



Influence of Parenting Styles on Willingness to Use Marijuana among Rural and Urban Costa Rican Adolescents

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Abstract

Marijuana use during adolescence may result in altered neurocognitive functioning; therefore, preventing or delaying the onset of marijuana use is a public health concern. Parenting styles have been consistently identified as influential risk factors for adolescent drug use. However, most relevant studies have focused on non-Latin American populations. This cross-sectional study aimed to determine the influence of parenting styles on the reasons for Costa Rican adolescents' willingness to use marijuana using Structural Equation Models. 728 urban and rural adolescents (aged 13–18) participated in the study. Mothers and fathers rated as having an authoritative style were negatively related to the willingness to use marijuana ($\beta = -0.18$ and $\beta = -0.13$, respectively, $p < 0.05$), while mothers and fathers rated as having an authoritarian style were positively associated with this outcome ($\beta = 0.13$, $\beta = 0.12$, respectively, $p < 0.01$). Mothers rated as having a permissive style showed a positive association too ($\beta = 0.13$, $p < 0.01$). An authoritative style in both parents was negatively associated with the reasons for willingness to use marijuana: emotion regulation, social approval and fun, and perceived access to marijuana. Meanwhile, an authoritarian style presented positive and significant associations. Mothers rated as having a permissive style were positively related to emotion regulation ($\beta = 0.11$, $p < 0.05$), and social approval and fun ($\beta = 0.09$, $p < 0.05$). Reasons to use marijuana vary according to parenting styles, sociocultural context and same-sex parent/child dyads (mother/daughter, father/son). Hence, a careful examination of the relationships between these variables in various adolescent subpopulations will be a critical step in developing practical, culturally tailored adolescent health promotion interventions.

Keywords Marijuana use · Parenting styles · Adolescents · Latin america · Urban area · Rural area

Highlights

- Fathers' and mothers' authoritative parenting styles reduce willingness to use marijuana in adolescents.
- Fathers' and mothers' authoritarian and permissive parenting styles increase willingness to use marijuana in adolescents.
- The influence of parenting styles on willingness to use marijuana varies in relation to the sociocultural context.
- Same-sex parent/child dyads influence adolescent willingness to use marijuana.
- The influence of parenting styles varies according to the reasons for adolescent willingness to use marijuana.

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Parenting styles are a constellation of attitudes toward the child that are communicated to him or her, and that, taken together, create an emotional climate in which parental behaviors are expressed (Darling & Steinberg, 1993). Based on two dimensions of parenting styles—demandingness (extent to which parents expect and demand children's maturity) and responsiveness (parents' general tendency to provide warmth, support, acceptance and positive responses toward the children's needs)—Diana Baumrind identified three styles of parenting behavior: authoritative (high responsiveness, high demandingness), authoritarian (low

responsiveness, high demandingness) and permissive/indulgent (high responsiveness, low demandingness) (Baumrind, 1991; Darling & Steinberg, 1993). An analysis of trends in parenting style literature from 2008 to 2017 showed that the authoritative style is the most common, followed by the authoritarian and the permissive styles (Farzand et al., 2017).

Several authors have repeatedly suggested that the authoritative parenting style is ideal, as children are raised democratically, with more autonomy, better parent-child communication and improved emotion regulation. However, this may lead to the authoritative parenting style becoming a regime of truth and a worldwide standard for childrearing, which is controversial because there are serious doubts about its benefits as the best strategy for all cultural contexts. The authoritarian (Sorkhabi, 2005) and indulgent (García & Gracia, 2009) parenting styles have been associated with positive development outcomes when the family and societal environments provide good responses according to the parenting style (Sorkhabi, 2005). Currently, there are various viewpoints regarding parenting styles in the context of different cultures because parenting behaviors and their impacts differ from one culture to another (Davids et al., 2016).

Individualistic cultures, such as are common in the Global North countries, are generally inclined towards authoritative parenting because they tend to be high in demandingness and responsiveness; however, their demandingness is very different from that of authoritarian parents in collectivist cultures, which prevails in Global South countries (Febiyanti & Rachmawati, 2021). The differences in demandingness are caused by the differences between cultures. A society that develops characteristics of individualism supports emotional independence, assertiveness, autonomy, and the need for privacy where the individual loosens its bound with others (Sorkhabi, 2005). On the contrary, collectivism prioritizes socialization, obedience, security and family integrity (Sorkhabi, 2005). The differences in thoughts and behaviors between the two cultures lead to differences in the fundamental basics of the parenting styles, and their results can vary even between urban and rural communities in the same country, as well as according to the sex of the child. For example, studies in South Asian and Middle East countries suggest that the authoritarian style is more prevalent in urban areas, while the authoritative style is more pervasive in rural areas (Dwairy et al. 2006; Dwairy & Menshar, 2006; Mayuri et al., 2015; Sondhi, 2017). Even within the same urban or rural environment, parenting styles may depend on the child's sex, according to the cultural context in which the parent-child dyad socializes (Dwairy et al., 2006; Dwairy & Menshar, 2006; Mayuri et al., 2015; Sondhi, 2017). Some studies have suggested that the opposite-sex parent/

adolescent dyads (mother/son, father/daughter) produce positive influence on various adolescents' health behaviors (Berge et al., 2010a, 2010b; Temple et al. 2006; Hou et al., 2020, Yoon et al., 2020).

A recent systematic review shows that parenting styles are also influenced by the parents' gender (Yaffe, 2020). A study spanning over 15 countries around the globe (Farzand et al., 2017) showed that mothers are predominantly more authoritative than fathers, whereas fathers are more authoritarian than mothers. Further, the authoritarian style is more likely adopted when parenting sons, while the authoritative style tends to be used with daughters (Conrade & Ho, 2001; McKinney & Renk, 2008; Simons & Conger, 2007).

As the evidence points out, parenting styles are influenced by various socio-cultural factors, which might explain their varying impact on the different outcomes studied in adolescents, including behavioral, emotional and social competences, development and adjustment, school achievement, dietary behaviors, weight and weight-related behaviors. An example would be the inconsistencies in the association between parenting styles and illegal substance use.

Some studies using Baumrind's typology of parenting styles have concluded that authoritative styles are more protective against adolescent substance use than authoritarian and permissive/indulgent styles (Baumrind, 1991; Becoña et al., 2012; Merianos et al., 2020; Stephenson & Helme, 2006). In contrast, other studies have pointed out that permissive parenting styles protect against substance use in adolescents, providing equal or even greater protection than authoritative styles (Calafat et al., 2014; García et al., 2015; Riquelme et al., 2018). Meanwhile, other researchers have identified indulgent and authoritarian parenting styles as risk factors for adolescent marijuana use (Brosnan et al., 2020; Merinos et al., 2020; Montgomery et al., 2008; Riquelme et al., 2018). Since the effects of parenting styles vary according to the cultural context, this might explain why authoritative parenting styles have been found to reduce the risk of adolescent substance use in the United States, while in Europe, it is the permissive parenting style that acts as a protective factor (Riquelme et al., 2018).

