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BRIEF REPORT

Factors Mediating the Association of the Recency of Parent's Marijuana Use and Their Adolescent Children's Subsequent Initiation

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This study was designed to determine whether the relation between parents' recency of (lifetime) marijuana use (RMU) and their adolescent children's subsequent marijuana initiation was mediated by the adolescents' expectancies regarding the consequences of usage, their anticipated severity of punishment for use, and their evaluative attitudes toward marijuana. Parents and their initially marijuana-abstinent adolescent children drawn from the National Survey of Parents and Youth were studied (N = 1,399). A bootstrapped multiple mediation analysis tested whether adolescents' expectations, anticipated punishment, and attitudes toward marijuana collected in the first year of the longitudinal study mediated the relationship between parents' RMU and their adolescent children's marijuana initiation 1 year later. Analysis revealed a statistically significant association between the parental measure and youths' subsequent initiation ($p < .001$). The three mediators were related significantly to parents' RMU and adolescents' usage. Individually, each variable mediated the association of the parental measure and that of their initially abstinent adolescents when usage was assessed 1 year later. The results offer insight into the positive association of parents' RMU with their child's marijuana use and provide insights that may be useful in future prevention efforts.

Keywords: adolescent attitudes, marijuana, marijuana usage, expectations, parental behavior

Marijuana is the illicit substance most frequently used by 12- to 17-year-olds in the United States. The 2010 National Survey on Drug Use and Health revealed that of 7.4% of youths this age had used marijuana (a 10% increase from 2007), and 58.5% of the 2.4 million recent marijuana initiates had not yet reached their 18th birthday (Substance Abuse and Mental Health Services Administration, 2011). Though peers become increasingly influential in adolescence, parents still yield extraordinary sway over their children's drug use (Andrews, Hops, Ary, Tildesley, & Harris, 1993; Hassandra et al., 2001; Maldonado-Molina, Reingle, Delcher, & Branchini, 2011). Positive parenting, characterized by authoritative parenting practices (i.e., being both warm and demanding), reduces the influence of peer drug use on children's decisions to use drugs (Dorius, Bahr, Hoffmann, & Harmon, 2004), consistent with Lac and Crano's (2009) meta-analysis, which revealed that parental monitoring was significantly and inversely associated with adolescent marijuana use.

This is not to suggest that parents' influence over their children is always beneficial. Parents who currently use drugs are more likely—sometimes up to three times more likely—to have children who also use drugs (Johnson, Shontz, & Locke, 1984; Substance Abuse and Mental Health Services Administration, 2006). Research has yet to determine conclusively why this relationship exists. There may be many indirect paths through which parental drug use influences adolescent behavior. For example, research indicates that parents who use drugs obtain lower scores on such parenting measures as "connectedness and bonding" and "rules setting and discipline" (Brook, Balka, Fei, & Whiteman, 2006; Maalouf, 2010). The current study examines an additional path, one that assesses the association of the recency of parental marijuana use (RMU) with adolescents' outcome expectations regarding use, their expected likelihood of punishment, and their attitudes toward marijuana. All of these factors could affect the likelihood of drug initiation.

Outcome expectations (Tolman, 1932, 1959) refer to the perceived positive and negative outcomes associated with engagement in a specific act (e.g., If I smoke marijuana, I will become more social/creative/stupid). They have proven powerful predictors of substance use (Alfonso & Dunn, 2007; Budd, Bleiker, & Spencer, 1983; Siegel, Alvaro, Patel, & Crano, 2009; Stacy, Newcomb, & Bentler, 1991). Expectations of physical and social effects predict marijuana use (Skenderian, Siegel, Crano, Alvaro, & Lac, 2008; Stacy, Galaif, Sussman, & Dent, 1996), alcohol use (Brown, 1985; Patrick, Wray-Lake, Finlay, & Maggs, 2010; Stacy

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et al., 1991), inhalant (Siegel et al., 2008, 2009), and tobacco use (Jøsendal & Aarø, 2012; Halpern-Felsher, Biehl, Kropp, & Rubinstein, 2004). Expectations of outcomes of alcohol use, for example, predict frequency and quantity of drinking over and above demographic factors, previous drinking levels, and alcohol-related attitudes (Carey, 1995); and expectations of inhalant use predict usage over and above demographic variables, prior use, sensation seeking, peer deviance, and parental monitoring (Siegel et al., 2008). If adolescents witness, learn, or infer that a parent used drugs without harmful consequence, they may be less likely to associate usage with negative repercussions.

