

# Reasons for Marijuana Use Among Young Adults and Long-Term Associations With Marijuana Use and Problems

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**ABSTRACT. Objective:** This study examines reasons for marijuana use among young adults age 19/20 in the United States and the extent to which patterns of reasons are associated with marijuana use and problems 15 years later. **Method:** The national Monitoring the Future study provided data on marijuana users at age 19/20 who were also surveyed at age 35 ( $n = 2,288$ ; 50% women; 83% White). Latent class analysis was used to identify distinct patterns of reasons for marijuana use, which were then used as predictors of later marijuana use and problems. **Results:** Five latent classes described the following patterns

of reasons for marijuana use at age 19/20: Experimental, Get High + Relax, Typical, Typical + Escape, and Coping + Drug Use. Highest risk for later marijuana use and problems was found for people with Coping + Drug Use and Get High + Relax reasons in young adulthood; those with Experimental reasons were at lowest risk for later use or problems. **Conclusions:** Coping and getting high emerged as strong predictors of later marijuana use and problems. Results support the predictive value of self-reported reasons for using marijuana among young adults. (*J. Stud. Alcohol Drugs*, 77, 881–888, 2016)

MARIJUANA IS THE SECOND MOST WIDELY used substance, after alcohol, among young adults in the United States: 32% of 19- to 28-year-olds report having used marijuana in the past year (Johnston et al., 2015). Marijuana use is associated with negative consequences for users (Caldeira et al., 2008; Kilmer et al., 2007) and has long-term risks including addiction (Volkow et al., 2014). Furthermore, 3% of adults in the United States meet *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV; American Psychiatric Association, 1994), criteria for past-year marijuana abuse or dependence (Hasin et al., 2015). Understanding when marijuana use among young adults may lead to problematic marijuana use in adulthood is a crucial issue for addictions research and public health. Identifying patterns of reasons for marijuana use reported during young adulthood, at the height of marijuana use across the life course (Johnston et al., 2015), may help identify individuals at risk for later problems.

Motivational models for substance use assert that people use substances to meet certain needs or provide particular benefits (Cooper, 1994; Cox & Klinger, 1988). Research on

self-reported reasons for marijuana use, in particular, has grown substantially in the past several years. Commonly studied motives for marijuana use include coping, conformity, social, enhancement, and expansion (Simons et al., 1998, 2000; Zvolensky et al., 2007). The most prevalent reasons for marijuana use among adolescents and young adults are social (e.g., to have fun), experimenting, getting high, and relaxing (Lee et al., 2009; Patrick et al., 2011b; Simons et al., 2000; Terry-McElrath et al., 2009). Although social and enhancement reasons tend to be most often reported, using marijuana for coping reasons appears to be more problematic for marijuana use consequences (Fox et al., 2011).

Cross-sectional studies have consistently demonstrated that motives are associated with marijuana use behavior and consequences (Bonn-Miller et al., 2007; Simons et al., 1998). Some motives, such as experimentation, are associated with less use and fewer problems, whereas others, such as using for conformity reasons (e.g., to fit in), are not strong predictors of behavior (Bonn-Miller et al., 2007; Lee et al., 2007, 2009; Patrick et al., 2011a, 2011b). Coping motives tend to be the strongest predictor of marijuana problems among college students (Buckner, 2013; Buckner et al., 2007, 2012; Lee et al., 2009; Simons et al., 2005) and young adults more generally (Moitra et al., 2015).