The Current Study

Typical adolescent behavior involves increased experimentation with new behaviors and exploration of risky habits, including illicit substances like marijuana (Lerner & Steinberg, 2009). Adolescent marijuana use is associated with impaired social functioning and engaging in other high-risk behaviors, such as drinking, using other illicit drugs, and having unprotected sex (Ellickson et al., 2004; Graves et al., 2005; Gruber & Pope, 2002). In addition,

exposure to marijuana during the adolescent period of neurodevelopmental vulnerability may result in altered neurocognitive functioning (Fontes et al., 2011; Dorius et al., 2004; Gruber et al., 2012).

Despite an increased prevalence of marijuana use among Latin American adolescents (Comisión Interamericana para el Control del Abuso de Drogas/Organización de los Estados Americanos, 2020), there is little information on the influence of parenting styles on marijuana use in this population. In Costa Rica, the prevalence of marijuana use increased from 1.9% in 2006 to 4.9% in 2015, while tobacco use decreased from 8.5% to 2.4% in the same period, suggesting a potential swap between tobacco and marijuana consumption (Instituto sobre Alcoholismo y Farmacodependencia, 2016). Since marijuana use tends to precede the use of other illegal drugs (Duncan et al., 1998; Gruber & Pope, 2002), it is imperative to understand which factors are associated with its prevalence among adolescents in Costa Rica to inform targeted interventions for prevention or delay. Hence, the specific aim of our study was to determine the influence of paternal and maternal parenting styles on the willingness to use marijuana among urban and rural Costa Rican adolescents. We hypothesized: (a) that authoritative parenting styles protect adolescents against the willingness to use marijuana, and (b) that permissive and authoritarian parenting styles increase the risk of willingness to use marijuana. We also wanted to explore how the hypothesized associations vary according to the parents' sex and residence area.

Methods

Framework

Baumrind's typology of parenting styles was chosen as the theoretical proposal to guide this study because it has been universally used to study the influence of parenting styles in many behavioral domains including substance use (Becoña et al., 2012). By using Baumrind's typology, there is an increased likelihood that the results of this study can be compared to others conducted in different sociocultural contexts. New ways of categorizing parenting types have emerged, and all align with Baumrind's original construct of parental warmth and control (Kiefner-Burmeister & Hinman, 2020). Since few studies utilize the new scales, using them would have limited the comparability of this study's results substantially.

Participants and Recruitment

Data stemmed from a cross-sectional sample of adolescents (13–18 years old; 7–11th graders) enrolled in ten urban and six

rural schools ($n = 16$) in the province of San José, Costa Rica in 2017. Most Costa Rican adolescents (80%) are enrolled in school (Programa Estado de la Nación, 2019), and San José has the highest adolescent concentration (30%) in the country (Instituto Nacional de Estadística y Censos, 2013).

To determine school selection and sample size, we assumed a sampling error for a population proportion with correction for a finite population (Ryan, 2013). We selected the study population as follows: 1) Schools were selected using a proportional-size probability method to represent urban and rural municipalities within the province (Alam et al., 2015). 2) Ten classrooms from each school (two from each grade) were selected by simple random sampling. The selected classrooms were invited to participate, and the students were provided with informed assent forms for themselves and informed consent forms for their parents. 3) Participants were randomly selected among the students who returned signed informed assent and consent forms.

Adolescents were first contacted at the schools and invited to participate in the study. We informed them orally that the aim of the study was to understand the reasons why they might be willing to use marijuana. The information was also conveyed in writing on the informed assents given to the adolescents and the informed consents distributed to parents. Approximately 1500 adolescents received informed assent and consent forms. Both forms had to be duly signed and returned before data collection started. 2% of adolescents were not allowed to participate by their parents to avoid missing lessons. 13% forgot to give the informed consent to parents. 23% forgot to bring back the signed consent on the first day of the study. All adolescents completed and signed assent forms.

All 975 (65%) students who returned signed assent and consent forms were selected for the study, but around 16% ($n = 157$) changed their minds about participating before the start for various reasons, such as not wanting to miss lessons, a friend not wanting to participate, losing interest in the study, or having sports commitments, student council election activities or other school activities during the data collection period. The final sample study was comprised of 818 adolescents aged 13 to 18 years.

Only those who provided complete data on their fathers' and mothers' parental styles and filled out 100% of the willingness to use marijuana scale were selected for analysis ($n = 728$). We collected data via paper surveys in a private classroom during school hours. Teachers were not in the room when the adolescents were answering the surveys to avoid any bias caused by their presence and to ensure a more comfortable environment for honest answers. In addition, to remove any pressure of being identified and provide full anonymity, participants were not required to write down their names and the questionnaires were identified by a code only.

The Bioethics Committee of the Costa Rican Institute for Research and Education in Nutrition and Health (INCIENSA) approved all study protocols on August 26, 2016 under number IC-2007-01. All guidelines for human subject research were strictly followed.

Measures

Parenting Styles

Adolescents filled out a 32-item questionnaire to report their perception of their parents' parenting styles (Parenting Styles and Dimensions Questionnaire (PSDQ), short version) (Robinson et al., 2001). The PSDQ short version is a modified version of the original 62-item PSDQ developed by Robinson et al. (1995) for use with parents of children aged 4 to 12 in various cultures. The 32-item PSDQ assesses parenting styles according to Baumrind's well-known typologies: authoritative (high responsiveness and high demandingness), authoritarian (low responsiveness and high demandingness), and permissive (high responsiveness and low demandingness) (Baumrind, 1991). The Authoritative scale encompasses 15 items reflecting dimensions of warmth and support, regulation, and autonomy granting. There are 12 items on the Authoritarian scale related to physical coercion, verbal hostility, and non-reasoning/punitive strategies. The Permissive scale has five items and assesses the subfactor of indulgence (Robinson et al., 2001). PSDQ responses follow a 5-point Likert scale ranging from never (1) to always (5). The score for each of the dimensions is the average of its items.

Although the original scale was designed to assess children aged 4 through 12, it has been proven effective in measuring adolescent perceptions of parenting (Fahiroh et al., 2019). The measurement has been used extensively with children and adolescents and has displayed adequate internal reliability, as well as face, construct, and predictive validity (Olivari et al., 2013). The scale has been frequently used in various international studies with adolescents aged 13 through 18 to study multiple behavioral domains, including substance use (Antonopoulou et al., 2012; Berge et al., 2010b; Brosnan et al., 2020; Calafat et al., 2014; Kremers et al., 2003; Roman et al., 2015; Stephenson et al., 2010).

