

Exploring Cannabis-Specific Parenting as a Mechanism of the Intergenerational Transmission of Cannabis Use and Cannabis Use Disorder

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ABSTRACT. Objective: Parental cannabis use disorder (CUD) is a known risk factor in the development of adolescent cannabis use. One potential mechanism is parenting behaviors. This study considered cannabis-specific parenting strategies as a mechanism of the relation between parental CUD and adolescent cannabis use. **Method:** Pathways were examined using multilevel longitudinal mediation models ($N = 363$, mean age = 16.3 years) comparing adolescent offspring of parents who never used cannabis, parents who used cannabis without CUD, and parents with CUD. **Results:** Parental cannabis use history did not

significantly predict parental sharing of negative experiences with cannabis or parental strategies to prevent cannabis use. Cannabis-specific strategies did not successfully deter adolescent use. Parental sharing of negative experiences with cannabis use in fact predicted increased adolescent cannabis use. **Conclusions:** Cannabis-specific parenting did not reduce adolescent cannabis use, and sharing negative experiences was detrimental. Future studies should consider alternative mechanisms underlying the intergenerational transmission of cannabis use. (*J. Stud. Alcohol Drugs*, 80, 32–41, 2019)

RESEARCH SUGGESTS THAT adolescents who use cannabis are at heightened risk for academic problems (Meier et al., 2015), neuropsychological decline (Meier et al., 2012), and mental health problems (Arsenault et al., 2002; Bagot et al., 2015; Caspi et al., 2005). Given these costs, it is important to understand risk factors that contribute to adolescent cannabis use. One important factor is parental cannabis use history. Research is needed to understand the impact of parental cannabis use and cannabis use disorder (CUD) on adolescent offspring use, and the mechanisms by which parents transmit risk for cannabis use to their children. The current study tested cannabis-specific parenting as one mechanism through which parental cannabis use or parental CUD transmits risk for cannabis use to offspring.

Studies have shown that parental cannabis use is associated with increased risk of adolescent use (Henry & Augustyn, 2017; Hill et al., 2018; Kosty et al., 2015), but few studies have examined the mechanisms underlying this relation. One proposed mechanism is parenting behaviors that are intended to deter adolescent substance use, including setting rules against substance use, discussing reasons not to use substances, and sharing personal negative experiences

with substance use. These parenting behaviors are referred to as “substance-specific” parenting, and several studies have assessed how these parenting behaviors affect adolescent substance use (Chassin et al., 1998; Handley & Chassin, 2013; Vermeulen-Smit et al., 2015). Findings suggest that different substance-specific parenting strategies have different effects. For example, several studies found that parental rules to prohibit substance use and parental discussion and punishment of smoking were associated with decreased adolescent smoking (Chassin et al., 1998, 2002), but parental disclosure of their negative experiences with alcohol was associated with higher levels of adolescent drinking (Handley & Chassin, 2013). To date, only one study has assessed the impact of cannabis-specific parenting on adolescent use, and this study focused exclusively on parental rules to restrict cannabis use, which were associated with less adolescent cannabis use (Vermeulen-Smit et al., 2015).

Moreover, parental substance use history has been found to affect substance-specific parenting strategies, suggesting that parental cannabis use history might influence use of cannabis-specific parenting strategies. To our knowledge, this has not been tested in the cannabis literature. In the tobacco

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literature, studies found that former smokers displayed more smoking-specific parenting than current smokers (Chassin et al., 2002), and discussion of smoking reduced adolescent smoking only when parents were not smokers (Chassin et al., 2005). A study of alcohol-specific parenting practices found that parents with higher levels of drinking were more likely to disclose their own negative experiences with alcohol than parents who drink less (Handley & Chassin, 2013). Taken together, these findings suggest that parents' own history of cannabis use or CUD may affect both the strategies parents implement and how effective these strategies are at reducing adolescent substance use.

Parental cannabis use history is also an important risk factor that influences the development of adolescent cannabis use. Indeed, parental CUD has been shown to increase the likelihood of CUD in adolescent offspring (Henry & Augustyn, 2017; Kosty et al., 2015), and parental cannabis use, even without the presence of disorder, has been shown to increase the risk of adolescent cannabis use (Bailey et al., 2016). Despite these findings, few studies have assessed differential risk conferred by parental cannabis use versus parental CUD. Thus, it is difficult to know whether parental cannabis use without CUD conveys risk for adolescent cannabis use, and whether parental CUD increases adolescents' risk, relative to parental cannabis use without CUD. Given that a diagnosis of CUD includes difficulty fulfilling role obligations within the home and the parenting role, parental CUD may be particularly detrimental.

