Full Length Article

Gradient of association between parenting styles and patterns of drug use in adolescence: A latent class analysis

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ABSTRACT

Background: To identify different patterns of drug use in adolescence and determine if these are associated with parenting styles and other sociodemographic factors.
Methods: A latent class analysis was conducted using baseline data collected in a sample (n = 6381) from a randomized controlled trial conducted to evaluate the effectiveness of the #Tamojunto drug-use prevention program, carried out with 7th- and 8th-grade public school students in six Brazilian cities.
Results: Three latent classes were identified among the students: 1) abstainers/low users (81.54%), 2) alcohol users/binge drinkers (16.65%), and 3) polydrug users (1.80%). A gradient of inverse association was found between parenting styles (authoritative, authoritarian, and indulgent, with the neglectful style as a reference point) and the classes "alcohol users/binge drinkers" (aOR = 0.36, 95%CI = 0.27–0.47; aOR = 0.56, 95%CI = 0.43–0.72; and aOR = 0.64, 95%CI = 0.51–0.80, respectively) and "polydrug users" (aOR = 0.09, 95%CI = 0.03–0.24; aOR = 0.23, 95%CI = 0.11–0.52; and aOR = 0.24, 95%CI = 0.08–0.74, respectively). Associations were also revealed between the latent classes and the adolescent's age and socioeconomic status.
Conclusion: The results suggest that activities to develop parenting skills should be included in school programs aimed at the prevention of drug use among adolescents in order to reduce neglectful practices and thereby possibly reduce drug use among the children.

1. Introduction

Global concern with the damage caused by drug use among adolescents is visibly growing (Bonomo et al., 2001). In Brazil, teenagers begin by consuming licit drugs; in this country, experimentation with alcohol is most prevalent among 12- to 14-year-olds (Malta et al., 2011). These data are worrisome because the risks of beginning drug consumption at an early age are well known (James et al., 2013).

In low of this situation, it is important to develop preventive campaigns that focus on the most significant risk and protective factors associated with the onset of early consumption of drugs by adolescents (Cleveland et al., 2008). The theory of social development suggests that teenagers learn behavior patterns, such as drug use, through their first models of socialization (Catalano and Hawkins, 1996). Consistent with this hypothesis, the influence of parental attitudes on drug use among adolescents is already well documented in the literature (Becoña et al., 2013).

Maccoby and Martin (1983) proposed a typological model that classifies the styles of relationships among parents and their children,

referred to as "parenting styles." This theoretical model is based on two fundamental aspects of parents' educational practices: demandingness and responsiveness. Authoritarian parents (high demandingness and low responsiveness) require obedience to rules and offer environments that are not very warm, limited communication, and regular physical punishment. Indulgent parents (low demandingness and high responsiveness) impose few rules, eschew punishment, and adopt extreme tolerance toward their children by avoiding controlling behavior. The authoritative parenting style (high demandingness and high responsiveness) is characterized by reciprocity in family relationships. Children must obey their parents' demands, but parents also accept their obligation to respond, insofar as possible, to the children's points of view and reasonable demands. Parents with a neglectful style (low demandingness and low responsiveness) show little willingness to take on the responsibilities and tasks of parenthood.

Many studies show that the authoritative parenting style is associated with lower consumption of drugs (Berge et al., 2016) by adolescents than other styles. Many studies associate the neglectful parenting style with higher rates of drug use by adolescents (Chassin,

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2005). However, the results for the indulgent parenting style have been mixed, as some findings indicate a positive association with drug use (Calafat et al., 2014), whereas other studies show a negative association with drug use (Cerezo et al., 2013).

It is noteworthy that these studies fail to consider the association that risk and protective factors have with the multiple patterns of drug use among adolescents (Lanza et al., 2010). The studies tend to examine the relationships between parenting styles and a single type of substance (Čablová et al., 2014). However, simple associations between parenting styles and various drugs fail to capture the complexity involved in the pattern of drug use itself, as they overlook the fact that a teenager can be consuming multiple substances simultaneously. Patterns of drug use are features underlying the various types of drugs being used, which most studies treat in a dichotomous manner. Youths with similar patterns of drug use can be grouped together to form what are called latent groups. These underlying *unobserved* groups of adolescents are inferred from a set of measured dichotomous questions about use (or not) of alcohol, tobacco, marijuana, and inhalants and could be treated as homogeneous, and the benefits and drawbacks of various parenting styles could then be tested in a more methodologically robust manner (Percy and Iwaniec, 2007).