By 2017, before data collection began for the study, no literature had reported using the PSDQ short version in native Spanish-speaking Latin American adolescents or other Spanish-speaking countries. Consequently, the authors (native Spanish speakers from Costa Rica) translated the questionnaire into Spanish. We employed cognitive interviewing techniques (Smith-Castro & Molina, 2011; Willis, 2005) on 100 adolescents to evaluate the comprehension of each item on the survey. Survey

questions were then revised to improve comprehension in the study sample.

The PSDQ psychometric validation ($n = 202$ adolescents, mean age = 15.02, $SD = 1.67$) showed that authoritative and authoritarian parenting styles had acceptable internal consistency for mothers (Cronbach $\alpha = 0.88$ and 0.79, respectively) and fathers (Cronbach $\alpha = 0.89$ and 0.78, respectively). Meanwhile, the permissive parenting style subscale had low internal consistency for mothers (Cronbach $\alpha = 0.47$) and fathers (Cronbach $\alpha = 0.50$).

Adolescents completed the PSDQ twice to report their perception of their fathers' and mothers' warmth and demandingness, respectively. Any adolescents who lived with a biological parent and a stepparent who did not live with them during childhood had to complete the biological parent's evaluation only.

Social desirability was measured using the short form of the Social Desirability Scale developed by Crowne and Marlowe (1960) (MCSDS), with 13 true/false items. An example item is: 'I am always courteous, even to people who are disagreeable.' The authors of the MCSDS considered it to have a single construct, namely, 'the need for approval,' defined as the extent to which an individual seeks the approval of others and tries to avoid their disapproval (Crowne & Marlowe, 1960; Leite & Beretvas, 2005). The rationale behind the items on the MCSDS is that an average individual would not always behave in a socially desirable manner. Consequently, a person with a higher need for approval would tend to present more socially desirable responses than the average (Leite & Beretvas, 2005). The use of the MCSDS has been extensive since its development (Beretvas et al., 2002), including its adaptation and use in different languages, contexts, and cultural backgrounds (e.g., Gutiérrez et al., 2016; Kurz et al., 2016; Pérez et al., 2010). This instrument has already been adapted and applied in Costa Rica (Smith-Castro, 2014). Further details and discussions on the MCSDS structure, validity, and reliability have been provided elsewhere (e.g., Leite & Beretvas 2005; Ventimiglia & MacDonald, 2012; Vés-teinsdóttir et al. 2015).

Willingness to use marijuana

We developed a new scale for this study based on previous focus-group research about reasons/beliefs for using marijuana in Costa Rican adolescents (Reyes-Fernández & Smith-Castro, 2018). Qualitative research (e.g., focus groups) has been deemed relevant as evidence of content validity (Brod et al., 2009; Terwee et al., 2018). Therefore, information on how focus groups were carried out and the emerging categories is provided in Supplementary Appendix 1. Based on this previous qualitative stage, four categories about reasons/beliefs to use marijuana (emotional

regulation, social approval, fun and accessibility) were identified and several items were developed to address each of them. The scale response options followed a 5-point Likert format ranging from ‘strongly disagree’ (1) to ‘strongly agree’ (5).

We evaluated the scale’s psychometric properties on a sample of 202 students (Mean age = 15.02, SD = 1.67) enrolled in three urban and two rural schools of San José (Reyes-Fernández & Smith, 2018). One-dimensional items were selected using Exploratory Factor Analysis. Three dimensions emerged on the final set of 16 items (estimation method: maximum likelihood; varimax rotation), with eigenvalues >1 and explained variance of 59.7%. It should be highlighted that, according to factor analyses, two of the four original categories identified in the focus groups were merged. As a result, the three final dimensions were emotion regulation, social approval and fun, and access to marijuana, accounting for 42.5%, 10.6%, and 6.5% of the variance, respectively. Each dimension was understood as a reason to use marijuana, or a “salient belief” (Ajzen, 1991), indicating a willingness to use marijuana as a general construct. We determined Cronbach’s alpha for each dimension. Overall reliability was $\alpha = 0.91$, with α s = 0.93, 0.84, and 0.80 for emotion regulation, social approval and fun, and access to marijuana, respectively. The correlations of these dimensions with social desirability were all small ($r \leq 0.19$, $p < 0.001$).

The dimension of emotion regulation was defined as “marijuana use to face negative affectivity and difficult situations and seek positive emotions.” The dimension of social approval and fun was defined as “marijuana as a means to obtain approval and pleasure in social life.” Finally, access to marijuana was defined as “adolescents’ ability to obtain marijuana in the environment in which they habitually socialize, e.g., school and neighborhood.”

The above-mentioned information provided important evidence of content and construct validity of the new measure for the purpose of this research.

Sociodemographic variables

We used a paper-based questionnaire to collect data on sex, age, residence area, and parental education level. For the last item, only the highest level achieved was considered.

Data Analyses

Considering that the large number of items ($n = 32$) in the PSDQ may end up in a complex, non-parsimonious final model, we reduced the number of indicators for each dimension, as suggested by Kline (2015). First, we examined item dimensionality and loadings for the permissive and authoritarian dimensions using exploratory factor analysis, as suggested by Little et al. 2013. We considered for

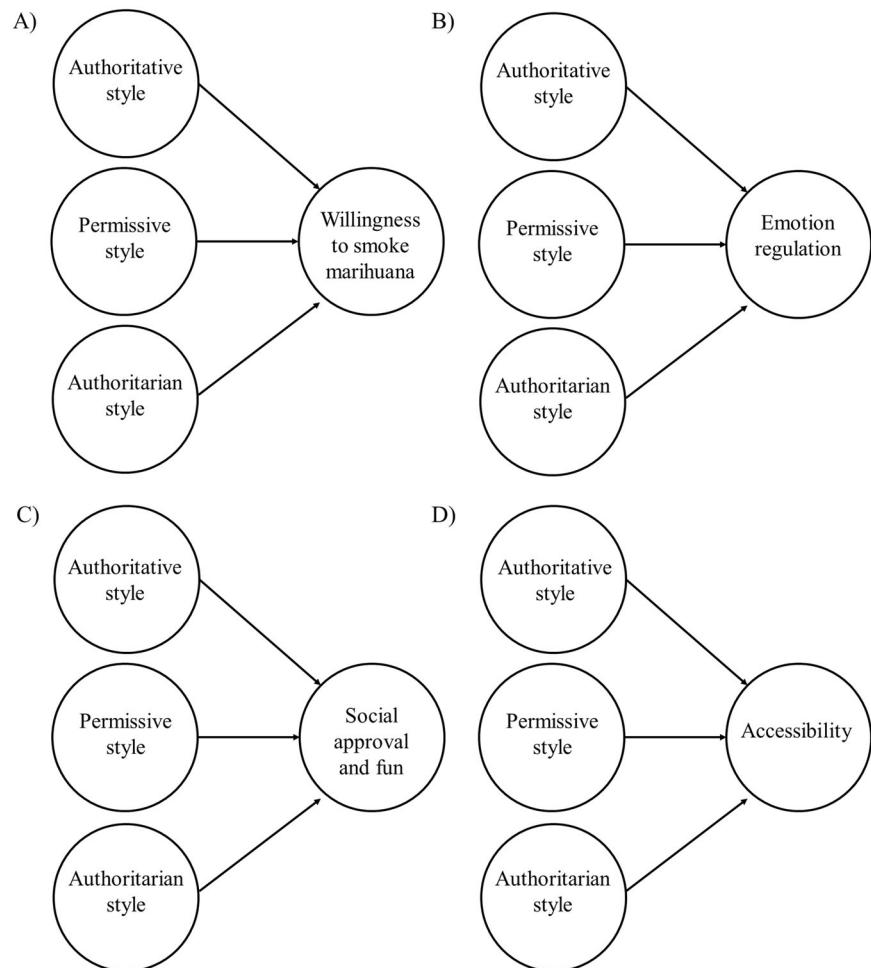
exclusion any items that were not clearly one-dimensional (i.e., two or more factors presented relevant loadings) and those with low loadings ($\beta < 0.30$). However, we determined that each factor should keep at least three indicators (Kline, 2015). Then, we left selected sets of items for the authoritarian and permissive dimensions. However, considering the large number of items ($n = 15$) in the authoritative dimension, we created parcels by averaging pairs of selected items (Kline, 2015). We chose pairs according to the higher bivariate correlation criterion described by Landis et al. (2000). We computed correlations based on the father-focused PSDQ and created parcels using pairs of items with the highest correlations. Then we replicated the parcels using the items on the mother-focused PSDQ. After creating parcels for the authoritative dimension and selecting items for the other dimensions of the PSDQ, we specified two Confirmatory Factor Analyses (CFA) of the measurement models using Maximum Likelihood as the estimation method. Each analysis included the willingness to use marijuana scale and the selected indicators (either items or parcels) of either the father-focused or the mother-focused PSDQ.