The majority of studies on motives for marijuana use utilize cross-sectional samples of college students. Research using more diverse young adult populations and prospective data is scarce. However, studies using available longitudinal data on individual reasons or motive subscales to predict later marijuana use problems demonstrate that motives for marijuana use are prospective predictors. Among adolescent marijuana users recruited in high school, results from

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multivariable models that included prior substance use and internalizing and externalizing behaviors showed that using marijuana to cope with negative affect was associated with marijuana use problems and dependence symptoms 12 months later; no other motives subscales were prospective predictors (Fox et al., 2011). Among adolescents who had never used marijuana, reporting more positive reinforcement motives in adolescence was associated with greater marijuana use and problems at age 25; reporting more negative reinforcement motives in adolescence was associated with more marijuana problems when previous marijuana use and motives were also included in the model (Anderson et al., 2015). Among nationally representative samples of 12th graders, individual self-reported reasons (e.g., using marijuana to get high, relax, or get through the day) were prospectively associated with more frequent marijuana use at age 35; fewer individual reasons predicted marijuana problems (Patrick et al., 2011b). Using marijuana to alleviate boredom at age 18 was associated with higher odds of marijuana problems at age 35 (compared with nonproblem marijuana use), and using to decrease the effects of another drug was associated with lower odds of marijuana problems (Patrick et al., 2011b). Across studies, results suggest that self-reported reasons for marijuana use may be an important predictor of adult marijuana use and problems, although the patterns of reasons most associated with risk are not yet clear and require additional study.

Importantly, individuals may hold multiple reasons for marijuana use simultaneously. Examining these reasons together to identify patterns provides unique information about how reasons cluster within individuals and which patterns confer the greatest risk for later problems. For example, previous examinations of person-centered patterns for alcohol use have called into question whether coping and enhancement drinkers form distinct groups (Littlefield et al., 2013). More nuanced patterns of reasons for alcohol use have been found among 12th graders (Coffman et al., 2007) and college students (Patrick & Maggs, 2010). Whether these person-centered patterns of self-reported reasons for substance use predict long-term outcomes and which types may be evident for marijuana users have not yet been examined.

A number of studies demonstrate disparities in adult marijuana use and problems in adulthood across sociodemographic characteristics. Men have greater incidence of disorder than women (Hasin et al., 2015). Rates also differ by race/ethnicity; in 2012–2013, past-year marijuana use disorder was reported by 2.7% of Whites, 2.8% of Hispanics, and 4.6% of Blacks (Hasin et al., 2015; Schauer et al., 2016). Young adults with higher family socioeconomic status (e.g., parental education) have higher rates of marijuana use than those from lower socioeconomic statuses (Patrick et al., 2012). The current study will examine how patterns of self-reported reasons for marijuana use predict later use and problems after these known disparities are controlled for.

### *Current study*

Identifying the patterns of self-reported reasons for marijuana use as well as long-term consequences will provide new information about the extent to which reasons for use are long-term risk factors for marijuana-related problems. The current study addresses two research questions. First, what are the person-centered patterns in self-reported reasons for marijuana use among young adults age 19/20? Second, do these patterns predict marijuana use and problems longitudinally, about 15 years later, when we control for key covariates?

## **Method**

### *Participants*

The current study used longitudinal panel data from Monitoring the Future (MTF), an ongoing multi-cohort study of adolescents and adults (Johnston et al., 2015). Annually, MTF collects nationally representative data from about 15,000 U.S. high school seniors using classroom-administered questionnaires; approximately 2,400 individuals are selected randomly from each cohort for follow-up via mailed questionnaires (for detailed study information, see Bachman et al., 2015; Johnston et al., 2015).

The sample used in the current analyses includes senior-year cohorts from 1976 to 1997 who provided data at age 35 from 1994 to 2014. The sample includes all individuals who (a) were selected for longitudinal follow-up; (b) reported marijuana use in the past 12 months at age 19/20; (c) provided data on reasons for marijuana use at age 19/20; (d) provided data on gender, race/ethnicity, parental education, and grade at first marijuana use at age 18 and on college attendance at age 19/20; and (e) reported marijuana use and marijuana problems at age 35. All analyses used attrition weights to adjust for attrition from ages 18 to 35, calculated as the inverse of the probabilities of participation at age 35 based on the following variables assessed at age 18: gender, race/ethnicity, college plans, high school grades, number of parents in the home, religiosity, parental education, alcohol use, cigarette use, marijuana use, region, cohort, and the sampling weight correcting for oversampling of age 18 substance users.