Latent class analysis (LCA) is a mixture model (Collins and Lanza, 2009; Lazarsfeld and Henry, 1968) that allows to better understanding profiles of behavior outcomes such as substance use profiles (Anderson et al., 2010; Scheier et al., 2008). The breakthrough of LCA is the use of an analytical methodology focused on the person, in contrast to past data analysis techniques that have focused on the variables (Lanza and Rhoades, 2013), where for each observed outcome, a regression was build up and as consequence and increasing in the false discovery rates might occur (Simmons et al., 2011). LCA makes it possible to analyze the simultaneous use of different types of substances and different patterns of use, seeking the risk factors associated with each specific pattern (Cho et al., 2015).

In low of this, this study aims to identify different patterns of drug use in early adolescence and fill this gap in the literature by determining whether these patterns are associated with certain parenting styles and other sociodemographic factors among Brazilian students.

2. Material and methods

This study presents the results of the baseline data collection of a randomized controlled trial to evaluate a school drug-use prevention program. Thus, the original design of the study is a controlled parallel-group randomized trial among 7th- and 8th-grade public school students in six Brazilian cities. In partnership with the Brazilian branch of the United Nations Office on Drugs and Crime (UNODC), the Brazilian Ministry of Health decided to undertake a culturally adapted version of the European drug prevention program *Unplugged*, renamed #Tamojunto, to be applied in Brazilian public schools (Pedroso et al., 2015).

This article examined the data from this cross-sectional sample from the baseline data collection, prior to the application of the intervention (that is, from the pre-test). The study was registered in the Brazilian Ministry of Health's Brazilian Registry of Clinical Trials (Registro Brasileiro de Ensaios Clínicos – REBEC) under the number RBR-4mnv5g. The study protocol was approved by the Federal University of São Paulo's research ethics committee (protocol #473,498).

2.1. Sampling

The sample in this study consisted of 6391 students aged 11–15 in the 7th and 8th grades of 72 public schools in the cities of São Paulo, São Bernardo do Campo, Brasília, Florianópolis, Tubarão, and Fortaleza.

Based on Lwanga and Lemeshow (1991) calculation of sample sizes for longitudinal studies, for a power of 80%, a level of significance of 5%, and a difference between the groups of 1.5 percentage points (5%–3.5%), the sample size necessary for each group in this study was calculated to be 2835 participants. Taking into account a loss of 50%, the sample had to include 4253 participants in each group. The parameters used were based on a previous pilot study and the expected results for the randomized controlled trial. Details of the study design and a flowchart of the sampling were presented in a prior publication (Sanchez et al., 2017).

2.2. Questionnaires

The data were collected through an anonymous questionnaire completed by the participants and administered by researchers in the classroom, without the presence of the teacher. The questionnaire was developed and tested by the European Union Drug Abuse Prevention (EU-DAP) program and used in previous studies on the effectiveness of *Unplugged* (Faggiano et al., 2008). A version that had been translated into and adapted for Portuguese was used in Brazil, with some questions replaced by items from two questionnaires that have been widely used in various studies of Brazilian students: a World Health Organization questionnaire, used by the Brazilian Center for Information about Psychotropic Drugs (Centro Brasileiro de Informações Sobre Drogas Psicotrópicas – CEBRID), (Carlini et al., 2010) and the questionnaire of the National Survey of Student Health (Pesquisa Nacional de Saúde do Escolar – PENSE), used by the Brazilian Ministry of Health (IBGE, 2012).

The questionnaire assessed the use of the following drugs: alcohol, tobacco, marijuana, and inhalants. In addition, it assessed binge drinking (the consumption of 5 or more doses of alcohol during a two-hour period) and sociodemographic data. The students' socioeconomic class was assessed using the scale of the Brazilian Association of Research Companies (Associação Brasileira de Empresas de Pesquisa – ABEP) (ABEP, 2012), which takes into account the head-of-household's education and the goods and services used, with scores ranging from 0 to 46 or in categories from A to E; higher scores indicate better economic standing, and socioeconomic classes are ranked from A (highest) to E (lowest).