Separately, to estimate reliability, we calculated Cronbach’s alpha (α) and MacDonald’s Omega (ω) for each factor included in the measurement models. Some consider MacDonald’s Omega to be a better measure of reliability (Peters 2014). To calculate these reliability measures, we used the indicator sets (either items or parcels).

After examining the fit of the measurement models, we specified eight Structural Equation Models (SEM), four for fathers and four for mothers. These models involved the same sets of input variables (authoritative, authoritarian, and permissive parenting styles) but different outcome variables. For the fathers, we performed one general and three specific models. Model 1 (general) used the variable “willingness to use marijuana” as the outcome (Panel A, Fig. 1). The three specific models (2, 3, and 4, respectively) used each reason to use marijuana as outcomes: emotion regulation, social approval and fun, and access to marijuana (Panels B, C, and D, Fig. 1). We replicated the same methodology for the mothers. In this case, model 5 was the general model, and the specific models were 6, 7, and 8 (Panels B, C, and D, Fig. 1). We also replicated the general models in multi-group analyses based on sex (boys vs. girls) and residence area (rural vs. urban) (models 9–12). We specified variations to the multi-group models, one for each reason to use marijuana. We further examined the associations between paternal and maternal parenting styles and the reasons for the adolescents’ willingness to use marijuana, and how these associations varied according to sex and residence area (models 13–24).

Although we recognize its theoretical value, we do not consider it necessary to estimate an alternative general

Fig. 1 Basis structural equation models specified in the current study. Models are represented in a simplified form: factor loadings, items, and errors are not depicted. **A** represents models 1 and 5, **B** represents models 2 and 6, **C** represents models 3 and 7, and **D** represents models 4 and 8



model that simultaneously includes mothers' and fathers' parenting styles as predictors. The main technical reason is that fathers' and mothers' parenting styles may be highly correlated, and therefore, a model including the parenting styles of both parents as predictors could present high collinearity, thereby violating the requirements of the analytical approach used (SEM). (Tabachnick et al., 2007). A high correlation might be expected even just because fathers' and mothers' measures share the same wordings. For readers who are interested in a more complete picture of the study's findings, we include the results of a supplemental data analysis of the alternative general model (Supplementary Tables 1 and 2).

To evaluate fit on the measurement models and general structural equation models and their variations, we used the ratio of Chi-square to degrees of freedom (χ^2/df), the Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA). These indices minimize the likelihood of Type I and Type II errors (Hu & Bentler, 1999). Several cut-off values have been suggested for these indices (Cangur & Ercan, 2015; Hooper et al., 2008; Hu & Bentler, 1999; Marsh et al., 2004): CFI: close to 0.90 or

0.95; RMSEA: close to 0.06 (Cangur & Ercan, 2015; Hooper et al., 2008; Marsh et al., 2004); Chi-square to df ratio: close to 2.0 (Tabachnick et al., 2007) or 3.0 (Cangur & Ercan, 2015). We used SEM maximum likelihood-based correlations to determine if the study variables were highly linearly related. A correlation coefficient ≥ 0.9 indicates the presence of multicollinearity (Tabachnick et al., 2007), what could inflate the size of error terms and create other statistical problems. We used the Student T-test to analyze descriptive variables. All analyses were conducted using IBM SPSS 23 and AMOS 23, and R userfriendlyscience package (Peters et al., 2018).

Results

The sample consisted of 728 adolescents, 65% girls, and 50.2% urban inhabitants. The mean age was 14.9 (SD = 1.7). 59.4% of participants were between 13 and 15 years of age, while 40.6% were between 16 and 18. The education level of most fathers (70%) and mothers (72.4%) was less than high school or high school graduate (Table 1).

Table 1 Sociodemographic characteristics of the study population ($n = 695$)^a

Parameter	Value
Sex	
Boys	35%
Girls	65%
Age	
Mean	14.9 y (SD = 1.7)
13–15 y	59.4%
16–18 y	40.6%
Area	
Urban	50.2%
Rural	49.8%
Adolescents living with both parents	100%
Father's education level ^b	
Elementary school – not completed	11.3%
Elementary school – completed	27.0%
High school – not completed	19.8%
High school – completed	11.9%
Occupational program	2.6%
University – not completed	5.5%
University – completed	21.9%
Mother's education level ^b	
Elementary school – not completed	10.5%
Elementary school – completed	29.6%
High school – not completed	18.5%
High school – completed	13.8%
Occupational program	0.6%
University – not completed	10.3%
University – completed	16.7%

^aValues are percentages or means \pm SDs unless otherwise indicated

^bIn Costa Rica, elementary school means grades 1 through 6; high school means grades 7 through 11; occupational programs extend at least two years beyond high school; university signifies completion of at least 5 years of studies beyond high school

Table 2 shows the variable correlations between paternal and maternal parenting styles and the reasons for adolescent willingness to use marijuana (correlations between latent variables). Since, for the results reported in the main body of this manuscript we did not specify a model involving both paternal and maternal parenting styles, we did not report the correlations between styles (such results are reported in Supplementary Table 1 though). As expected, when significant, the authoritative style was negatively associated with other styles and with the dimensions of willingness to use marijuana. Authoritarian and permissive styles were positively intercorrelated and, when significant, were positively associated with the adolescents' willingness to use marijuana. Table 2 also reports the means and standard deviations (SD) for the study variables disaggregated

by sex and residence area. The mean for mothers and fathers rated as permissive and authoritarian permissive and authoritarian mothers and fathers was significantly higher ($p < 0.05$) in boys. The mean for mothers and fathers rated as authoritative was significantly higher in rural areas ($p < 0.05$), whereas the mean was higher in urban areas.