This study tested the hypothesis that cannabis-specific parenting strategies are a mechanism through which parental cannabis use and parental CUD influence adolescent cannabis use. Given that the sample included siblings nested within families, the current study used a multilevel mediation model to parse apart cannabis-specific parenting practices that are shared across adolescents in the same family from those that are specific to one adolescent in the family. If family-level cannabis-specific parenting practices (parenting practices that are shared across adolescents in the same family) significantly predict adolescent cannabis use, this suggests that parenting that is the same across adolescents (i.e., because of the parent's characteristics and parenting choices) is important. If individual-level cannabis-specific parenting practices (parenting practices that are specific to one adolescent in the family) significantly predict adolescent cannabis use, this suggests that the cannabis-specific practices unique to an adolescent (perhaps because of that adolescent's individual characteristics or other time-varying characteristics of the parents/family environment) are predictive of later adolescent use.

One other study of the current sample (Hill et al., 2018) used this methodology to assess general parenting as a mediator of the relation between parental cannabis use history and offspring adolescent cannabis use. This study found that parental CUD affected family-level but not individual-level

parenting. However, because cannabis-specific parenting may be more malleable than general parenting (Ennett et al., 2001), separating family- and individual-level effects is important for prevention research because results at the family level would have different intervention implications than results at the individual level.

In summary, the current study tested whether parental cannabis use history, including parental use without CUD and parental CUD, confers risk for adolescent cannabis use through cannabis-specific parenting practices. Specifically, this study examined (a) whether cannabis-specific parenting practices mediated the effects of parental cannabis use history on offspring cannabis use and (b) the impact of parental cannabis use versus parental CUD on adolescent cannabis use. We tested four specific hypotheses. First, we hypothesized that parental cannabis use would be related to lower levels of parental discussion and behaviors to prevent cannabis use (Kerr et al., 2015; Lac & Crano, 2009), and higher levels of parental disclosure of negative experiences with cannabis (Handley & Chassin, 2013). Second, we hypothesized that parental discussion and behaviors to prevent cannabis use would be predictive of lower levels of adolescent cannabis use, whereas disclosure of negative experiences with cannabis would be predictive of higher levels of adolescent cannabis use (de Looze et al., 2012; Handley & Chassin, 2013; Lac & Crano, 2009; Vermeulen-Smit et al., 2015). Third, we hypothesized that any parental cannabis use history would directly confer increased risk for adolescent cannabis use (Henry & Augustyn, 2017; Kosty et al., 2015). Fourth, we hypothesized the indirect effects of parental cannabis use history on adolescent cannabis use through the mediators of parenting practices to prevent cannabis use and disclosure of negative experiences with cannabis.

Method

Participants

Participants were drawn from the third generation of a longitudinal and multigenerational study of families with alcohol use disorder (AUD) and matched controls (see Chassin et al., 1992; see supplemental material for recruitment details). The original study began with 454 families with at least one adolescent (Generation 2 [G2]) and their parents (Generation 1 [G1]). G1s and G2s were interviewed over six waves of data collection, and, at Wave 5, Generation 3 (G3) was added to the study ($M_{\text{age}} = 5$ years). Siblings of the G2s and spouses/partners of the G2s were added at Wave 4. The G3s were then assessed for an additional three waves (Waves 7–9). Participants in the current study were 363 adolescents from G3.

Participants selected for this study were between ages 13 and 19 years at Wave 8 when cannabis use was assessed. These adolescents self-reported their cannabis use. For

TABLE 1. Descriptive statistics for all variables by parental cannabis use history and in total sample

Variable	No parental cannabis use			Parental cannabis use only			Parental CUD			Total sample		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Adolescent age at Wave 8	107	16.28 _a	1.79	157	16.4 _a	1.9	99	16.3 _a	1.72	363	16.3	1.84
Adolescent sex (% female)	107	60.6 _a	—	157	51.0 _{ab}	—	99	39.4 _b	—	363	48.9	—
Adolescent ethnicity (% White)	107	76.9% _a	—	157	51.0% _{ab}	—	99	58.2% _b	—	363	60.4%	—
Parental education	107	7.7 _a	2.1	157	6.21 _b	2.3	99	5.56 _c	2.4	363	6.42	2.43
Positive parenting	107	0.29 _a	0.75	157	0.03 _b	0.79	99	-0.21 _c	0.80	363	0.04	0.81
Adolescent cannabis use: % No use; % less than monthly	107	91.3% _a ; 6.7% _a		157	76.4% _b ; 16.6% _b		99	61.6% _c ; 26.3% _c		363	76.9%; 16.2%	
Parental strategies to prevent cannabis use	107	0.01 _{ab}	0.96	157	0.09 _a	0.98	99	-0.14 _b	0.90	363	0.00	0.96
Parental sharing of negative experiences to prevent use	107	-0.01 _a	0.96	157	0.03 _a	0.83	99	-0.02 _a	0.85	363	0.00	0.79