Current or prior parental usage also may lead adolescents to expect less severe punishment for marijuana initiation. Although there are relatively few studies on perceived parental punishment influencing adolescent drug use per se, evidence suggests that the perception of expected punishment influences children's social behaviors (Wang, Zhang, Xu, Chen, & Liu, 2007). Theoretically, injunctive norms represent what people perceive as the likely response to their actions (Parsai, Voisine, Marsiglia, Kulis, & Nieri, 2009). Parental injunctive norms represent how adolescents think their parents would react if they discovered their children using drugs (Kulis, Napoli, & Marsiglia, 2002). For adolescents, current (or even past) parental marijuana usage may suggest a weak injunctive norm. If so, they may perceive usage as more acceptable and fear punishment less that those who assume a strong injunction against drug use. Following this logic, parents' RMU may be associated with adolescents' perceptions.

Attitudes, posited as the result of outcome expectations and the value placed on the associated outcome (Ajzen, 2012), also should be affected by parents' RMU. Attitudes are evaluative integrations of thoughts and feelings experienced with respect to an object (Crano & Prislin, 2006). They have long been associated with intentions and behavior (Ajzen, 2012). Indeed, research has shown that more positive attitudes toward marijuana use were related to marijuana use initiation (Lac, Alvaro, Crano, & Siegel, 2009; Malmberg et al., 2011). It is possible that parents' RMU is associated with children's more positive attitudes toward marijuana, which research suggests is an antecedent to use (Ajzen & Fishbein, 2005; Hemovich, Lac, & Crano, 2011; Lac et al., 2009; Sayeed, Fishbein, Hornik, Cappella, & Ahern, 2005).

This study is designed to investigate the strength of these postulated expectancy-based paths through which parental RMU is associated with children's marijuana use. We hypothesize that parents' RMU is linked to adolescents' expectations and attitudes, which are associated with subsequent marijuana use. We hypothesize a negative relationship between RMU and children's concern with punishment for marijuana use. These children also will associate marijuana with more favorable outcomes than children of abstinent parents, or those who have used in the more distant (vs. recent) past, and they will hold more favorable attitudes toward the drug. Finally, we posit that adolescents' outcome expectations, attitudes, and punishment beliefs will be associated with future marijuana use, and that these factors will mediate the relationship between parents' RMU and their children's usage.

Method

Data used in this secondary analysis were collected and archived in the National Survey of Parents and Youth (NSPY), a 4-year panel survey conducted to evaluate the National Youth Antidrug Media Campaign (David, Hornik, & Maklan, 2010). The sampling methodology applied in the NSPY was comprehensive, designed to develop a nationally representative sample of children and their parents. Respondents were interviewed four times, at approximately yearly intervals, from November 1999 to June 2004, and received $20 for each interview (see Crano, Siegel, Alvaro, Lac, & Hemovich, 2008, for procedural details).

Respondents

Marijuana-abstinent respondents at the first round of data collection (R1), aged 12 to 17 years, were used in the analysis (172 sample respondents who reported marijuana use at R1 were excluded from the analyses, as the research is concerned with initiation). Nine- to 11-year-olds also were excluded, because they answered different, abbreviated, surveys. To maximize sample size, data from the first two rounds (R1-R2) of the panel survey were used; respondents 18-year-olds at R1 were excluded because they would have aged out of the study before completing R2; 1399 parent–child pairs with complete data across R1 and R2 constituted the respondent sample. Only one parent for each child was interviewed (891 mothers and 508 fathers).

Measures

General marijuana outcome expectations. Eight questions at R1 were used to create an index of expectations toward marijuana use: "How likely is it that the following would happen to you if you used marijuana, even once or twice, over the next 12 months, I would . . . 1. *Damage my brain*? 2. *Mess up my life?* 3. *Do worse in school?* 4. *Be acting against my moral beliefs?* 5. *Lose my ambition?* 6. *Lose my friend's respect?* 7. *Have a good time with my friends?* 8. *Be more creative and imaginative?*" Item responses ranged from 1 (*very unlikely*) to 5 (*very likely*) (M = 4.14, SD = .87). Items were reflected so that high scores represent negative marijuana outcome expectations. The scale was internally consistent (α = .88).

Expectations of punishment. Adolescents were asked at R1 about the severity of punishment they expected to receive if caught using controlled substances with the following item: "If one of your {parents/caregivers} knew that you used tobacco or alcohol, how likely is it that he or she would punish you in some way?" Response options ranged from 1 (*not at all likely*) to 5 (*very likely*). The response distribution for this measure (M = 4.18, SD = .92) was as follows: 1 (n = 35), 2 (n = 43), 3 (n = 88), 4 (n = 219), 5 (n = 1,061). In the absence of questions relating specifically to marijuana, this item served as a proxy for expected parental responses to controlled substance use.