Measurement Models

Two measurement models were specified: 1) a model involving the parenting styles reported *for fathers* as well as the willingness to smoke marijuana, and 2) a model involving the parenting styles reported *for mothers* and the willingness to smoke marijuana. The fit of the first model was: $\chi^2/df = 2.34$, CFI = 0.95, RMSEA = 0.043, 90% CI [0.040; 0.047]. The fit of the second model was: $\chi^2/df = 2.46$, CFI = 0.94, RMSEA = 0.045, 90% CI [0.041; 0.048]. In both cases, fit was acceptable (Cangur and Ercan, 2015; Hooper et al., 2008; Marsh et al., 2004).

Table 3 shows the factorial loadings for each factor on its corresponding indicator (either parcel or item) and reliability information for each dimension of the instruments. The factors presented loadings on indicators (β s) that were between 0.37 and 0.93. Only item 15 of the permissive style showed a $\beta < 0.30$, but we left it in the model to observe the rule of including at least three indicators per factor (Kline, 2015). The reliability of most PSDQ dimensions was acceptable ($\alpha > 0.65$, $\omega = 0.65$). Only the permissive style dimension presented low reliability in both paternal ($\alpha = 0.53$, $\omega = 0.61$) and maternal ($\alpha = 0.53$, $\omega = 0.63$) measures, suggesting that we should exercise caution when interpreting results about this dimension. Table 3 also shows that factor loadings (β s) for the items on each dimension of the willingness to use marijuana scale ranged between 0.64 and 0.90. Likewise, reliability for each dimension of the scale was acceptable in the father-focused models, with $\alpha = 0.93/\omega = 0.93$; $\alpha = 0.84/\omega = 0.85$, and $\alpha = 0.82/\omega = 0.83$ for emotion regulation, social approval and fun, and access to marijuana, respectively. Similar values for reliability coefficients were found for each dimension in the mother-focused models.

Structural Models

Table 4 and Table 5 provide information on the fit of the structural models (models 1–8). They were all acceptable (Cangur & Ercan, 2015; Hooper et al., 2008; Marsh et al., 2004). Explained variance (R^2) ranged between 4% and 7%.

Models 1–4 focused on paternal parenting styles as putative determinants of willingness to use marijuana (and each of its dimensions). Models 5–8 focused on maternal parenting styles as putative determinants of willingness to use marijuana (and each of its dimensions).

Table 2 Correlations between latent variables and means (SD) of study variables

	Authoritative style (father)	Authoritative style (mother)	Permissive style (father)	Permissive style (mother)	Authoritarian style (father)	Authoritarian style (mother)	Emotion regulation	Social approval and fun	Access to marijuana
Authoritative style (father)	–	–	0.08	–	–0.18***	–	–0.16***	–0.21***	–0.02***
Permissive style (father)	0.08	–	–	–	0.18***	–	0.00	0.04	0.21***
Authoritarian style (father)	–0.18***	–	0.18***	–	–	–	0.13**	0.15***	0.14**
Authoritative style (mother)	–	–	–	–0.08	–	–0.30***	–0.02***	–0.12***	–0.17***
Permissive style (mother)	–	–0.08	–	–	–	0.24***	0.14**	0.13**	0.11*
Authoritarian style (mother)	–	–0.30***	–	0.24***	–	–	0.15***	0.17***	0.19***
Emotion regulation	–0.16***	–0.15***	0.00	0.14**	0.13**	0.15***	–	0.74***	0.51***
Social approval and fun	–0.21***	–0.12***	0.04	0.13**	0.15***	0.17***	0.74***	–	0.53***
Access to marijuana	–0.16***	–0.17***	0.21***	0.11*	0.14**	0.19***	0.51***	0.53***	–
Variable mean (SD) by sex	3.06 (1.32)	3.42 (0.96)	2.12 (0.97)	2.35 (0.99)	1.05 (0.58)	1.23 (0.63)	2.30 (1.16)	1.78 (0.85)	2.63 (1.20)
Variable mean (SD) by residence area									
Men	3.12 (1.00)	3.47 (0.99)	2.22* (0.96)	2.46* (0.99)	1.15** (0.61)	1.31* (0.63)	2.37 (1.17)	1.79 (0.87)	2.63 (1.13)
Women	3.01 (1.08)	3.40 (0.99)	2.07 (0.96)	2.29 (0.99)	0.99 (0.56)	1.19 (0.63)	2.25 (1.15)	1.78 (0.85)	2.63 (1.24)
Variable mean (SD) by residence area									
Urban	2.92 (1.06)	3.33 (0.97)	2.14 (1.00)	2.37 (0.99)	1.11** (0.62)	1.31*** (0.66)	2.34 (1.17)	1.81 (0.86)	2.68 (1.26)
Rural	3.18** (1.03)	3.51* (0.95)	2.11 (0.93)	2.32 (1.00)	0.99 (0.53)	1.15 (0.60)	2.25 (1.15)	1.75 (0.85)	2.58 (1.14)

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3 Factor loadings and reliabilities for the dimensions of the parenting styles and dimensions questionnaire (PSDQ) and the scale of willingness to smoke marijuana ($n = 728$)^a