Notes: Means with different subscripts are significantly different at $p < .05$ using analysis of variance with Tukey post hoc between-group comparisons and chi-square tests with Bonferroni correction post hoc between-group comparisons. Positive parenting, parental strategies to prevent cannabis use, and parental sharing of negative experiences to prevent use are standardized factor scores, where scores near zero are mean levels, negative scores are low levels, and positive scores are high levels. Adolescent cannabis use is an ordered categorical variable with the following categories: 0 = no use, 1 = less than monthly, 2 = monthly or more (not shown). Parental education is an ordered categorical variable where higher scores indicate higher levels of education; mean level in total sample ($M = 6.42$) indicates parents graduated high school and completed some vocational/technical school. CUD = cannabis use disorder.

parental data, adolescent reports about biological custodial parents were used. If only one biological custodial parent's data was available, only that parent was included in analyses. Adolescents who did not report on their cannabis use at Wave 8 or were not between ages 13 and 19 years were excluded. Descriptive data on included and excluded participants are presented in the supplemental materials (see Table S1). (Tables S1–S5 appear in an online-only addendum to the article on the journal's website.) There were no significant differences between included and excluded participants on any variable. Characteristics of the participants in each of the parental cannabis use groups are in Table 1.

Measures

Parental cannabis use history. Parental history of cannabis use was gathered from biological custodial parents. Cannabis use history was categorized as follows: (a) neither parent ever used cannabis, (b) at least one or both parents used cannabis but neither parent ever met criteria for CUD, and (c) one or both parents had a history of CUD. CUD diagnoses were obtained using a computerized version of the Diagnostic Interview Schedule IV (Robins et al., 2000) over Waves 4, 5, and 6 (parent average ages: 21.1, 25.7, and 34.1 years, respectively), which assessed lifetime and past-year CUD. If one parent was not available for interview, diagnoses were obtained from the spousal report using the Research Diagnostic Criteria (RDC; Andreasen et al., 1977). If either parent ever met criteria for CUD at any wave, parental cannabis use history was categorized as "parental history of CUD." If either parent ever used cannabis at any wave and neither parent was ever dependent, parental cannabis use history was categorized as "parental cannabis use without CUD." All but two parents with a history of CUD continued to meet criteria for CUD when parenting was assessed. Simi-

larly, all but one parent who endorsed using cannabis without a history of CUD continued using cannabis when parenting was assessed.

Cannabis-specific parenting. Adolescents reported on each of their parents' cannabis-specific parenting at Wave 6 when they were mean age 11.6 years. Parenting was assessed using eight items from the Indiana Smoking Study (Chassin et al., 2002). Responses for these items ranged from 1 (*almost never*) to 5 (*almost always*). Example items include "talks to me about the dangers of using cannabis," "takes action to prevent me from using cannabis," and "shares negative experiences associated with cannabis use to prevent cannabis use." Because of the high correlations between adolescent reports of mothers' and fathers' cannabis-specific parenting ($r = .7-.9$), cannabis-specific parenting strategies were collapsed across parents. As in a previous study (Handley & Chassin, 2013), an exploratory factor analysis found evidence for two factors: a "Parental Sharing of Negative Experiences with Cannabis" factor and a "Parental Strategies to Reduce Cannabis Use" factor. The data fit this two-factor structure well: root mean square error of approximation = .053, comparative fit index = .99, and standardized root mean square residual = .017. Loadings for both factors were strong and significant ($p < .01$).

Adolescent cannabis use. Adolescents indicated the most they had ever used cannabis in their lives at Wave 8 of data collection (age range: 13–19 years; $M = 16.3$).¹ Response options ranged from 1 (*never*) to 8 (*every day*). This question was recoded into three categories to create an ordered

¹Only 9 of the total 363 participants reported that they had used marijuana before Wave 8 of data collection. Exclusion of these 9 participants does not change the direction of the effect in our results. Of these 9 participants, all but 2 increased their cannabis use from Waves 6 and 7 to Wave 9. Results are unchanged by the exclusion of these 2 participants.

categorical variable: 0 (*never used*), 76.9% of the sample; 1 (*used less than monthly*), 16.2% of the sample; and 2 (*used monthly or more*), 6.1% of the sample.² This variable was treated as an ordered categorical variable in analyses.

Demographics. Participants reported on their age, sex, and ethnicity (Table 1). These variables were used as covariates in all models as they are related to parenting practices and adolescent cannabis use (Chen & Jacobson, 2012; Svensson, 2003). Ethnicity was a binary variable, where 0 = *White* (non-Hispanic White) and 1 = *non-White* (Hispanic or any minority race). Parental age at birth of the G3 was considered as a covariate but had no significant effect and was dropped (see supplemental material and Tables S3 and S4).

Parental education. Parents reported their highest level of education at Wave 6 of data collection, when parents were an average age of 34.1 years—an age by which most people have attained their highest level of education. The responses ranged from 1 (*eighth grade or less*) to 11 (*completed graduate or professional school*). The highest level of education obtained by either parent was used. This variable was treated as continuous, with higher scores indicating higher education. It was included as a covariate because parental education is associated with both cannabis use and parenting (Wills et al., 1995).