The data relating to parenting styles were collected through the scales of Demandingness and Responsiveness (Lamborn et al., 1991). This instrument was used to define four parenting styles (authoritarian, authoritative, neglectful, and indulgent) based on Maccoby and Martin's theoretical model (Maccoby and Martin, 1983). The instrument consists of two scales that refer to the orthogonal dimensions of demandingness and responsiveness. The scales are structured by six items on the demandingness dimension and ten items on the responsiveness dimension, assessed by means of a three-point Likert scale such that values closer to three indicate greater perceived demandingness and responsiveness.

Parents are classified as high or low in demandingness and high or low in responsiveness. The scale is corrected based on the median scores for each subscale, with the parents who score at or above the median for demandingness or responsiveness being classified as high in demandingness or responsiveness, respectively, whereas parents who score at or below the median were classified as low in demandingness or responsiveness. Parenting styles are defined in four categories, based on the combination of these two dimensions: authoritative (parents scoring high on demandingness and responsiveness), authoritarian (those scoring high on demandingness and low on responsiveness), indulgent (parents scoring low on demandingness and high on responsiveness), or neglectful (those scoring low on both demandingness and responsiveness) (Calafat et al., 2014).

The assessed outcome variables included whether the following had been used over the past 12 months: alcohol, tobacco, marijuana, or inhalants. In the case of alcohol, any pattern of binge drinking (BD) over the past year was also assessed. The explanatory variables analyzed were parenting style (neglectful, authoritative, authoritarian, or

indulgent), the ABEP score, city, gender, and age. All variables used in this study were collected at the initial (baseline) time and were therefore neither randomized nor influenced by the intervention.

2.3. Statistical analysis

Latent class analysis was used for the purpose of identifying groups with similar patterns of drug use. The enumeration process extracted from 1 to 6 classes, and due to the study's multilevel sampling, the standard errors were corrected as described in Asparouhov (Asparouhov, 2006) taking the school (second level) as cluster indicator. Mplus version 7.4 was used for all analyses (Muthén and Muthén, 2010). The extraction of latent classes ceased when the inclusion of a class yielded little additional information. The model was adjusted based on the goodness of fit criterion and took into consideration the parsimony and interpretability of the classes; that is, in addition to the statistical indices presented below, the decision about the best solution and number of latent classes took into consideration the most consistent statistical and conceptual distinctions among the groups. The following fit indices used to decide statistically the best solution: the Akaike information criterion (AIC); the Bayesian information criterion (BIC); the sample-size-adjusted Bayesian information criterion (SSABIC); and the Vuong-Lo-Mendell-Rubin test (VLMR). Finally, to assess how well discriminated the latent classes underlying the best solution were, we used entropy, which is based on a posteriori probability and indicates the accuracy of the classification; values close to 1 indicate clear and very precise classifications. We emphasize that entropy, in itself, was not used to decide the best solution for the number of latent classes. Because large amounts of data relating to parenting styles were lost due to the fact that students left many responses blank, they were imputed in Mplus through the method of imputed regression (Muthén and Muthén, 2010). The following were used as variables in the non-restricted model: group, school, gender, age, drug use (alcohol, binge drinking, cigarettes, inhalants, marijuana), and ABEP classification. Five imputed data sets were generated. Subsequently, a multinomial logistic regression (Hosmer et al., 2013) was performed in Mplus following the 3RSTEP Mplus's *AUXILIARY* command (Asparouhov and Muthén, 2014). Descriptive statistics on Table 1 are weighted percentages (wgt%s) based on random levels of the sample subjects and records of the expected population taken from official data from the Anisio Texeira National Institute of Educational Studies and Research (Instituto Nacional de Estudos e Pesquisa Educacionais Anisio Teixeira – INEP). Inferential point estimates are given in odds ratios (ORs) with their respective 95%CIs and p-values. The adopted level of significance was 5%.

3. Results

Table 1 presents the demographic characteristics of the students participating in the study (n = 6391), drawn from the baseline data collected prior to the intervention. The obtained data show that the majority of students were girls (51.21%) between the ages of 11 and 12 (53.83%) who belonged to the middle socioeconomic class (53.98%). Moreover, the drug most used by these students over the last year was alcohol (30.94%), and the most prevalent parenting style was the neglectful style (37.84%).