Attitudes toward marijuana use. Two items from R1 were averaged to create a measure of youths' attitudes toward marijuana use: "Your using marijuana, even once or twice, over the next 12 months, would be . . ." 1 (*extremely bad*) to 7 (*extremely good*) and 1 (*extremely unenjoyable*) to 7 (*extremely enjoyable*), r = .62, $p <$ .001; M = 1.41, SD = .89.

RMU. RMU use was measured at R1. Parents were asked: "Have you ever, even once, smoked marijuana?" Those responding yes were asked, "How long has it been since you last smoked marijuana?" Responses were coded so that higher scores indicated

more recent use. Those answering *no* received a score of 1 (n = 689); other answers were scored as follows: 2 (*yes, more than 20 years ago,* n = 297), 3 (*yes, 16 to 20 years ago,* n = 148), 4 (*yes, 11 to 15 years ago,* n = 101), 5 (*yes, 6 to 10 years ago,* n = 61), 6 (*yes, 1 to 5 years ago,* n = 68), 7 (*yes, within the past year,* n = 26), or 8 (*yes, during the last 30 days,* n = 9).

Adolescents' marijuana use. Adolescents' use was measured at R2, which was administered approximately one year after R1. The originally abstinent respondents from R1 were asked at R2, "Have you ever, even once, smoked marijuana?" Those responding yes were asked, "How long has it been since you last smoked marijuana?" Those answering *no* received a score of 1 (n = 1279); other answers were scored as follows: 2 (*yes, more than 30 days but within the last 12 months,* n = 78), or 3 (*yes, during the last 30 days,* n = 42). These rates of initiation are in the range of other national studies (Substance Abuse and Mental Health Services Administration, 2011).

Several demographic variables were collected at R1, including the respondent's age (M = 13.56, SD = 1.45), gender (there were 693 females and 706 males), race/ethnicity (967 respondents were Caucasian; 196 were African American, 185 were Hispanic, and 51 were Asian), and parent's education (200 less than high school diploma, 466 high school diploma, 380 some college, and 353 college degree).

Results

Entering gender, race, and parent's education, as well as which parent was interviewed (mother or father) as covariates in the forthcoming regression analyses did not significantly affect the relationship between parents' RMU and adolescents' initiation of marijuana use; however, age was significantly associated with R2 marijuana use (r = .12, $p < .001$) and so was included as a covariate in all analyses. As shown in Table 1, children's R1 expectations, anticipated punishment, and attitudes toward marijuana were all significantly related (all $p < .001$) to parents' RMU scores (also assessed at R1). Direction of all correlations was consistent with hypotheses.

Direct Effects of Parent Lifetime Use/Nonuse

R2 usage of children of lifetime abstinent parents (n = 689) was compared with that of children whose parents had used at some point in the past (n = 710) in a logistic regression analysis. With past usage and youth age entered as predictors, the analysis revealed that children of parents who had ever used marijuana were significantly more likely to use marijuana than children whose parents had never used the substance (B = .851, SE = .18, Wald χ^2 = 22.39, df = 1, $p < .001$, odds ratio [OR] = 2.34).

Mediation

RMU and its association with factors thought to affect adolescents' usage were investigated in a series of mediation analyses. The mediation of expectations of parental punishment, marijuana outcome expectations, and attitudes on the relationship between parents' RMU and their children's marijuana use (with age as a covariate) was assessed using a bootstrapped multiple mediation method (Antonakis, Bendahan, Jacquart, & Lalive, 2010; Bollen, 1987, 1989; Preacher & Hayes, 2004, 2008). In this analysis 20,000 bootstrapped samples were drawn to estimate indirect effects of each of the mediators. Bias corrected and accelerated 95% confidence intervals (CIs) were computed to determine statistical significance of the ab paths of each mediator. A CI that does not include zero provides evidence of a significant indirect effect, or significant mediation Preacher & Hayes, 2008). The parent and adolescent use variables were skewed, but the bootstrapped approach adjusts for bias and skewness in the sampling distribution (Antonakis et al., 2010; Preacher & Hayes, 2004, 2008). The results of the mediation model are presented in Figure 1. The point estimates, *SE*s and 95% bias corrected and accelerated (BCa) CI are reported in Table 2.

