	
6. To cheer me up when I am in a bad mood				.77	
17. To forget about my problems				.78	
3. Because it helps me enjoy a party					.80
5. To be sociable					.63
11. Because it makes social gatherings more fun					.85
14. Because it improves parties and Celebrations					.84
15. Because I feel more self-confident and sure of myself					.44

Notes: Values represent standardized regression weights.

Table 2

Descriptive Data and Zero-Order Correlations among Theoretically-Relevant Variables.

Variable Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	M (SD)
1. Enhancement ¹	-	-.08	.47**	.37**	.48**	-.11	.55**	.22**	.18**	.25**	-.05	-.01	.04	-.21**	3.69 (1.01)
2. Conformity ²	-	-	.11	.11	.20**	-.09	-.16*	.02	.01	.02	.20**	.17**	.05	.03	1.42 (.55)
3. Expansion ³	-	-	-	.43**	.43**	-.15*	.41**	.20*	.11	.04	.07	.06	.24**	.00	2.29 (1.17)
4. Coping ⁴	-	-	-	-	.41**	.07	.41**	.26**	.06	-.13*	.35**	.38**	.39**	.25**	2.20 (1.09)
5. Social ⁵	-	-	-	-	-	-.22**	.38**	.10	.11	.06	-.00	.03	.06	-.03	2.58 (.98)
6. Gender ⁶	-	-	-	-	-	.20	-.09	-.00	-.14*	.11	.18**	.18**	.05	.18**	-
7. Marijuana Use ⁷	-	-	-	-	-	-	-	.26**	.29**	.04	-.00	.09	.17**	-.01	4.74 (2.57)
8. Tobacco Use ⁸	-	-	-	-	-	-	-	-	-.05	-.17*	.32**	.31**	.28**	.35**	9.39 (9.20)
9. Alcohol Use ⁹	-	-	-	-	-	-	-	-	-	.11	-.06	-.04	.02	-.20**	8.37 (4.36)
10. PANAS – PA ¹⁰	-	-	-	-	-	-	-	-	-	-	-.18**	-.19**	-.12	-.56**	32.65 (5.80)
11. PANAS – NA ¹¹	-	-	-	-	-	-	-	-	-	-	-	.68**	.67**	.52**	18.73 (6.69)
12. ASI ¹²	-	-	-	-	-	-	-	-	-	-	-	-	.62**	.44**	19.02 (11.66)
13. MASQ – AA ¹³	-	-	-	-	-	-	-	-	-	-	-	-	-	.35**	24.77 (7.92)
14. MASQ – AD ¹⁴	-	-	-	-	-	-	-	-	-	-	-	-	-	-.35**	53.53 (13.42)

* $p < .05$

** $p < .01$

¹ Marijuana Motives Measure – Enhancement Factor

² Marijuana Motives Measure – Conformity Factor

³ Marijuana Motives Measure – Expansion Factor

⁴ Marijuana Motives Measure – Coping Factor

⁵ Marijuana Motives Measure – Social Factor

⁶ Dichotomous Variable (male = 1; female = 2)