MTF uses multiple randomly assigned questionnaire forms to decrease respondent burden; reasons for marijuana use were included on one form (of five from 1976 to 1988 and of six from 1989 to 2015). Only those individuals who reported using marijuana in the past 12 months were asked about their reasons for use. The weighted analytic *n* was 2,288 (50.0% female; 83.1% White, 7.7% Black, 4.8% Hispanic, 4.5% other). Of eligible participants who provided data at age 19/20, 99.0% also provided data on marijuana use and marijuana problems at age 35.

TABLE 1. Descriptive statistics for latent class analysis indicators, covariates, and outcomes

	Weighted frequency	Valid %
Covariates:		
Cohort group		
1976–1985	1,253.5	54.8
1986–1997	1,034.2	45.2
Gender		
Male	1,146.0	50.1
Female	1,141.8	49.9
Race		
White	1,900.8	83.1
Black	175.5	7.7
Hispanic	108.8	4.8
Other	102.7	4.5
Parental education		
High school or less	814.6	35.6
Some college or higher	1,473.1	64.4
Grade at first marijuana use		
Early use, Grade 8 or earlier	505.3	22.1
Late use, Grade 9 or later	1,782.4	77.9
Marijuana use at age 19/20		
Low	1,236.6	54.1
High	1,051.1	46.0
Four-year college attendance		
No	1,396.9	61.1
Yes	890.8	38.9
Indicators:		
Reasons for marijuana use at age 19/20		
To feel good or get high	1,729.6	75.6
To have a good time with my friends	1,514.7	66.2
To experiment—to see what it's like	1,299.3	56.8
To relax or relieve tension	1,106.2	48.4
Because of boredom, nothing else to do	502.8	22.0
To get away from my problems or troubles	396.3	17.3
To seek deeper insights and understanding	329.0	14.4
Because of anger or frustration	257.8	11.3
To increase the effects of some other drug(s)	250.5	11.0
To fit in with a group I like	242.2	10.6
To get through the day	106.4	4.7
To decrease (offset) the effects of some other drug(s)	53.5	2.3
Because I am “hooked”—I have to have it	36.9	1.6
Outcome:		
Marijuana use at age 35		
No use	1,311.2	57.3
Nonproblem use	663.6	29.0
Problem use	312.9	13.7

### Measures

*Marijuana use.* At age 19/20, participants were asked, “On how many occasions (if any) have you used marijuana [hashish] during the last 12 months?” (1 = 0 occasions, 2 = 1–2 occasions, 3 = 3–5 occasions, 4 = 6–9 occasions, 5 = 10–19 occasions, 6 = 20–39 occasions, 7 = 40 or more occasions). Responses were dichotomized (high use = 10 or more occasions, low use = 1–9 occasions [reference group]) for analysis. Nonusers were excluded from analyses because they were not asked questions about motivations for use.

*Reasons for marijuana use.* At age 19/20, participants who indicated that they had used marijuana or hashish at least once in the past 12 months were asked, “What have been the most important reasons for your using marijuana or hashish? (Mark all that apply.)” Responses were dichotomous (marked

vs. unmarked). The 13 reasons assessed are listed in Table 1. As in previous research (Patrick et al., 2011a, 2011b; Terry-McElrath et al., 2009), the reasons were conceptually grouped into the following categories: social and recreational (e.g., to experiment, to feel good), coping with negative affect (e.g., to get away from my problems, because of anger), compulsive use (e.g., to get through the day, because I am “hooked”), and drug effect (e.g., to decrease the effects of some other drugs, to seek deeper insights and understanding).

*Demographic variables.* Covariates measured at age 18 included cohort group (1976–1985, 1986–1997), gender (male, female), race/ethnicity (Black, Hispanic, other, White), parental education (some college or higher, high school or lower), and grade at first marijuana use (grade 8 or earlier, grade 9 or later). At age 19/20, participants indicated whether they were currently attending a 4-year college (yes, no).