The latent classes were identified based on the variables related to drug consumption over the past year (alcohol, binge drinking, cigarettes, inhalants, and marijuana). A total of five classes (classes 1–5) were examined (Table 2). The three-class model showed a lower BIC value, and the lowest SSABIC value was detected in the model with four classes. Moreover, the values of AIC decreased as the number of classes increased. For the three-class solution, the value of entropy was 0.89. Taking the BIC value as the most reliable measure, (Nylund et al., 2007) the model with three latent classes was chosen as the most parsimonious, as it presented values that were acceptable considering the

Table 1

Sociodemographic characteristics of students participating in the baseline data collection of a study evaluating the #Tamojunto school-based program of drug-use prevention (N = 6391).

Variables	N	wgt%	wgt95%CI
Gender			
Male	3130	48.79	[47.03; 50.56]
Female	3261	51.21	[49.44; 52.97]
Age			
11–12 years	3343	53.83	[50.91; 56.72]
13–15 years	3048	46.17	[43.28; 49.09]
Average Age		12.61	[12.56; 12.67]
ABEP score		27.67	[26.92; 28.41]
A (35–42)	244	3.78	[2.80; 5.11]
B (23–34)	2467	36.64	[33.54; 39.85]
C (14–22)	3343	53.98	[50.41; 57.50]
D/E (0–13)	322	5.6	[4.60; 6.80]
Use in the past year			
Alcohol	2015	30.94	[28.67; 33.30]
Binge drinking	1006	16.50	[15.10;18.01]
Tobacco	243	4.02	[3.31; 4.86]
Inhalants	525	8.22	[7.45; 9.07]
Marijuana	156	2.56	[2.05; 3.20]
Parenting Style[a]			
Authoritative	1447	28.69	[26.65; 30.83]
Authoritarian	960	19.66	[18.56; 20.80]
Indulgent	662	13.81	[12.72; 14.98]
Neglectful	1863	37.84	[35.66; 40.07]

[*] This variable showed 22% of data as missing and included imputed data in the inferential analyses.

criteria of "goodness of fit" and interpretability from the perspective of the event.

Fig. 1 shows the probability of drug use and binge drinking over the past year for each latent class in the model chosen for the best fit (i.e., 3 latent classes). The classes were denominated as "abstainers/low users" corresponding to 81.54% of the students, "alcohol users/binge drinkers," representing 16.66% of the total sample, and "polydrug users," accounting for 1.8% of the students. Students in the "abstainers/low users" class had an average likelihood of having used alcohol over the past year (12.4%) and a very low probability of having used other drugs (< 5%); no cases of binge drinking (BD) were found in this group. Students in the "alcohol users/binge drinkers" class had a high probability of drinking (100%) and binge drinking (70.70%), an average likelihood of inhalant use (16.82%), a low likelihood of tobacco use (8.30%), and a very low probability of marijuana use (< 3%) The students in the "polydrug users" class had a high probability of having used all drugs (> 57%).

Table 3 shows the results of the multinomial logistic regression model (univariate and multivariate), using the class "abstainers/low users" as its reference. For every year of increasing age, the students had a 46% (aOR = 1.46, 95%CI = 1.32;1.61) greater probability of belonging to the "alcohol users/binge drinkers" class compared to the "low users" class. Every point on the scale of social class (which varied from 0 to 42) corresponded to an increase of 2% (aOR = 1.02, 95%CI = 1.00–1.03) in the probability that a student would belong to the "alcohol users/binge drinkers" class compared to the "low users" class. The adolescent of authoritative, authoritarian, and indulgent parents was progressively less likely to be in the "alcohol users/binge drinkers" class, rather than the "abstainers/low users" class, compared to the children of neglectful parents (aOR = 0.33, 95%CI = 0.25–0.44; aOR = 0.55, 95%CI = 0.42–0.72; and aOR = 0.64, 95%CI = 0.51–0.80, respectively). With each passing year of age, respondents were 2.58 times more likely to belong to the "polydrug users" group than to the "abstainers/low users" group (95%CI = 2.08–3.20). A student's chance of belonging to the "polydrug users" group, rather than to the "abstainers/low users" group, increased by 4% (95%CI = 1.02–1.06) with each additional point on the social class

Table 2

Goodness-of-fit statistics for the number of latent classes of drug use over the past year among students participating in the baseline data collection of a study to evaluate the effect of the #Tamojunto school-based drug-use prevention program (N = 6381).