Parental alcohol use disorder. Because the larger study oversampled families with alcohol disorders, parent AUD was included as a covariate. Diagnosis for biological custodial parents (lifetime abuse or dependence according to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* [DSM-IV; American Psychiatric Association, 1994]) was obtained using a computerized version of the Diagnostic Interview Schedule IV (Robins et al., 2000). Parents who were unavailable for interview were diagnosed using the RDC (Andreasen et al., 1977) via spousal interview. If either parent met DSM-IV criteria for lifetime alcohol abuse or dependence at any of the three waves (Waves 4–6; average ages of 21.1, 25.7, and 34.1 years), they were coded as positive for AUD, and this binary variable was used as a covariate.

Positive parenting. Adolescents reported on parental support, monitoring, and consistency of discipline at Wave 6 ($M_{\text{age}} = 11.6$). Reports for mother and father were combined, and a factor score for positive parenting was created. The positive parenting factor was included as a covariate because it is associated with adolescent cannabis use and parental cannabis use (Hill et al., 2018; see supplemental material for details).

Data analytic plan

To assess the effects of parental cannabis use history on adolescent cannabis use through the mediator of cannabis-

specific parenting, we tested two single-mediator models in ordered logistic regressions using Mplus Version 7.11 (Muthén & Muthén, 2007). To account for the clustering of adolescents within families, we used a multilevel modeling approach (for more information, see supplemental material). Parental history of cannabis use was measured at the family level (level 2) because this variable was the same for every adolescent within a family. Cannabis-specific parenting and adolescent cannabis use were measured at the individual level (level 1), meaning each individual adolescent reported on his/her parents' cannabis-specific parenting as well as on his/her own cannabis use. Dummy codes were used to ascertain the differences between parental cannabis history groups (never used, used without CUD, and CUD). All models were fit using Mplus (Version 7.11; Muthén & Muthén, 1998–2015), and parameters were estimated using full information maximum-likelihood estimation. Indirect effects were tested using RMediation (Tofiqhi & Mackinnon, 2011).

Results

Descriptive analyses

Means and standard deviations on all measures are presented in Table 1, and correlations between all variables are in Table S2. Before estimating the full mediation models, we regressed parental cannabis use history on adolescent cannabis use, controlling for age, gender, ethnicity, positive parenting, and parental education to better understand how the model changed with the addition of the mediator. Adolescents whose parents used cannabis with no CUD had significantly higher odds of belonging to a higher cannabis use level than adolescents whose parents never used cannabis (adjusted odds ratio [AOR] = 4.1, $p < .01$). Similarly, having parents with CUD significantly increased the odds of adolescents belonging to a higher cannabis use level than having parents who had never used cannabis (AOR = 13.4, $p < .001$). Finally, adolescents of parents with CUD had significantly higher odds of belonging to a higher cannabis use level than adolescents whose parents used cannabis without CUD (AOR = 3.15, $p < .01$).

Full mediation model with parental sharing of negative experiences with cannabis

Table 2 and Figure 1 show the results of the mediation model for parental sharing of negative experiences with covariates of sex, age, ethnicity, parental AUD, positive parenting, and parental education. The fitted model correctly classified 85.59% of adolescents in terms of their cannabis use. Parental history of cannabis use had no statistically significant effect on the family-level reports of parental sharing of negative experiences with cannabis. The individual-level direct effect of parental sharing of negative experiences with

²A decision was made to create an ordered categorical variable as opposed to a binary variable because we did not want to conflate adolescents who had used once or twice in their lives with adolescents who used more regularly.

TABLE 2. Standardized coefficients of the effect of parental cannabis history use group on adolescent cannabis use through parent sharing of negative experiences with cannabis

Predictor/covariates	Mediator			Dependent variable	
	Parental sharing of negative experiences with cannabis			Adolescent cannabis use	
	<i>B</i>	<i>SE</i>	<i>p</i>	AOR	<i>p</i>
Within (individual) level					
Age	–	–	–	1.43	.006**
Sex	–	–	–	0.72	.290
Ethnicity	–	–	–	1.20	.603
Positive parenting	–	–	–	0.85	.630
Parental sharing of negative experiences with cannabis	–	–	–	0.59	.410
Between (family) level					
No parental cannabis use vs. parental cannabis use	-0.09	0.12	.389	1.87	.192
No cannabis use vs. parental cannabis dependence	-0.09	0.16	.572	3.88	.024*
Parental cannabis use vs. parental cannabis dependence	0.01	0.13	.925	2.06	.038*
Parental sharing of negative experiences with cannabis	–	–	–	1.81	.005**
Age	0.07	0.03	.045*	1.81	.000**
Parental education	-0.01	0.02	.524	.95	.563
Parental alcohol use disorder	0.14	0.09	.195	3.03	.016*
Positive parenting	0.02	0.09	.213	0.29	.000**

Notes: Paths that were run exclusively as between-level paths are denoted with “–” in the within-level path section. Parental alcohol use disorder is a dichotomous variable. 0 = no disorder; 1 = alcohol use disorder. AOR = adjusted odds ratio.