*Marijuana use problems.* At age 35, participants who indicated they had used marijuana in the past 5 years were asked, “Think back over the last five years. Did your use of marijuana cause you any of the following problems?” (0 = no, 1 = a little, 2 = some, 3 = a lot; coded as none vs. any). The 16 problems include, for example: “Caused you to behave in ways that you later regretted”; “Hurt your relationship with your spouse/partner or girlfriend/boyfriend.” This measure does not provide a clinical diagnosis of marijuana use disorder, but items cover 8 of the 11 DSM-5 criteria (American Psychiatric Association, 2013) for cannabis use disorder (Patrick et al., 2011b; Schulenberg et al., 2016). For the outcome analysis, participants were categorized as nonusers (i.e., had not used marijuana in the past 5 years), nonproblem users (i.e., had used marijuana in the past 5 years but did not meet criteria for disorder), or problem users (i.e., had affirmative responses to two or more criteria; see Schulenberg et al., 2016).

### *Analysis plan*

Latent class analysis (LCA) is a type of finite mixture model that uses manifest indicators with discrete responses to divide a population into a set of mutually exclusive and exhaustive latent classes. Data analysis proceeded in two phases. The first phase identified and described latent classes of reasons for marijuana use using LCA (Collins & Lanza, 2010) at age 19/20. The second phase determined whether latent class membership at age 19/20 was related to marijuana use and problems at age 35 when we controlled for key covariates.

Model selection was based on the Akaike information criterion (AIC; Akaike, 1974), Bayesian information criterion (BIC; Schwarz, 1978), consistent AIC (CAIC; Bozdogan, 1987), sample size-adjusted BIC (aBIC; Sclove, 1987), entropy (Celeux & Soromenho, 1996), and a bootstrapped likelihood ratio test (BLRT; McLachlan, 1987; McLachlan & Peel, 2000), as well as model stability and interpretability. Lower values for the AIC, BIC, CAIC, and aBIC indicated a better balance between model fit and model parsimony; higher values for entropy indicated higher classification utility; and significant BLRT *p* values indicated better model fit compared to models with one class fewer. Emphasis was placed on the utility and theoretical interpretation of a solution. Model identification for all models was confirmed with 1,000 sets of random starting values. All models were estimated using PROC LCA (Lanza et al., 2015) in SAS Version 9.4 (SAS Institute Inc., Cary, NC).

Latent class membership can be used to predict an outcome, although this is somewhat challenging methodologically; several new approaches have been proposed in the recent methodological literature. We used an approach proposed by Bray et al. (2015), colloquially termed the “inclusive classify-analyze approach.” This approach is

based on the conceptually appealing “standard three-step approach” that assigns individuals to latent classes based on their modal posterior probabilities and then treats the assignments as known in a subsequent outcome model. However, this approach adjusts posterior probability estimates using information from the outcome to reduce attenuation in the outcome model. This approach works well for a discrete outcome (e.g., marijuana problems) and also allows for a complex outcome model (e.g., one that includes covariates). After the inclusive classify-analyze approach and modal assignment were used, assignments were treated as known in a baseline category multinomial logistic regression model with the three-level marijuana use and problems variable (i.e., no use, nonproblem use, problem use) as the outcome. Latent class membership was the predictor of interest in this model; covariates included cohort group, gender, race/ethnicity, parental education, grade at first marijuana use, marijuana use at age 19/20, and 4-year college attendance. We also explored moderation effects by adding interactions of class memberships by each covariate. There was limited evidence of moderation, particularly after considering the increased number of significance tests; these results are not shown but are available on request.

## **Results**

Descriptive statistics for the demographic characteristic covariates, LCA indicators of reasons for marijuana use, and the marijuana use/problems outcome are shown in Table 1. Note that four of the reasons for marijuana use were endorsed by approximately half or more of the participants (i.e., “to feel good or get high,” “to have a good time with my friends,” “to experiment—to see what it’s like,” and “to relax or relieve tension”). These are considered “typical reasons” for use.