Models			Goodness-of-fit statistics				
	Free Parameters	Factor correction	AIC	BIC	ssaBIC	VLMR LRT	LMR-LR adjusted test
1 class	5	1.3978	20767.80	20801.60	20785.71		
2 classes	11	1.3573	16714.26	16788.63	16753.68	<0.0001	<0.0001
3 classes	17	1.4054	16391.96	16506.90	16452.88	<0.001	<0.0001
4 classes	23	1.3063	16338.12	16493.62	16420.54	0.001	0.0011
5 classes	29	1.2373	16347.53	16543.60	16451.44	0.5773	0.5786

Legend: AIC = Akaike Information Criteria; BIC = Bayesian Information Criteria; ssABIC = sample size adjusted;
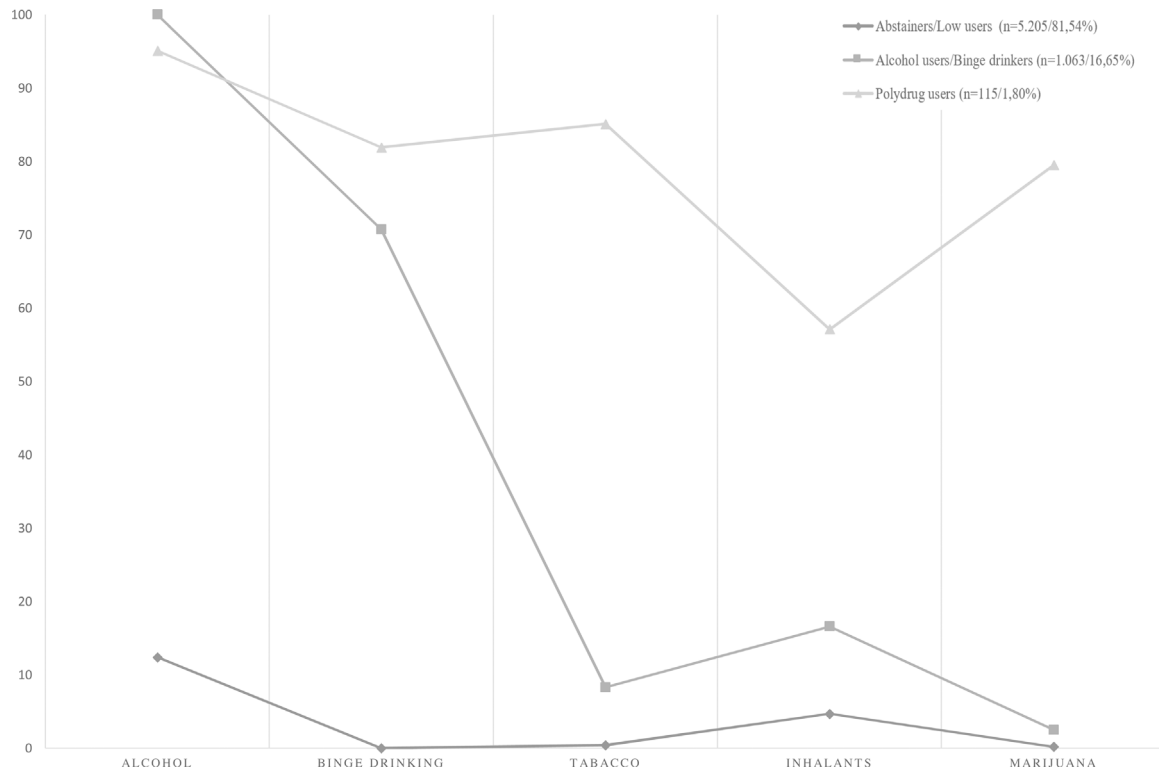VLMR-LRT = Voung-Lo-Mendell-Rubin Likelihood Ratio Test.