Total effects. Taken together, adolescents' attitudes, expectations of parental punishment, and marijuana outcome expectations at R1 significantly mediated the effects of parental RMU on adolescents' usage initiations at R2. The total effect of RMU on adolescent marijuana use (path c) was statistically significant (b = −.06, SE = .011, $p < .001$). When the three mediators were entered simultaneously, the direct effect (path c') remained significant, (b = −.05, SE = .011, $p < .001$). The total indirect effect through the three mediators (paths $a1b1 + a2b2 + a3b3$) was the difference between the total and direct effects. The point estimate was .010, and the 95% BCa confidence intervals of .005 to .018 did not include zero, indicating statistically significant partial mediation.

Specific indirect effects. Decomposing the overall mediation model provides more precise information. The directions of paths $a1$ and $b1$ for expectations of parental punishment were consistent with the hypothesis that children of parents with lower RMU scores had higher expectations of being punished. The more severe the expected punishment, the less likely were the abstinent adolescents (at R1) to use marijuana one year later. Parental RMU (path $a1$) significantly predicted children's expectations of parental punishment (b = −.076, SE = .015, $p < .001$), and expectations of parental punishment (path $b1$) significantly predicted adolescent marijuana use at R2, (b = −.055, SE = .020, p = .006). The indirect effect of expectations of parental punishment had a point estimate of .004; the 95% BCa confidence interval of .001 to .011 did not include zero, demonstrating that expectations of punishment significantly mediated the relationship between parental RMU and adolescent marijuana use.

The directions of paths $a2$ and $b2$ for marijuana expectancies revealed a positive association between parents' RMU and their

Table 1
Correlations Between Child Marijuana Use, Parent Marijuana Use, Expectation of Punishment, Attitude, and Expectations

Item	V1	V2	V3	V4
V1. Child marijuana use	—			
V2. Parent marijuana use	.13***	—		
V3. Punish	−.14***	−.13***	—	
V4. Attitude	.18***	.08**	−.19***	—
V5. Expectations	−.13***	−.07*	.24***	.34***

Note. All variables were measured at R1, except child marijuana use, which was measured at R2.
* $p < .05$. ** $p < .01$. *** $p < .001$.

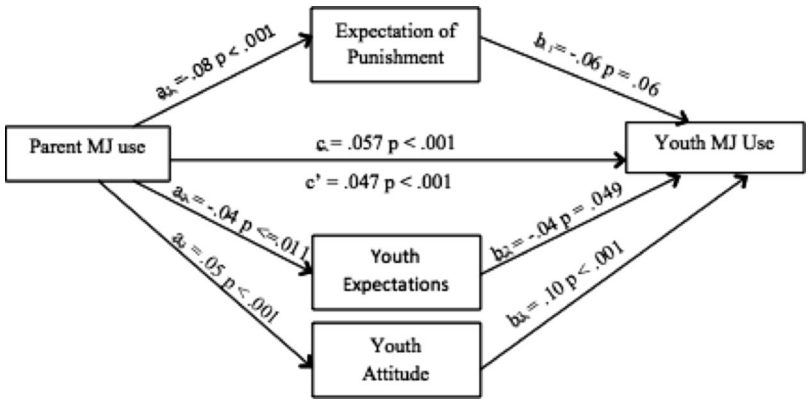

Figure 1. Mediation model. *Note*. All variables were measured at R1 except youth marijuana use, which was measured at R2, and the effects were controlled for age measured at R1.

children's positive expectations toward usage. Furthermore, the more positive their expectations, the more likely were adolescents to use marijuana one year later. Parental RMU (path *a2*) was significantly associated with children's expectancies ($b = -.036$, $SE = .014$, $p = .011$), and expectancies (path *b3*) were significantly linked to adolescent marijuana use at R2 ($b = -.043$, $SE = .022$, $p < .05$). The indirect effect of expectancies had a point estimate of .002; the 95% BCa confidence interval of .0001 to .0047 did not include zero, leading to the conclusion that expectancies significantly mediated the relationship between parents' RMU and adolescent marijuana use.

The directions of paths *a3* and *b3* for attitudes toward marijuana were consistent with the prediction that children of parents with high RMU scores would express more positive attitudes toward marijuana, and the more positive their attitudes, the more likely they were to use the drug one year later. RMU (path *a2*) significantly predicted R1 attitudes ($b = .049$, $SE = .014$, $p < .001$), and attitudes (path *b2*) significantly predicted adolescent marijuana use at R2, ($b = -096$, $SE = .021$, $p < .001$). The indirect effect of attitude had a point estimate of .005; the 95% BCa confidence interval of .002 to .010 did not include zero. Adolescents' attitudes toward marijuana mediated the relationship between parents' and adolescents' marijuana use.