Addressing Research Question 1, model fit information and model selection criteria for the LCAs are shown in Table 2; models with one to eight latent classes were considered. The BIC and CAIC were minimized for the five-class model, and the aBIC was minimized for the seven-class model; the AIC was not minimized, and the BLRT was never nonsignificant (i.e., it always suggested the model with one additional class). Based on these results, we considered models with five to seven latent classes. Upon examination, the six-class and seven-class models contained classes similar to those in the five-class model, with the additional classes being redundant or uninterpretable theoretically. Thus, we selected the five-class model for interpretation and additional analysis.

Parameter estimates for the five-class model are shown in Table 3. Classes are presented based on the number of highly endorsed items, from least to greatest. Class 1 (26% prevalence) was characterized by a high probability of using marijuana “to experiment—to see what it’s like,” but low probabilities of using marijuana for all other reasons; we

TABLE 2. Model fit information and model selection criteria

No. of classes	$G^2$	$df$	AIC	BIC	CAIC	aBIC	Entropy	Solution %	BLRT
1	3,977.0	8,178.0	4,003.0	4,073.9	4,086.9	4,032.6	1.0	100.0	–
2	2,252.9	8,164.0	2,306.9	2,454.1	2,481.1	2,368.4	0.7	100.0	0.02
3	1,857.6	8,150.0	1,939.6	2,163.3	2,204.3	2,033.0	0.7	100.0	0.02
4	1,689.4	8,136.0	1,799.4	2,099.4	2,154.4 <sup>a</sup>	1,924.7	0.8	98.0	0.02
<b>5</b>	<b>1,578.8</b>	<b>8,122.0</b>	<b>1,716.8</b>	<b>2,093.2<sup>a</sup></b>	<b>2,162.2</b>	<b>1,874.0</b>	<b>0.6</b>	<b>45.8</b>	0.02
6	1,482.3	8,108.0	1,648.3	2,101.0	2,184.0	1,837.3	0.7	80.9	0.02
7	1,402.1	8,094.0	1,596.1	2,125.2	2,222.2	1,817.0 <sup>a</sup>	0.7	56.4	0.02
8	1,348.8	8,080.0	1,570.8 <sup>a</sup>	2,176.3	2,287.3	1,823.7	0.7	12.7	0.02

Notes: Dash (–) indicates criterion was not applicable; **bold** font indicates selected model. No. = number; AIC = Akaike information criterion; BIC = Bayesian information criterion; CAIC = consistent AIC; aBIC = sample size–adjusted BIC; BLRT = bootstrapped likelihood ratio test. Solution % refers to the percentage of times the maximum likelihood solution was identified out of 1,000 sets of random starting values. <sup>a</sup>Optimal criterion value.

labeled this class Experimental Reasons. Class 2 (32%) was characterized by high probabilities for “to feel good or get high” and “to relax or relieve tension,” but low probabilities for all other reasons; we labeled this class Get High + Relax Reasons. Class 3 (23%) was characterized by high or average probabilities for the four typical reasons for marijuana use, but low probabilities for all other reasons; we labeled this class Typical Reasons. Class 4 (10%) was characterized by high or average probabilities for the typical reasons and by high (or notably elevated) probabilities for “to get away from my problems or troubles” and “because of anger or frustration”; we labeled this class Typical + Escape Reasons. Class 5 (9%) was characterized by high (or notably elevated) probabilities for all of the reasons for marijuana use—including coping with negative affect reasons (e.g., “because of boredom, nothing else to do,” “to get through the day”) and drug effect reasons (e.g., “to seek deeper insights and understanding,” “to increase the effects of some other drug[s]”)—which were unique to this class; we labeled this class Coping + Drug Effect Reasons.