Fig. 1. Weighted probabilities associated with occurrence over the past year of alcohol use, binge drinking, tobacco use, inhalant use, and marijuana use given the model of the three latent classes among adolescents who participated in the collection of baseline data in the study evaluating the #Tamojunto program, 2014 (n = 6381).

scale. With regard to parenting styles, it was found that students whose parents adopted authoritative, authoritarian, and indulgent styles were progressively less likely to belong to the "polydrug users" group, rather than to the "abstainers/low users" group, compared to the adolescents of neglectful parents (aOR = 0.08, 95%CI = 0.03–0.22; aOR = 0.23, 95%CI = 0.11–0.53; and aOR = 0.27, 95%CI = 0.10–0.72, respectively).

4. Discussion

This study's significant contribution revolves around bringing the established knowledge about latent class formation to the understanding of the association between adolescent drug use and parenting styles to which adolescents are exposed. A solution of 3 latent classes ("abstainers/low users", "alcohol users/binge drinkers," and "polydrug users") provided the best explanation for the patterns of drug use among those adolescents surveyed. This study found differences between the "abstainers/low users" class and the two other classes ("alcohol users/binge drinkers" and "polydrug users") with regard to parenting style, age, and social class. Of particular note were the inverse associations found between parenting styles and classes of drug use

among Brazilian students.

The findings related to the best solution for the latent classes were consistent with previous studies carried out in the United States and Australia, which also found the same three latent classes of drug use in adolescents ("non-users or abstainers/low users of drugs," 'predominant use of alcohol' and "polydrug users") as the best model to describe the patterns of drug use (Chung et al., 2013; Kelly et al., 2015). The great majority of students in this study fell into the class of abstainers/low users (81%). A systematic review showed that the class of "non-users" or "low users" tends to be the most prevalent and that the class of "polydrug users" is the least prevalent. The intermediate classes usually use isolated substances, such as the "use of alcohol alone" (Tomczyk et al., 2016).

This analysis identified a clear and consistent gradient of an inverse association between parenting styles and patterns of adolescent drug use, when controlling for gender, age, and social class. The evidence that the authoritative parenting style is a protective factor (Berge et al., 2016) and that the neglectful style is a risk factor (Chassin, 2005) for the use of drugs in adolescence corroborates previous studies that assessed the use of drugs in a one-dimensional manner. On the other hand, the association between

Table 3

Characteristics of polysubstance drug use and binge drinking (BD) identified through LCA in a sample of students participating in the baseline data collection of a study to evaluate the effect of the #Tamojunto school-based drug-use prevention program (N = 6381).

	Latent Classes				Univariate analysis						Multivariate analysis					
	Abstainers/Low users	Alcohol users/Binge drinkers	Polydrug users	p	Abstainers/Low users vs. Alcohol users/Binge drinkers			Abstainers/Low users vs. Polydrug users			Alcohol users/Binge drinkers vs. Abstainers/Low users			Polydrug users vs. Abstainers/Low users		
	w%	w%	w%		cOR	95%CI	p	cOR	95%CI	p	aOR	95%CI	p	aOR	95%CI	p
Sex				0.223												
Girl	48.93	52.81	42.58		0.96	[0.82;1.12]	0.599	0.80	[0.50;1.28]	0.346	1.00	[0.85;1.17]	0.995	0.86	[0.53;1.40]	0.544
Boy	51.07	47.19	57.42													
Age	12.54 ± 1.1	12.83 ± 2.6	13.41 ± 8.2	<0.001	1.51	[1.37;1.67]	0.584	2.76	[2.23;3.40]	<0.001	1.46	[1.32;1.61]	<0.001	2.58	[2.08;3.20]	<0.001
ABEP	27.7 ± 36.9	28.94 ± 23.4	29.4 ± 72.1	<0.001	1.01	[1.00;1.02]	0.023	1.04	[1.01;1.06]	0.004	1.02	[1.00;1.03]	0.005	1.04	[1.02;1.06]	<0.001
Parenting Style[a]				0.408												
Neglectful	37.14	39.73	46.23		1			1			1			1		
Indulgent	13.96	13.77	6.63		0.61	[0.46;0.80]	<0.001	0.24	[0.09;0.65]	0.008	0.64	[0.51;0.80]	<0.001	0.27	[0.10;0.72]	0.013
Authoritarian	19.82	19.45	16.87		0.53	[0.40;0.69]	<0.001	0.19	[0.08;0.43]	<0.001	0.55	[0.42;0.72]	<0.001	0.23	[0.11;0.53]	<0.001
Authoritative	29.08	27.05	30.27		0.31	[0.23;0.42]	<0.001	0.06	[0.02;0.19]	<0.001	0.33	[025;0.44]	0.009	0.08	[0.03;0.22]	<0.001