Parenting styles	Item and parcel loadings in father-focused models	Item and parcel loadings in mother-focused models
Parenting Styles and Dimensions Questionnaire (PSDQ)		
Dimension: Authoritarian style		
2. My parent used punishment as a way of disciplining me	0.79	0.79
6. My parent spanked me when I was disobedient	0.80	0.79
19. My parent grabbed me when I was being disobedient	0.45	0.37
26. My parent used threats as punishment with little or no justification	0.43	0.41
32. My parent slapped me when I misbehaved	0.71	0.64
Reliability	$\alpha = 0.72/\omega = 0.78$	$\alpha = 0.69/\omega = 0.75$
Dimension: Permissive style		
15. My parent gave in when I caused a commotion about something	0.19	0.19
17. My parent threatened me with punishment more often than actually using it	0.80	0.93
20. My parent stated punishments to me and did not actually use them	0.63	0.57
Reliability	$\alpha = 0.53/\omega = 0.61$	$\alpha = 0.56/\omega = 0.64$
Dimension: Authoritative style		
Parcel 1: Items 7 (My parent encouraged me to talk about my troubles) & 12 (My parent gave comfort and understanding when I was upset)	0.85	0.85
Parcel 2: Items 18 (My parent took into account my preferences in making plans for the family) & 21 (My parent showed respect for my opinions by encouraging me to express them)	0.82	0.82
Parcel 3: Items 29 (My parent helped me to understand the impact of my behavior by encouraging me to talk about the consequences of my own actions) & 31 (My parent explained the consequences of my behavior)	0.74	0.71
Parcel 4: Items 1 (My parent was responsive to my feelings and needs) & 27 (My parent had warm and intimate times with me)	0.78	0.75
Parcel 5: Items 5 (My parent explained to me how s/he felt about my good and bad behavior) & 9 (My parent encouraged me to freely express myself even when I disagreed with them)	0.80	0.76
Parcel 6: Items 3 (My parent took my desires into account before asking me to do something) & 14 (My parent praised me when I was good)	0.74	0.70
Parcel 25: Items 22 (My parent allowed me to give input into family rules) & 25 (My parent gave me reasons why rules should be obeyed)	0.70	0.65
Reliability	$\alpha = 0.91/\omega = 0.92$	$\alpha = 0.90/\omega = 0.91$
Willingness to use marijuana		
Dimension (Reason 1): Emotion regulation		
3. Marijuana helps people forget about their worries.	0.83	0.83
4. Smoking marijuana helps to remove shyness	0.77	0.77
7. Marijuana helps people get less angry	0.80	0.80
8. Smoking marijuana helps to remove frustrations	0.90	0.90
11. Smoking marijuana helps you forget your problems	0.87	0.87
21. Marijuana helps people relax	0.79	0.79
Reliability	$\alpha = 0.93/\omega = 0.93$	$\alpha = 0.91/\omega = 0.92$
Dimension (Reason 2): Social approval and fun		
15. Smoking makes people seem cool	0.55	0.55
17. Marijuana cigarettes taste good	0.74	0.74
19. Parties are more fun when you smoke marijuana	0.82	0.82

Table 3 (continued)

Parenting styles	Item and parcel loadings in father-focused models	Item and parcel loadings in mother-focused models
20. The most popular people smoke marijuana	0.62	0.62
25. The sensation of a pull of marijuana is pleasant	0.79	0.79
26. Smoking marijuana makes people feel more mature	0.64	0.64
Reliability	$\alpha = 0.84/\omega = 0.85$	$\alpha = 0.83/\omega = 0.83$
Dimension (Reason 3): Access to marijuana		
5. You can buy it near the school without anyone being suspicious	0.80	0.80
10. They sell it in the neighborhood	0.67	0.67
13. You can buy it at school	0.78	0.78
18. Marijuana is readily available	0.70	0.70
Reliability	$\alpha = 0.82/\omega = 0.83$	$\alpha = 0.81/\omega = 0.82$

^aEstimation method: Maximum likelihood. All loadings were $p < 0.001$. The loadings of willingness to smoke marijuana as a second-order factor, on its subdimensions, were $\beta = 0.84$ on emotion regulation, $\beta = 0.88$ on social approval and fun, and $\beta = 0.84$ on access (all at $p < 0.001$)

Table 4 Fathers' parenting styles and willingness to smoke marijuana

	Model 1 (General model)	Model 2	Model 3	Model 4
Outcome variables	Willingness to smoke marijuana	Emotion regulation	Social approval and fun	Access to marijuana
Authoritative style	-0.18***	-0.14***	-0.14**	-0.20***
Permissive style	0.02	-0.00	0.03	0.03
Authoritarian style	0.13**	0.10*	0.12**	0.10*
R ²	0.06	0.04	0.04	0.06
Fit indices	$\chi^2/df = 2.34$ CFI = 0.95 RMSEA = 0.043 90% CI [0.040; 0.047]	$\chi^2/df = 2.40$ CFI = 0.96 RMSEA = 0.044 90% CI [0.039; 0.049]	$\chi^2/df = 2.66$ CFI = 0.95 RMSEA = 0.048 90% CI [0.043; 0.053]	$\chi^2/df = 2.74$ CFI = 0.95 RMSEA = 0.049 90% CI [0.043; 0.055]

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5 Mothers' parenting styles and willingness to smoke marijuana

	Model 5 (General model)	Model 6	Model 7	Model 8
Outcome variables	Willingness to smoke marijuana	Emotion regulation	Social approval and fun	Access to marijuana
Authoritative style	-0.13*	-0.12**	-0.08	-0.12**
Permissive style	0.12**	0.11*	0.09*	0.07
Authoritarian style	0.13**	0.09	0.12*	0.13**
R ²	0.07	0.05	0.04	0.05
Fit indices	$\chi^2/df = 2.46$ CFI = 0.94 RMSEA = 0.045 90% CI [0.041; 0.048]	$\chi^2/df = 2.49$ CFI = 0.96 RMSEA = 0.045 90% CI [0.040; 0.051]	$\chi^2/df = 2.89$ CFI = 0.94 RMSEA = 0.051 90% CI [0.046; 0.056]	$\chi^2/df = 2.97$ CFI = 0.94 RMSEA = 0.052 90% CI [0.046; 0.058]

* $p < 0.05$, ** $p < 0.01$

In Model 1, an authoritative style in fathers was negatively related to the willingness to use marijuana ($\beta = -0.18$, $p < 0.001$) (Table 4). In contrast, the authoritarian style was positively associated with this outcome ($\beta = 0.13$, $p < 0.01$). The permissive style did not correlate

significantly to the willingness to use marijuana. We examined the association between the fathers' parenting style and each dimension of the willingness to use marijuana scale on models 2, 3, and 4 (Table 4). The authoritative style presented a negative association to emotion

Table 6 Father's and mother's parenting styles and willingness to marijuana use by residence area and sex

	Willingness to smoke marijuana			
	Model 9		Model 10	
	Rural (<i>N</i> = 364)	Urban (<i>N</i> = 364)	Girls (<i>N</i> = 470)	Boys (<i>N</i> = 258)
Parenting styles of fathers				
Authoritative style	-0.15*	-0.19**	-0.18***	-0.18*
Permissive style	0.05	0.01	0.04	-0.03
Authoritarian style	0.12	0.16*	0.10	0.19*
R ²	0.05	0.07	0.06	0.07
Fit indices	$\chi^2/df = 1.86$ CFI = 0.93 RMSEA = 0.035 90% CI [0.032; 0.037]		$\chi^2/df = 1.71$ CFI = 0.94 RMSEA = 0.031 90% CI [0.029; 0.034]	
	Model 11		Model 12	
	Rural (<i>N</i> = 364)	Urban (<i>N</i> = 364)	Girls (<i>N</i> = 470)	Boys (<i>N</i> = 258)
	Parenting styles of mothers			
Authoritative style	-0.08	-0.15*	-0.12*	-0.14
Permissive style	0.09	0.17*	0.12*	0.10
Authoritarian style	0.19**	0.08	0.13*	0.13
R ²	0.07	0.07	0.07	0.07
Fit indices	$\chi^2/df = 1.95$ CFI = 0.93 RMSEA = 0.036 90% CI [0.034; 0.039]		$\chi^2/df = 1.81$ CFI = 0.93 RMSEA = 0.033 90% CI [0.031; 0.036]	

p* < 0.05, *p* < 0.01, ****p* < 0.001

regulation ($\beta = -0.14$, $p < 0.001$), social approval and fun ($\beta = -0.14$, $p < 0.01$), and perceived access to marijuana ($\beta = -0.20$, $p < 0.001$). In contrast, the authoritarian style presented positive and significant associations with emotion regulation ($\beta = 0.10$, $p < 0.05$), social approval and fun ($\beta = 0.12$, $p < 0.01$) and access to marijuana ($\beta = 0.10$, $p < 0.05$). The permissive style remained neutrally associated with these outcomes.