⁷ Marijuana History Questionnaire – Marijuana Use, Past 30 Days

⁸ Smoking History Questionnaire – Number of Cigarettes Smoked per Day

⁹ Alcohol Assessment: Alcohol Volume × Frequency of Use

¹⁰ Positive Affect Negative Affect Scale – Positive Affectivity

¹¹ Positive Affect Negative Affect Scale – Negative Affectivity

¹² Anxiety Sensitivity Index – Total Score

*I*³ Mood and Anxiety Symptoms Questionnaire – Anxious Arousal subscale

*I*⁴ Mood and Anxiety Symptom Questionnaire – Anhedonic Depression subscale

Table 3

Marijuana Use Motives Predicting Substance Use

	ΔR^2	t (each predictor)	β	sr^2	p
Criterion Variable: Marijuana Use¹					
<i>Step 1</i>					
Gender ⁴	.13	.16	.01	.00	.001
Age at Onset of Marijuana Use		-.245	-.20	.04	ns
Tobacco Use		2.75	.22	.05	.015
Alcohol Consumption		1.42	.12	.01	<.01
<i>Step 2</i>	.30				ns
MMM – Enhancement ⁵		3.85	.33	.09	<.001
MMM – Conformity ⁶		-2.91	-.20	.05	<.001
MMM – Expansion ⁷		.63	.05	.00	<.01
MMM – Coping ⁸		1.77	.14	.02	ns
MMM – Social ⁹		2.10	.17	.03	ns
Criterion Variable: Tobacco Use²					
<i>Step 1</i>	.12				.001
Gender		-.57	-.04	.00	ns
Age at Onset of Marijuana Use		-2.49	-.20	.04	.01
Marijuana Use		2.75	.22	.05	<.01
Alcohol Consumption		-1.38	-.11	.01	ns
<i>Step 2</i>	.06				.05
MMM – Enhancement		.63	.06	.00	ns
MMM – Conformity		.65	.05	.00	ns
MMM – Expansion		.96	.09	.00	ns
MMM – Coping		2.33	.22	.03	<.05
MMM – Social		-1.15	-.11	.00	ns
Criterion Variable: Alcohol Consumption³					
<i>Step 1</i>	.12				.001
Gender		-3.96	-.31	.10	<.001
Age at Onset of Marijuana Use		-.99	-.08	.00	ns
Marijuana Use		1.42	.12	.01	ns
Tobacco Use		-1.38	-.11	.01	ns
<i>Step 2</i>	.02				ns
MMM – Enhancement		1.12	.12	.00	ns
MMM – Conformity		.65	.06	.00	ns
MMM – Expansion		-.99	-.09	.00	ns
MMM – Coping		.91	.09	.00	ns
MMM – Social		-.33	-.03	.00	ns

Note: β = standardized beta weight

sr^2 = Squared semi-partial correlation

¹ Marijuana History Questionnaire – Marijuana Use, Past 30 Days

² Smoking History Questionnaire – Number of Cigarettes Smoke per Day

³ Alcohol Assessment: Alcohol Volume $\times$ Frequency of Use

⁴ Dichotomous Variable (1 = male; 2 = female)

- ⁵ Marijuana Motives Measure – Enhancement Factor
- ⁶ Marijuana Motives Measure – Conformity Factor
- ⁷ Marijuana Motives Measure – Expansion Factor
- ⁸ Marijuana Motives Measure – Coping Factor
- ⁹ Marijuana Motives Measure – Social Factor

Table 4

Marijuana Use Motives Predicting Affect-Relevant Factors

	ΔR^2	t (each predictor)	β	sr^2	p
Criterion Variable: Positive Affect¹					
<i>Step 1</i>					
Gender ³		-1.17	-.10	.00	ns
Age at Onset of Marijuana Use	.06	-.90	-.07	.00	ns
Marijuana Use ⁴		1.41	.12	.01	ns
Tobacco Use ⁵		-2.45	-.21	.04	<.05
Alcohol Consumption ⁶		.31	.02	.00	ns
<i>Step 2</i>	.16				
MMM – Enhancement ⁷		4.61	.49	.13	<.001
MMM – Conformity ⁸		.83	.07	.00	ns
MMM – Expansion ⁹		-.06	-.00	.00	ns
MMM – Coping ¹⁰		-3.13	-.30	.06	<.01
MMM – Social ¹¹		-.39	-.03	.00	ns
Criterion Variable: Negative Affect²					
<i>Step 1</i>					
Gender		1.38	.11	.01	.001
Age at Onset of Marijuana Use	.13	1.03	.08	.00	ns
Marijuana Use		-1.17	-.09	.00	ns
Tobacco Use		4.56	.38	.13	<.001
Alcohol Consumption		.62	.05	.00	ns
<i>Step 2</i>	.11				
MMM – Enhancement		-.93	-.09	.00	<.01
MMM – Conformity		1.90	.16	.02	ns
MMM – Expansion		.43	.04	.00	.05
MMM – Coping		3.42	.33	.08	ns
MMM – Social		-1.38	-.13	.01	.001