Addressing Research Question 2, parameter estimates for the baseline category multinomial logistic regression

model predicting marijuana use and problems at age 35 from reasons for marijuana use latent class membership at age 19/20 (with key covariates controlled for) are shown in Table 4. Significant predictors of marijuana use and problems at age 35 included membership in all other classes compared with membership in the Experimental Reasons class,  $\chi^2(2)_{\text{Classes 2,3,4,5}} = 131.41, 184.35, 31.86, 98.61$ , respectively,  $ps < .0001$ ; membership in cohort group 1986–1997 compared with cohort group 1976–1985,  $\chi^2(2) = 18.72, p < .0001$ ; gender,  $\chi^2(2) = 36.18, p < .0001$ ; Hispanic and other compared with White race/ethnicity,  $\chi^2(2)_{\text{Hispanic, Other}} = 14.00, 9.17, ps = .0009, .01$ , respectively; high marijuana use compared with low use at age 19/20,  $\chi^2(2) = 26.82, p = .0001$ ; and college attendance compared with nonattendance at age 19/20,  $\chi^2(2) = 26.85, p < .0001$ .

Overall, reasons for marijuana use latent class membership at age 19/20 was strongly related to marijuana use and problems at age 35. Members of all of the other classes, compared with members of the Experimental Reasons class, were significantly more likely to have marijuana problems compared with nonproblem marijuana use and were significantly more likely to have nonproblem use compared with

TABLE 3. Parameter estimates from the selected 5-class model

	Experimental Reasons	Get High + Relax Reasons	Typical Reasons	Typical + Escape Reasons	Coping + Drug Use Reasons	
Latent class membership probabilities	.26	.32	.23	.10	.09	
Indicators	Overall probabilities	Item response probabilities ( <i>SE</i> )				
To feel good or get high	.76	.36 (.07)	<b>.82</b> (.06)	<b>.99</b> (.07)	<b>.84</b> (.10)	<b>1.00</b> (.00)
To have a good time with my friends	.66	.38 (.07)	<b>.54</b> (.14)	<b>1.00</b> (.00)	<b>.76</b> (.10)	<b>.96</b> (.02)
To experiment—to see what it’s like	.57	<b>.87</b> (.08)	.27 (.09)	<b>.67</b> (.17)	.44 (.09)	<b>.59</b> (.06)
To relax or relieve tension	.48	.05 (.06)	<b>.58</b> (.12)	<b>.50</b> (.11)	<b>.90</b> (.04)	<b>.93</b> (.04)
Because of boredom, nothing else to do	.22	.05 (.02)	.20 (.04)	.23 (.06)	.17 (.17)	<b>.81</b> (.08)
To get away from my problems or troubles	.17	.02 (.02)	.00 (.01)	.11 (.12)	<b>.88</b> (.54)	<b>.64</b> (.08)
To seek deeper insights and understanding	.15	.03 (.01)	.11 (.04)	.18 (.09)	.16 (.05)	<b>.50</b> (.07)
Because of anger or frustration	.11	.01 (.01)	.03 (.07)	.03 (.04)	.46 (.12)	<b>.54</b> (.09)
To increase the effects of some other drugs(s)	.11	.01 (.01)	.06 (.03)	.14 (.06)	.05 (.05)	<b>.53</b> (.09)
To fit in with a group I like	.11	.16 (.03)	.02 (.04)	.14 (.04)	.08 (.07)	.18 (.05)
To get through the day	.05	.00 (.00)	.02 (.01)	.00 (.01)	.05 (.03)	.39 (.10)
To decrease (offset) the effects of some other drug(s)	.02	.00 (.00)	.02 (.01)	.01 (.01)	.00 (.01)	.16 (.05)
Because I am “hooked”—I have to have it	.02	.00 (.00)	.01 (.01)	.00 (.00)	.02 (.01)	.13 (.05)

Notes: **Bold** font indicates item response probabilities at .50 or above to facilitate interpretation of the latent classes.