In Model 5 (Table 5), an authoritative style in mothers was negatively associated with willingness to use marijuana ($\beta = -0.13$, $p < 0.05$), but mothers rated as permissive and authoritarian showed a positive association ($\beta = 0.12$ and $\beta = 0.13$ respectively, $p < 0.01$). Results on models 6, 7, and 8 are also presented on Table 5. Mothers rates as authoritative were negatively associated with emotion regulation ($\beta = -0.12$, $p < 0.01$), and access to marijuana ($\beta = -0.12$, $p < 0.01$). In contrast, mothers rated as authoritarian were positively related to social approval and fun ($\beta = 0.12$, $p < 0.05$), and access to marijuana ($\beta = 0.13$, $p < 0.01$). Contrary to fathers, a permissive parenting style in mothers was positively related to emotion regulation ($\beta = 0.11$, $p < 0.05$), and social approval and fun ($\beta = 0.09$, $p < 0.05$).

The association between paternal and maternal parenting styles and the willingness to use marijuana by residence area and sex is presented in Table 6 (models 9 to 12).

We found a negative association between fathers rated as authoritative and willingness to use marijuana among rural ($\beta = -0.15$, $p < 0.05$) and urban adolescents ($\beta = -0.19$, $p < 0.01$), and among girls ($\beta = -0.18$, $p < 0.001$), and boys ($\beta = -0.18$, $p < 0.05$). By contrast, fathers rated as authoritarian were positively associated with willingness to use marijuana in urban adolescents ($\beta = 0.16$, $p < 0.05$) and boys ($\beta = 0.19$, $p < 0.05$). Authoritative mothers were negatively associated with willingness to use marijuana among urban adolescents ($\beta = -0.15$, $p < 0.05$), and girls ($\beta = -0.12$, $p < 0.05$). Meanwhile, mothers rated as authoritarian were positively associated with willingness to use marijuana in rural adolescents ($\beta = 0.19$, $p < 0.01$) and girls ($\beta = 0.13$, $p < 0.05$). Lastly, mothers rated as permissive showed an association with willingness to use marijuana among urban adolescents ($\beta = 0.17$, $p < 0.05$) and girls ($\beta = 0.12$, $p < 0.05$). Fit for each model was acceptable (Cangur & Ercan, 2015; Hooper et al., 2008; Marsh et al., 2004). Explained variance was 7% for each analyzed sub-group.

The associations between maternal and paternal parenting styles with each dimension of the willingness to use marijuana scale varied across a combination of sex and residence area (Supplementary Tables 3 and 4). Given the diversity of results, it was challenging to find a pattern of

influence. In general, parents rated as authoritative were negatively associated with some of the dimensions on the scale, while parents rated as authoritarian and permissive were positively associated with some dimensions. However, such associations vary greatly depending on the fathers' and mothers' styles, residence area, and sex.

Discussion

The purpose of this study was to determine the influence of paternal and maternal parenting styles on the willingness to use marijuana among urban and rural Costa Rican adolescents. Due to the general higher impulsivity of adolescents combined with their limited capacity to adequately envision the consequences of their decisions, the influence of parenting styles may protect that age group from making risky choices (Partridge, 2010). Like previous studies conducted in contexts other than Latin America (Baumrind, 1991; Becoña et al., 2012; Merianos et al., 2020; Stephenson & Helme, 2006) and according to our hypothesis, our research found that authoritative parenting reduces the willingness to use marijuana among Costa Rican urban and rural adolescents. In contrast, when either parent is authoritarian or when the mother is permissive, willingness to use marijuana increases, as others (Brosnan et al., 2020; Merinos et al., 2020; Montgomery et al., 2008; Penning & Barnes, 1982; Riquelme et al., 2018) but not all (Calafat et al., 2014; García et al., 2015) have also documented. The different effects of paternal and maternal parenting styles on the study outcome may reflect the adolescents' perception of their parents' styles. Fathers tend to be perceived as more authoritarian than permissive, while mothers are more likely to use permissive and authoritative parenting styles (Conrade & Ho, 2001; McKinney & Renk, 2008; Olivari et al., 2015).

Parental knowledge, monitoring, and control could explain the protective effect of an authoritative parenting style—three practices that predict parental warmth, which is high in authoritarian parents (Fletcher et al., 2004). According to Fletcher et al. (2004), greater parental knowledge about adolescent activities predicts lower levels of substance use, but high levels of monitoring and control mediate the effect of parental knowledge on adolescent behavior. Thus, adolescents are less likely to engage in substance use when their parents are warm and involved in their lives while also seeking to monitor the children's behaviors by obtaining information about their activities and providing higher control over these activities. Clear parental rules have been negatively associated with adolescent cannabis use (de Looze et al. 2012). Dorius et al. (2004) have pointed out that interest in marijuana decreases when adolescents perceive that their parents could catch them violating important rules.

A fragile balance between thrill-seeking and novelty explains risk-seeking behaviors among adolescents (Anderson et al., 2015; Riquelme et al., 2018). Hence, self-regulatory mechanisms, such as high self-esteem and healthy regulation, may reduce vulnerability to marijuana use (Dvorak & Day, 2014; Richardson et al., 2013). This effect is meaningful considering that emotion regulation and social approval and fun were two factors associated with willingness to use marijuana in this study. Adolescents with secure parental attachment patterns have high self-esteem and adequate emotion regulation (Allen & Miga, 2010; Gorrese & Ruggieri, 2013; Wilkinson, 2004). Consequently, they enjoy greater protection against possible experiences of social rejection (Gorrese & Ruggieri, 2013) and lower vulnerability to use marijuana as a recreational mechanism, to conform to their social network, or to alleviate negative emotional states (Patrick et al., 2011; Riquelme et al., 2018). As such, parenting styles may contribute to optimal psychological adjustment in adolescence and help prevent marijuana use in this period of life. Although we propose several mechanisms to explain the association between parenting styles and the reasons for adolescent willingness to use marijuana, the exact mechanism through which parenting styles exert influence is still unclear and requires additional study. Understanding the possible mechanisms may lead to the development of more comprehensive and better-targeted interventions.