Note: β = standardized beta weight

sr^2 = Squared semi-partial correlation

¹ Positive Affect Negative Scale – Positive Affect subscale

² Positive Affect Negative Affect Scale – Negative Affect subscale

³ Dichotomous Variable (1 = male; 2 = female)

⁴ Marijuana History Questionnaire – Marijuana Use, Past 30 Days

⁵ Smoking History Questionnaire – Number of Cigarettes Smoked per Day

⁶ Alcohol Assessment: Alcohol Volume $\times$ Frequency of Use

⁷ Marijuana Motives Measure – Enhancement Factor

⁸ Marijuana Motives Measure – Conformity Factor

- 9 Marijuana Motives Measure – Expansion Factor
- 10 Marijuana Motives Measure – Coping Factor
- 11 Marijuana Motives Measure – Social Factor

Table 5

Marijuana Use Motives Predicting Affect-Relevant Factors

	AR ²	t (each predictor)	β	sr ²	p
Criterion Variable: Anxiety Sensitivity¹					
<i>Step 1</i>					
Gender ⁴	.13	2.37	.19	.03	.001
Age at Onset of Marijuana Use		.81	.06	.00	< .05
Marijuana Use ⁵		-.08	-.00	.00	ns
Tobacco Use ⁶		3.90	.33	.10	< .001
Alcohol Consumption ⁷		.37	.03	.00	ns
<i>Step 2</i>	.11				< .01
MMM – Enhancement ⁸		-1.59	-.16	.01	ns
MMM – Conformity ⁹		1.45	.12	.01	ns
MMM – Expansion ¹⁰		-.67	-.06	.00	ns
MMM – Coping ¹¹		3.81	.37	.09	< .001
MMM – Social ¹²		-.85	-.08	.00	ns
Criterion Variable: Anxious Arousal Symptoms²					
<i>Step 1</i>	.13				< .01
Gender		2.31	.19	.03	< .05
Age at Onset of Marijuana Use		.59	.05	.00	ns
Marijuana Use		.03	.00	.00	ns
Tobacco Use		3.81	.32	.09	< .001
Alcohol Consumption		1.53	.13	.01	ns
<i>Step 2</i>	.10				< .01
MMM – Enhancement		-2.06	-.21	.03	< .05
MMM – Conformity		.45	.04	.00	ns
MMM – Expansion		1.56	.14	.01	ns
MMM – Coping		3.29	.32	.07	.001
MMM – Social		-1.28	-.12	.01	ns
Criterion Variable: Anhedonic Depressive Symptoms³					
<i>Step 1</i>	.19				< .001
Gender		2.00	.16	.02	< .05
Age at Onset of Marijuana Use		1.69	.13	.02	ns
Marijuana Use		-.52	-.04	.00	ns
Tobacco Use		4.83	.39	.14	< .001
Alcohol Consumption		-1.10	-.09	.00	ns
<i>Step 2</i>	.15				< .001
MMM – Enhancement		-4.23	-.41	.11	< .001
MMM – Conformity		-.61	-.04	.00	ns
MMM – Expansion		.75	.06	.00	ns
MMM – Coping		4.30	.38	.12	< .001
MMM – Social		-.21	-.02	.00	ns

Note: β = standardized beta weight

sr² = Squared semi-partial correlation

¹ Anxiety Sensitivity Index – Total score

² Mood and Anxiety Symptom Questionnaire – Anxious Arousal subscale

³ Mood and Anxiety Symptom Questionnaire – Anhedonic Depressive subscale

- ⁴ Dichotomous Variable (1 = male; 2 = female)
- ⁵ Marijuana History Questionnaire – Marijuana Use, Past 30 Days
- ⁶ Smoking History Questionnaire – Number of Cigarettes Smoked per Day
- ⁷ Alcohol Assessment: Alcohol Volume × Frequency of Use
- ⁸ Marijuana Motives Measure – Enhancement Factor
- ⁹ Marijuana Motives Measure – Conformity Factor
- ¹⁰ Marijuana Motives Measure – Expansion Factor
- ¹¹ Marijuana Motives Measure – Coping Factor
- ¹² Marijuana Motives Measure – Social Factor