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

cannabis on adolescent cannabis use was not significant. However, the family-level direct effect of parental sharing of negative experiences with cannabis on adolescent cannabis use was significant (AOR = 1.81, $p < .01$), such that higher mean levels of parental sharing of negative experiences increased the odds of an adolescent belonging to a higher cannabis use level.

As with the univariate analyses, after inclusion of the mediator, parental CUD was associated with increased odds of an adolescent belonging to a higher cannabis use group. Compared with adolescents whose parents never used cannabis, adolescents of parents with CUD had greater odds of belonging to a higher cannabis use level (AOR = 3.88, $p < .05$). Similarly, adolescents of parents with CUD were more likely to belong to a higher cannabis use level than were adolescents whose parents used cannabis without CUD (AOR = 2.06, $p < .05$); adolescents of parents who used cannabis without CUD were not at increased risk compared to adolescents whose parents never used cannabis.

In summary, although there was a significant direct effect of parental sharing of negative experiences with cannabis on adolescent cannabis use, there was no effect of parental cannabis use history on parental sharing of negative experiences with cannabis. Therefore, findings did not support parental sharing of negative experiences as a mediator of the association between parental history of cannabis use and adolescent cannabis use.

Full mediation model with parental strategies to prevent cannabis use

The second model tested the effect of parental cannabis use history on adolescent cannabis use, mediated by parental strategies to prevent cannabis use. Covariates in the model were sex, age, ethnicity, parental AUD, positive parenting, and parental education. The fitted model correctly classified 82.94% of the adolescents included in the analysis. Results from this model are in Table 3 and Figure 2.

The family-level direct effect of parental cannabis use history on parental strategies to prevent cannabis use was not statistically significant. The direct effect of parental strategies to prevent cannabis use on adolescent cannabis use also was not statistically significant at the individual or family levels. However, the family-level direct effect of parental cannabis use history on adolescent cannabis use was statistically significant. Again, as with the univariate analyses, after inclusion of the mediator, adolescents of parents with CUD had greater odds of belonging to a higher adolescent cannabis use level compared to adolescents with parents who never used cannabis (AOR = 3.78, $p < .05$). Also, adolescents of parents with CUD were more likely to belong to a higher adolescent cannabis use group than were adolescents whose parents used cannabis without CUD (AOR = 2.04, $p < .05$). Again, adolescents of parents who used cannabis without CUD were not at increased