A unique contribution of this study is the examination of parenting styles from both fathers and mothers. Various studies in the United States have found significant associations between parenting styles and adolescent outcomes that are specific to opposite-sex parent/adolescent dyads (mother/son, father/daughter) (Berge et al., 2010a; Berge et al., 2010b; Temple et al., 2006), suggesting the opposite sex parent plays a unique role in influencing adolescent health behavior. However, there is no information on the influence of the opposite-sex parent/adolescent dyad on the use of marijuana or other substances. Our results pointed out an association between the influences of same-sex parent/child dyads (mother/daughter, father/son) on marijuana use with mothers rated as authoritative, authoritarian and permissive and fathers rated as authoritarian and permissive. Costa Rican adolescents have better communication with their parents of the same sex (Li et al., 2014). Hence, it is possible that in father/son and mother/daughter dyads, the parent constitutes a model and authority figure with which adolescents establish a solid and lasting hierarchical relationship and to which they respond according to the interrelational dynamics of their social context (McKinney & Renk, 2008; Monge-Rojas et al., 2021). Role theory predicts that mothers and fathers adopt parenting styles based on their usual roles as parents and their expected roles as women and men (Biddle, 1986),

suggesting that parent/child interrelationships and communication vary according to the sociocultural context in which they socialize (Arredondo et al., 2015). Fathers rated as authoritative are associated with lower willingness to use marijuana in urban and rural boys and girls; this is particularly relevant since paternal communication has been identified as a protective factor against marijuana use, mainly among boys (Luk et al., 2010). Even closeness to the father should buffer the relationship between peers and adolescent marijuana use (Dorius et al., 2004). On the other hand, parental control and emotional support are more strongly related to a lower risk of substance use in girls than in boys (Choquet et al., 2008), suggesting that there are different ways an authoritative father can act positively to reduce the willingness to use marijuana in boys and girls. Cultural values provide a general or initial template to guide parental decisions and socialization practices. Because cultural norms and sociocultural issues influence parental attitudes toward childrearing, parenting styles may differ across subpopulation groups (Arredondo et al., 2015).

Findings from the current study highlight the need for primary and community care settings to promote the adoption of an authoritative parenting style among fathers and mothers to prevent or buffer marijuana use among Costa Rican adolescents. Nevertheless, other parenting styles might have a protective effect against drug use in other contexts (e.g., permissive/indulgent in Spain (Martínez et al., 2013)) and should be considered. In addition, it is worthwhile noting that family-based interventions have been effective in reducing marijuana use among adolescents (Das et al., 2016) as long as there is active parental involvement and the development of skills in social competence, self-regulation, and parenting. Parenting intervention has demonstrated that actively motivating parents to monitor and continue to manage substance-using adolescents, results in improved parental supervision and decreased adolescent substance use (Connell et al., 2007). Targeting these processes improves parenting skills, which in turn improves adolescents' mental health outcomes (Connell et al., 2007). Additionally, family-based clinical therapy is consistently recognized among the most effective approaches for treating adolescents with drug problems (Rowe, 2012; Hawes & Allen, 2016). The most effective family-based interventions are those that do not frame drug use as a merely adolescent issue and, instead, address it from a holistic perspective that allows parents to perceive adolescent drug use as a part of their own and other family problems (Hawes & Allen, 2016). In this manner, adolescent drug use gradually expands from the individual sphere to include relevant topics in the family system (Hawes & Allen, 2016), which are generally linked to the adolescent's reasons for using drugs (Das et al., 2016; Ozechowski & Liddle, 2000).

This study should be interpreted in light of its strengths and limitations. First, this study's cross-sectional nature is not sufficient to establish a causal relationship between parenting styles and adolescent marijuana use. Secondly, the study only involved adolescents, and the results only reflect their perception of their parents' parenting styles. Involving at least two family members in the study would provide a more global perception of parenting styles (Bourdeaudhuij & Oost, 2000). Still, our study analyzed urban and rural adolescents' perception of paternal and maternal parenting styles, unlike other studies that only consider urban adolescents and maternal parenting styles. In the third place, the study sample was not nationally representative: it was limited to urban and rural areas within the province of San José. However, the highest proportion of Costa Rican adolescents (30%) is clustered in that province (Programa Estado de la Nación, 2019). Also, the sample included adolescents enrolled in school, representing ~80% of adolescents in Costa Rica (Instituto Nacional de Estadística y Censos, 2013). Furthermore, willingness to smoke marijuana was measured with a new scale, developed for this study. Although content and construct validity and reliability evidence were reported, further evidence is still required. Particularly, information on the association of this measure with marijuana use (criterion validity) and with other motivation scales (nomothetical validity) is needed. Moreover, the analytical approach used (SEM), although has its strengths in terms of assessing and dealing with measurement error, is not ideal to address interactions. Questions such as what happens when both parents share a parenting style could be studied in future research from a different statistical approach. Lastly, some socio-demographic variables such as family composition, parental age, number of siblings, and illness of the adolescents or their parents were not assessed in the study. These variables would have been useful in giving a better picture of the context in which the parent-child interrelation and communication takes place.

Conclusion

Our findings provide additional evidence that authoritative parenting helps reduce the likelihood that Latin American adolescents will choose to use marijuana. Future research should continue to provide new insights into the complex dynamics of the parent/adolescent interaction. Particular attention should be directed to the influence of the same- and opposite-sex parent/adolescent dyads and the sociocultural environment where parents and adolescents socialize because mothers and fathers may adopt different parenting styles based on their area of residence and child's sex (McKinney & Renk, 2008). Careful examination of the

relationship between parenting styles and the reasons for willingness to use marijuana in various adolescent sub-populations will be a critical step in developing practical, culturally tailored adolescent health promotion interventions.

Code Availability

The datasets generated and/or analyzed during the current study are not publicly available but are available from the corresponding author on reasonable request.

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Author Contributions R.M.-R.: Conceived and designed the study, collected and interpreted data, and wrote the manuscript. B.R.-F.: Contributed with analysis and data interpretation and assisted in writing the manuscript. V.S.-C.: Made notable contributions to data interpretation and assisted in writing the manuscript. All authors read and approved the final manuscript.

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Compliance with Ethical Standards

Conflict of Interest The authors declare no competing interests.

Ethical Approval This study was conducted according to the guidelines laid down in the Declaration of Helsinki and in accordance with Law 9234, "Regulatory Law of Biomedical Research," which regulates biomedical research in Costa Rica. The study protocol was approved by the Bioethics Committee of the Costa Rican Institute for Research and Education on Nutrition and Health (INCIENSA) under number IC-2007-01.

Informed Consent We obtained oral and written informed assent from all adolescents included in the study; likewise, we obtained written informed consent from their parents.

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