Discussion

The central goals of the analyses were to determine the association between the RMU and their children's initiation of use, and the factors that mediated the relationship. As shown, if parents had ever used marijuana, the odds of their children initiating the drug's use were more than twice that of children whose parents had never done so. This result is remarkable insofar as the parents who reported use had, on average, quit between 11 to 20 years prior to the research (mean RMU = 3.39). Furthermore, the analyses revealed reasons for this significant association, and thus, may contribute to adolescent drug prevention in ways that might benefit future research and applied preventive interventions.

The findings are consistent with, and extend, previous research that indicated an association between parental use and their children's attitudes toward marijuana (Andrews et al., 1993; LaBrie, Hummer, Lac, & Lee, 2010). These earlier studies, however, were based on convenience samples, and thus were not confidently generalizable to the population at large. The NSPY made use of a nationally representative youth sample, and in addition, allowed for assessment of the effects of the RMU, information that was not available in most prior examinations of this issue.

Analysis revealed that the association of parents' RMU with their children's marijuana use was mediated by three variables: their children's general expectations of usage outcomes, attitudes toward marijuana use, and estimates of likely punishment. There is no doubt that teenage drug use is related to many personal and environmental features (Castellanos-Ryan, Rubia, & Conrod, 2011; Ersche, Turton, Pradhan, Bullmore, & Robbins, 2010), but a significant factor in adolescents' marijuana initiation and use may be the expectations arising from their close and long-term interaction with parents. The implications of this possibility should not be minimized. There may be little we can do to alter behavior that occurred many years in the past, but the effects of that behavior may be attenuated. Making salient to parents the importance of the drug-relevant messages they convey to their children, and the subtle implicit cues of which they must be aware may help reduce the odds of their abstinent children initiating marijuana use. Most parents, for example, are unaware that marijuana's potency has risen steadily over the past 30 years, as have the drug's attendant dangers (NIDA, http://www.drugabuse.gov/publications/research-reports/marijuana-abuse/how-does-marijuana-produce-its-effects). This suggests that youth drug pre-

Table 2
Bootstrapped Point Estimate and Confidence Intervals for the Indirect Effect of Expectations of Punishment, Attitude, and Expectations on Child Marijuana Use

			BCa 95% CI	
	Point estimate	*SE*	Lower	Upper
Punishment	.0042	.0024	.0007	.0106
Attitude	.0047	.0022	.0015	.0103
Expectations	.0015	.0011	.0001	.0047
Total effect	.0104	.0034	.0049	.0183

Note. Bca = bias corrected and accelerated; CI = confidence interval.

vention efforts may be profitably directed toward parents, who would prove more open and nonreactive than the primary prevention target, their children.

Limitations

As with almost all secondary analyses, the original research instruments and design of the NSPY limited available analyses. The measure of parental marijuana usage, for example, combined recency of use with a dichotomous use/nonuse indicator. The direct effects and RMU analyses, however, helped to offset this limitation. Another limitation was that the survey did not assess adolescents' knowledge of their parents' (current or prior) drug use. Even so, the consistency of the results and their fit with expectations suggest that the measures, while improvable, provided important information. The lack of variables specific to the research questions might have attenuated the strength of observed relations, and this could have fostered the relatively small but significant effect sizes across the mediation variables. Recall that in a national sample, even small effects imply large population differences (Derzon & Lipsey, 2002).

Conclusion

It has long been established that children of parents who use drugs are more likely to use drugs themselves. What was less clear was why this relationship held, and what could be done about it. Our research suggests that parental usage and the recency of that use can have an influence on children's marijuana initiation. Children of more recent parent marijuana users expected less severe reproofs for initiating marijuana use, held more positive outcome expectancies of use, and were more positively attuned to the drug. Given this association of parents' behavior with their offspring's marijuana initiation, future adolescent drug prevention interventions might logically be targeted to parents, rather than adolescents, the focal targets of the campaign. Interventions targeting parents have the potential to influence parental attitudes (Summers, Wood, Russell, & MacGill, 2012), thereby altering parental behavior, and may indirectly affect adolescents' attitudes, as they are less likely to counterargue messages directed toward parents (Crano, Siegel, Alvaro, & Patel, 2007).

For parents who currently use marijuana, preventive communications should stress the fact that their actions may influence their children's expectations, attitudes, and ultimately, initiation of marijuana use. If results of the type found in this study were transmitted persuasively, it is conceivable that the ensuing effects on adolescent drug use might prove stronger than those seen in response to prevention campaigns that target the adolescents directly, raising the intriguing possibility that the path to moderating adolescent marijuana use might best run through the parent.

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