* This variable was imputed.

indulgent or authoritarian parenting styles and drug use is still open to debate (Garcia and Gracia, 2009) showing that cultural and ethnic differences vary the optimal parenting style (but now, in Brazil) (Chao, 2001; Dwairy et al., 2006; Garcia, 2015; Garcia and Gracia, 2009; García and Gracia, 2014, 2010). This study showed that both the authoritarian and indulgent parenting styles serve as protective factors against adolescents' involvement with drugs. It is not clear if authoritarian parenting was associated with best benefit for the prevention of consumption than indulgent parenting once there is an overlap of the confidences intervals in respect to belonging to "alcohol users/binge drinkers (aOR = 0.55, 95%CI = 0.42–0.72; and aOR = 0.64, 95%CI = 0.51–0.80, respectively) and 'polydrug users' (OR = 0.23, 95%CI = 0.11–0.53; and aOR = 0.27, 95%CI = 0.10–0.72, respectively).

These results confirm other previously works with samples of the American white majority (Lamborn et al., 1991; Steinberg et al., 1992). This study's findings reinforce the protective function that parents' monitoring (Shin et al., 2015) of their children plays in preventing alcohol consumption in adolescence and emphasize the need for school-based drug prevention programs to include training in parenting skills in their curricula. However, on the other hand, the benefit for the prevention of consumption that supposes the component of affection and involvement, which share indulgent and authoritative parents, also you should indicate it. There is previous research that has found similar results analyzing drug (Calafat et al., 2014; Fuentes et al., 2015; Fuentes et al., 2011; Martínez et al., 2013) and other outcomes, in both Brazil (Martínez et al., 2007; Martínez and García,2008) and other countries (Garcia and Gracia, 2009; Rodrigues et al., 2013). Affection and involvement of parents is key for reasoning and bidirectional communication between parents and children. Although monitoring is generally beneficial, it is not the same that be done by imposition, that the child himself, on his own initiative, informs his parents (Ahn and Lee, 2016; Álvarez-García et al., 2016; Calafat et al., 2014; Holdsworth et al., 2017; McLaughlin et al., 2016).

With respect to sociodemographic factors, the association between drug use and increasing age among teenagers is already well known in the literature (Tomczyk et al., 2016). This can be explained by the fact that the older the teenager is, the more access he or she has to the use of drugs, and the more extensive is his or her repertoire and experience with drug use (White et al., 2013). Moreover, it was shown that higher social class is associated with an increased likelihood of belonging to the "alcohol users/binge drinkers" class and an even greater likelihood of belonging to the "polydrug users" class, which potentially corroborates previous Brazilian data suggesting that Brazilian students with higher socioeconomic standing are at greater risk of binge drinking (Sanchez et al., 2013). However, this association runs counter to observations in developed countries, such as the United States and Europe, where drug use is generally associated with lower socio-economic status (Baumann et al., 2007; Helasoja et al., 2007).

This study has some limitations that should be considered, the primary one being the fact that adolescents' perceptions provided the only measure by which parenting style was assessed. Studies that assess the perceptions of both parents and children simultaneously tend to provide more reliable data on parenting styles and drug use, as children tend to have a more negative perception of their relationship with their parents (Shek, 1998). Moreover, it is important to underscore that because this is a cross-sectional study, it is not possible to assign causal inference between the factors analyzed and the outcome. Besides, adolescents' perceptions of parenting style were used as a categorical observed covariate as normally conducted (Berge et al., 2016; Garcia and Gracia, 2009). More robust model might use such perception in a latent solving likely problems of misclassifications increasing its incremental validity (Simmons et al., 2011; Westfall and Yarkoni, 2016).

Our findings suggest that parenting style is associated with different patterns of drug use by students in early adolescence, as are age and socioeconomic status. In low of the known risks of early drug consumption, these results indicate that school-based drug prevention

programs should include activities in their curricula directed exclusively at the parents to reduce neglectful practices and thus possibly reduce drug use among adolescents.

Conflict of interest

No conflict declared.

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