TABLE 4. Multinomial logistic regression effects of covariates and latent class membership on marijuana use at age 35

Variable	Nonproblem marijuana use vs. no use at age 35			Problem marijuana use vs. no use at age 35			Problem marijuana use vs. nonproblem marijuana use at age 35			$\chi^2$	df	p
	Est.	SE	OR	Est.	SE	OR	Est.	SE	OR			
Intercept	-2.36**	0.16	–	-3.80**	0.26	–	-1.53	0.29	–	–	–	–
Class membership (ref. = Experimental Reasons)												
Get High + Relax Reasons	1.62**	0.17	5.04	2.22**	0.26	9.22	0.60*	0.29	1.83	131.41	2	<.0001
Typical Reasons	1.67**	0.15	5.13	2.24**	0.24	9.38	0.56*	0.26	1.77	184.35	2	<.0001
Typical + Escape Reasons	1.11**	0.20	3.03	0.67	0.36	1.96	-0.44	0.38	0.65	31.86	2	<.0001
Coping + Drug Use Reasons	1.80**	0.23	6.04	2.63**	0.31	13.84	0.83*	0.32	2.29	98.61	2	<.0001
Cohort group (ref. = 1976–1985)	0.46**	0.11	1.58	0.37*	0.15	1.44	0.09	0.15	1.09	18.72	2	<.0001
Gender (ref. = female)	0.25**	0.10	1.38	0.87**	0.14	2.38	0.62**	0.15	1.86	36.18	2	<.0001
Race (ref. = White)												
Black	-0.34	0.22	0.71	0.20	0.26	1.23	0.54	0.29	1.73	4.02	2	.13
Hispanic	-0.57	0.30	0.57	0.75*	0.30	2.11	1.32**	0.36	3.73	14.00	2	.0009
Other	0.44	0.25	1.55	0.89**	0.30	2.45	0.46	0.29	1.58	9.17	2	.010
Parental education (ref. = high school or lower)	-0.07	0.11	0.94	-0.15	0.15	0.86	-0.08	0.16	0.92	1.04	2	.60
Grade at first marijuana use (ref. = Grade 9 and later)	0.26*	0.12	1.29	-0.02	0.16	0.98	-0.28	0.16	0.76	5.28	2	.07
Marijuana use at age 19/20 (ref. = low use)	0.47**	0.12	1.60	0.68**	0.16	1.98	0.21	0.16	1.24	26.82	2	.0001
Four-year college attendance (ref. = no)	-0.02	0.11	0.98	-0.81**	0.16	0.44	-0.79**	0.17	0.45	26.85	2	<.0001

Notes: Dash (–) indicates value was not applicable. Est. = parameter estimate; OR = odds ratio; ref. = reference.

\* $p < .05$ ; \*\* $p < .01$ .

no use. The one exception was the Typical + Escape Reasons class, which did not significantly differ from the Experimental Reasons class in odds of problem use compared with nonproblem use. Effects were stronger for problem use and nonproblem use compared with no use than they were for problem use compared with nonproblem use. In addition, effects were strongest for Coping + Drug Use Reasons, Get High + Relax Reasons, and Typical Reasons, and effects were weakest for Typical + Escape Reasons.

Given previous research suggesting coping motives are strong predictors of marijuana problems (Buckner, 2013; Buckner et al., 2007, 2012; Lee et al., 2009; Simons et al., 2005), we also treated members of the Coping + Drug Use Reasons class as the reference (results not tabled). This follow-up analysis was used to explore whether members of the Get High + Relax Reasons and Typical Reasons classes were more similar to members of the Coping + Drug Use Reasons or Experimental Reasons class. Members of the Get High + Relax Reasons and Typical Reasons classes were not significantly different from members of the Coping + Drug Use Reasons class in their chances of having marijuana problem use, nonproblem use, or no use. Members of the Experimental Reasons and Typical + Escape Reasons classes were significantly less likely than members of the Coping + Drug Use Reasons class in their chances of having problem and nonproblem use.