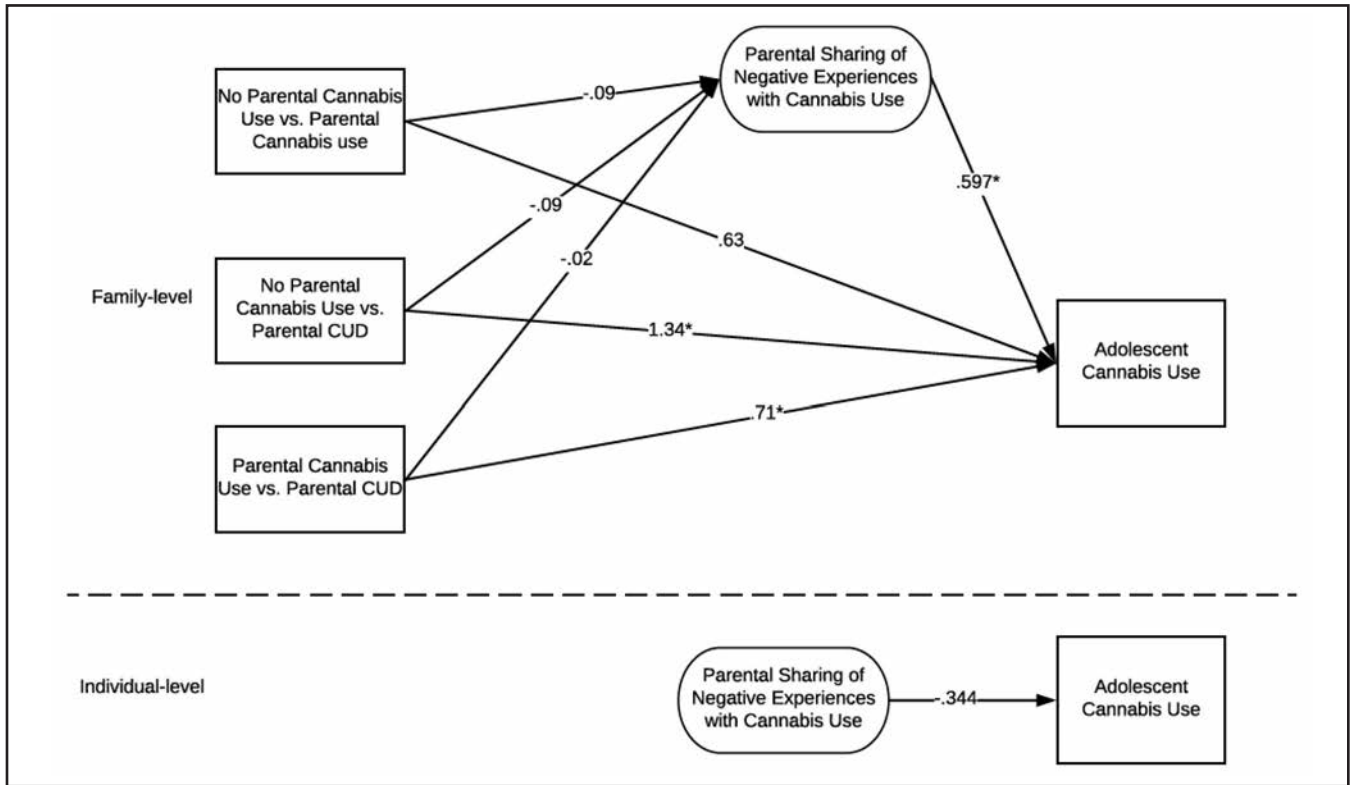


FIGURE 1. Path diagram of full mediation model. Path estimates marked * are significant at the .05 level. Each path from parental cannabis use history to adolescent cannabis use is labeled with the direct effect (estimate for the effect of parental cannabis use history on adolescent cannabis use, with parental sharing of negative experiences and covariates age, sex, ethnicity, positive parenting, and parental education controlled for). CUD = cannabis use disorder. * $p < .05$.

TABLE 3. Standardized coefficients of the effect of parental cannabis history use group on adolescent cannabis use through parent strategies to prevent cannabis use

Predictor/covariates	Mediator			Dependent variable	
	<i>B</i>	<i>SE</i>	<i>p</i>	AOR	<i>p</i>
Within (individual) level					
Age	–	–	–	1.41	.009**
Sex	–	–	–	0.76	.376
Ethnicity	–	–	–	1.21	.592
Positive parenting	–	–	–	0.83	.600
Parental strategies to prevent cannabis use	–	–	–	0.85	.674
Between (family) level					
No parental cannabis use vs. parental cannabis use	-0.12	0.16	.430	1.88	.184
No cannabis use vs. parental cannabis dependence	-0.29	0.18	.117	3.78	.024*
Parental cannabis use vs. parental cannabis dependence	-0.17	0.14	.216	2.04	.042*
Parental strategies to prevent cannabis use	–	–	–	1.34	.181
Age	0.06	0.04	.100	1.81	.000**
Parental education	-0.05	0.03	.031*	0.97	.666
Parental alcohol use disorder	0.16	0.13	.225	3.16	.008**
Positive parenting	0.30	0.10	.004**	0.29	.000**

Notes: Paths that were run exclusively as between-level paths are denoted with “–” in the within-level path section. Parental alcohol use disorder is a dichotomous variable. 0 = no disorder, 1 = alcohol use disorder. AOR = adjusted odds ratio.

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

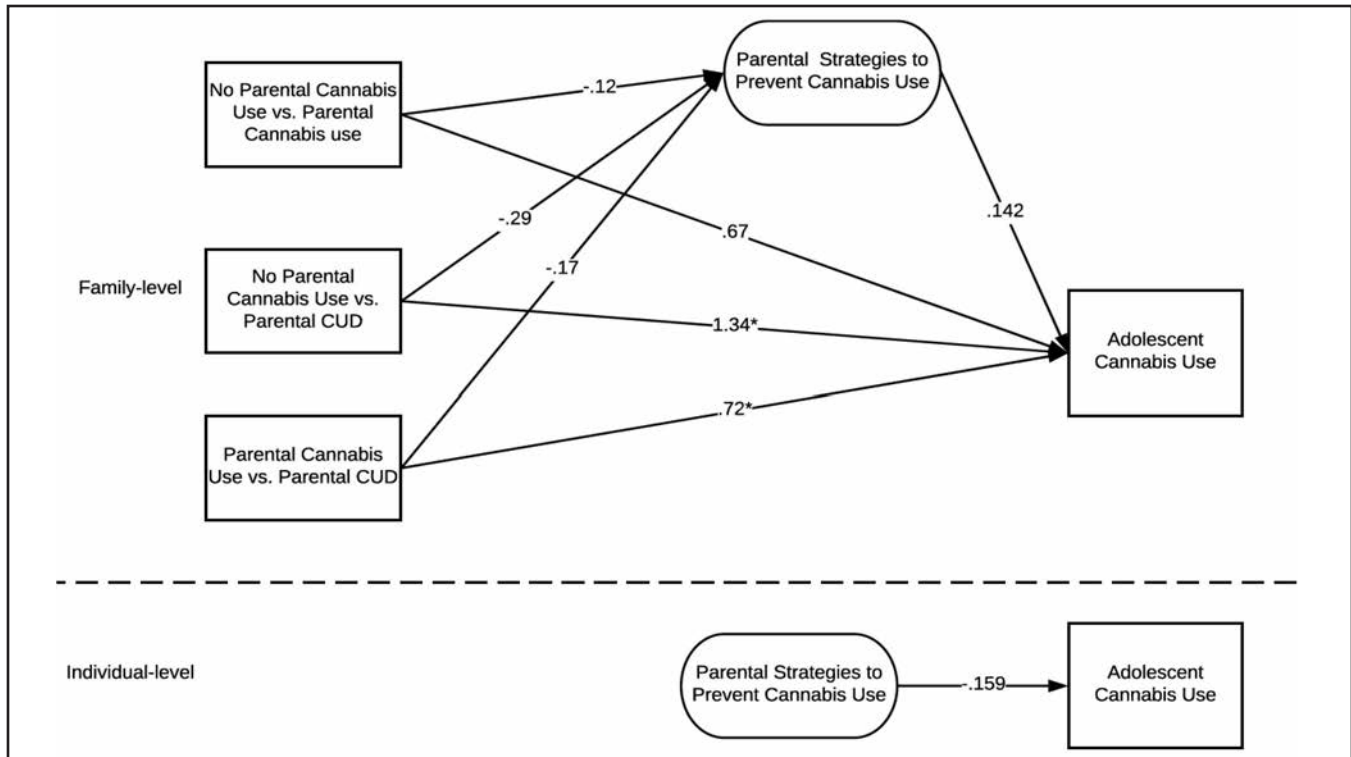


FIGURE 2. Path diagram of full mediation model. Path estimates marked * are significant at the .05 level. Each path from parental cannabis use history to adolescent cannabis use is labeled with the direct effect (estimate for the effect of parental cannabis use history on adolescent cannabis use, with parental strategies to prevent cannabis use and covariates age, sex, ethnicity, positive parenting, and parental education controlled for). CUD = cannabis use disorder. * $p < .05$.

risk compared to adolescents whose parents never used cannabis.

In summary, there was no significant effect of parental cannabis use history on parental strategies to prevent cannabis use, and there was also no significant effect of parental strategies to prevent cannabis use on adolescent cannabis use. Thus, there was no support for a mediational model.

Discussion

The current study tested two cannabis-specific parenting strategies (parental strategies to prevent cannabis use and parental sharing of negative cannabis experiences) as mediating mechanisms linking parental cannabis use history to adolescent cannabis use. Findings contribute new knowledge in two important ways. First, as with previous studies (Bailey et al., 2016; Henry & Augustyn, 2017; Kosty et al., 2015), the present study found that parental cannabis use history conferred risk for adolescent use. Unlike previous studies, this study shows that parental CUD specifically conveys risk for adolescent cannabis use, as parental cannabis use without CUD was no longer significantly related to adolescent cannabis use after taking account of cannabis-specific parenting. Given that the criteria for diagnosis of CUD include impair-

ment in functioning, parental CUD may affect adolescents more than parental cannabis use without CUD.

Second, the current study found that the relation between cannabis-specific parenting and adolescent cannabis use differs depending on the specific parenting strategy. Whereas parenting strategies to prevent cannabis use were generally unrelated to adolescent cannabis use, parental sharing of negative experiences was associated with increased risk of adolescent use. It is surprising that parental strategies to prevent use were unrelated to adolescent cannabis use. For example, previous studies have shown that parental rules about cannabis use are associated with reduced risk for adolescent cannabis use (Vermeulen-Smit et al., 2015). One explanation for this discrepancy is that parental rules about cannabis use might be more protective against adolescent cannabis use than discussion of the dangers of cannabis, which is what was assessed in our study.

In general, findings from the alcohol and smoking literatures corroborate this notion, as several studies have found that parental rules are more protective than discussion of dangers (Van der Zwaluw et al., 2008; Van Zundert et al., 2007). Adolescents may be more responsive to clear parental limits and consequences following use than to parental warnings about the dangers of use. Therefore, cannabis-specific

parenting that does not include rules may be less effective at reducing adolescent cannabis use. In addition, timing of cannabis-specific parenting practices is important to consider. Some parents may choose to use these strategies proactively, generating a negative (protective) association between cannabis-specific parenting and adolescent cannabis use. Yet, other parents might use these strategies in response to adolescent use, thereby generating a positive (risky) association between cannabis-specific parenting and adolescent cannabis use. However, in this study, the latter process was not operating because very few adolescents had initiated cannabis use at the time of their reports of cannabis-specific parenting.