Regarding covariates, those from the 1986–1997 cohort were more likely than those from the 1976–1985 cohort to have problem use and nonproblem use compared with no

use, but they were equally likely to have problem compared with nonproblem use. At age 35, men were significantly more likely than women to have problem marijuana use compared with nonproblem use, and to have nonproblem use compared with no use. Hispanics were more likely than Whites to have problem use compared with nonproblem use and no use, but they were equally likely to have nonproblem use compared with no use. Individuals from other races/ethnicities were more likely than Whites to have problem use compared with no use, but they were equally likely to have problem use compared with nonproblem use and nonproblem use compared with no use. High-frequency marijuana users at age 19/20 were more likely than low-frequency users to have problem use and nonproblem use at age 35 compared with no use, but they were equally likely to have problem use compared with nonproblem use. Finally, those attending a 4-year college at age 19/20 were less likely than those who were not attending to have problem use compared with nonproblem and no use, but they were equally likely to have nonproblem use compared with no use.

## Discussion

The current study examined the person-centered patterns of self-reported reasons for marijuana use among young adults age 19/20 and the extent to which these patterns predicted marijuana problems about 15 years later. Given recent and current changes regarding the legal status of marijuana use, it is particularly important to examine the long-term

associations between young adult marijuana use and motives and later problems. The majority of previous research has focused on adolescent marijuana use and/or early age at onset (Flory et al., 2004; Merline et al., 2004; Newcomb & Bentler, 1988; Stuart & Green, 2008); the current study's focus on the long-term consequences associated with young adult marijuana use extends this work.

We found five latent classes of reasons for marijuana use. Across the full sample, all of whom were marijuana users at age 19/20, there were four "typical" reasons for marijuana use: to feel good/get high, to have a good time with friends, to experiment, and to relax. However, not all individuals endorsed all of these reasons. Three unique patterns were identified: Experimental Reasons, Get High + Relax Reasons, and Typical Reasons. Two other classes—Typical + Escape Reasons and Coping + Drug Use Reasons—were characterized by additional reasons that were less frequently endorsed in the full sample and were not endorsed in any other classes. These additional reasons relating to coping have been shown in previous literature, largely with cross-sectional data, to be associated with greater risk for marijuana-related problems (Buckner, 2013; Buckner et al., 2007, 2012; Fox et al., 2011; Lee et al., 2009; Moitra et al., 2015; Simons et al., 2005).

The current study replicated and extended the existing literature on the importance of coping-related reasons for using marijuana in predicting use and problems. Longitudinal data across 15 years were used to demonstrate that individuals who used marijuana at age 19/20 for reasons other than just experimentation were clearly at high risk for later use and problems, even after we controlled for grade at first use and level of marijuana use at age 19/20. Similar to previous research, coping reasons for use put individuals at high risk for later marijuana use and problems. However, respondents were also at high risk if they had Get High + Relax Reasons and Typical Reasons. These latter reasons are sometimes thought of as more innocuous, but these results suggest that having any appreciable reason for using marijuana, other than just experimenting, puts young adults at higher risk for later use and problems. Future research should examine the transition from purely experimental reasons to other reasons, which would confer increased risk.

Links between the covariates and the outcome were consistent with previous studies (Hasin et al., 2015; Schauer et al., 2016). Men used more and were more likely to have marijuana use problems compared with women. The story was more complicated for minorities—Hispanics had about the same amount of use compared with Whites, but had more problems; other races/ethnicities had about the same amount of use and problems compared with Whites. In addition, those from later cohorts were more likely to use compared with those from earlier cohorts, but had about the same number of problems. More frequent marijuana use at age 19/20 was associated with both nonproblem and problem

marijuana use, compared with no use, at age 35. Those who attended college right after high school were less likely to use and less likely to have marijuana problems at age 35.

Limitations of the study include the use of a school-based sample, which therefore excludes high school drop-outs; the predominantly White sample; and measurement of marijuana problems only in the timeframe of the past 5 years. The measure of self-reported reasons used a dichotomous response; a multi-item scale of marijuana use motives was not available. Strengths include use of a national study with a sufficiently large number of marijuana users at age 19/20 who were followed until age 35 so that we could assess longer term outcomes. Results demonstrated distinct reasons for use profiles among young adults with long-lasting associations with marijuana use and marijuana-related problems. These findings support the utility of future research on motivation-based interventions that can target and adjust interventions based on salient reasons for use among young adults.

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