Importantly, parental sharing of negative cannabis experiences was predictive of increased adolescent use. This may be due to adolescents perceiving parental disclosure as normalizing, permissive, or attractive, and therefore might encourage adolescents' interest in using. This finding is consistent with previous literature in the sample, which showed a positive association between parental sharing of negative experiences with alcohol and adolescent drinking (Handley & Chassin, 2013). Moreover, parental sharing of negative experiences at the family level (i.e., common across siblings) was a much stronger predictor of adolescent cannabis use than was parental sharing that was specific to an individual adolescent. Importantly, this may mean that any parental sharing of negative experiences evoked by an adolescent as a result of his or her own behavior, peer group, or personality does not have as large an impact on use as the parental sharing of negative experiences that is common to all adolescents in the family before adolescent initiation of cannabis use. Future studies of cannabis-specific parenting, including rules about cannabis use, may consider a multilevel modeling approach to parse apart differential effects of rules about use common to the family as compared with rules about use specific to one adolescent within a family.

A surprising finding of the current study was that parental cannabis history was not related to parental strategies to prevent cannabis use. This may be because parental strategies to prevent cannabis use are significantly associated with positive parenting. In a previous study, we showed that parental cannabis use history in the current sample significantly predicts positive parenting, such that parents with CUD have significantly lower positive parenting than both parents who use cannabis without CUD and parents who have never used cannabis (Hill et al., 2018). Before the inclusion of positive parenting, parental CUD significantly predicted more parental strategies to prevent cannabis use as compared with parents who never used cannabis (see Table S5). However, after inclusion of positive parenting, parental cannabis use history does not uniquely predict parental strategies to prevent cannabis use over and above positive parenting.

In addition, parental cannabis history did not significantly predict parental sharing of negative experiences. This is contrary to findings from Handley and Chassin (2013), which

found that parental drinking history significantly predicted parental sharing of negative experiences with alcohol. However, there are perhaps more obvious negative experiences (i.e., blackouts, getting sick) related to alcohol use than to cannabis use, and the salience of these experiences may prompt parents with a history of heavy drinking to share these consequences with their children.

Strengths and limitations

A strength of the current study is the use of multilevel models to parse apart individual variability from familial variability, as well as the novel focus on cannabis-specific parenting. Additional strengths include the prospective prediction of adolescent cannabis use and direct diagnosis of parental CUD. Nevertheless, there are also several limitations to consider. Nonsignificant findings may be attributable to lack of statistical power. To our knowledge, there are no systematic simulation studies on the power to detect the effect of a predictor on an ordered categorical outcome variable in a multilevel mediation model. Models with categorical outcomes have diminished power as compared to models with continuous outcomes (Taylor et al., 2006). Although we have the power to detect small to moderate effects, we are likely underpowered to detect small effects.

Another limitation is that the current study used adolescent self-reports of substance use. Evidence suggests that adolescents both over-report and under-report substance use (Williams & Nowatzki, 2005). In addition, there is significant age heterogeneity among adolescents. Future studies may want to consider a smaller age range because there are different implications of being a non-user at younger versus older ages. Further, the current sample was ethnically homogenous, as the original data were collected to oversample Mexican Americans and non-Hispanic Whites. Also, nearly all parents who had ever used cannabis or met criteria for CUD continued to use and meet criteria after becoming parents in the current sample. There is evidence in the alcohol literature that parenting behaviors are less impaired in parents who have recovered from AUD as compared to parents with current AUD (Bountress & Chassin, 2015; Sternberg et al., 2018). Future studies with samples that include both parents with current CUD and parents with remitted CUD may want to consider recency of CUD in parents. Last, the current study collected cannabis use data approximately 10–15 years ago. Given increases in cannabis potency (El Sohly et al., 2016), parents who currently use cannabis without CUD may be more impaired than parents in the current study who used less potent cannabis.

Conclusions

The current study expanded on past research by examining the effect of parental cannabis use history on adolescent

cannabis use and tested mechanisms through which this effect occurs. Given that adolescent cannabis use is linked to many negative outcomes (Arsenault et al., 2002; Meier et al., 2015), clarification of these mechanisms is vital to intervention and prevention efforts. Overall, our findings suggest that parental CUD increases the risk of adolescent cannabis use. Moreover, family-mean levels of cannabis-specific parenting are not effective in preventing adolescent cannabis use. In fact, parental disclosure of their negative experiences with cannabis can increase offspring risk for cannabis use. Well-intentioned parents should refrain from disclosing their cannabis use to their adolescent. Although more general positive parenting reduces adolescent risk (Hill et al., 2018), our findings suggest that these types of cannabis-specific parenting do not prevent adolescent use.

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