

# Examining Associations Between Race, Gender, Alcohol Use, School Performance, and Patterns of Bullying in the School Context: A Latent Class Analysis

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## Abstract

Although many studies addressed bullying occurrence and its associations, they often use individual variables constructed from few items that probably are inadequate to evaluate bullying severity and type. We aimed to identify involvement patterns in bullying victimization and perpetration, and its association with alcohol use, school performance, and sociodemographic variables. Baseline assessment of a randomized controlled trial were used and a latent class analysis was conducted to identify bullying patterns among 1,742 fifth-grade and 2,316 seventh-grade students from 30 public schools in São Paulo, Brazil. Data were collected using an anonymous self-reported, audio-guided questionnaire completed by the participants on smartphones. Multinomial logistic regressions were performed to verify how covariant variables affected bullying latent classes. Both grades presented the same four latent classes: *low bullying*, *moderate bullying victimization*, *high bullying victimization*, and *high bullying victimization and perpetration*. Alcohol use was

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associated with all bullying classes in both grades, with odds ratio up to 5.36 (95% CI 3.05; 10.38) among fifth graders from the high bullying victimization and perpetration class. Poor school performance was also strongly associated with this class (aOR = 10.12, 95%CI = 4.19; 24.41). Black/brown 5th graders were 3.35 times more likely to fit into the high bullying victimization class (95% CI 1.34; 8.37). Lack of evidence for association of sociodemographic variables and bullying latent class among seventh-grade students was found. Bullying and alcohol use are highly harmful behaviors that must be prevented. However, prevention programs should consider how racial and gender issues are influencing the way students experience violence.

### **Keywords**

prevention, adolescents, schools, bullying, alcohol, latent class analysis

### **Introduction**

Bullying became an important public health problem in the school context worldwide due to its negative impact on young people's mental health (Ashrafi et al., 2020). Consistent evidence show a strong association between bullying behaviors and mental disorders (Azevedo da Silva et al., 2020; Moore et al., 2017), such as depression and anxiety (Strohacker et al., 2019; Thomas et al., 2017), in addition to representing a significant risk factor for self-harm (Fisher et al., 2012), suicidal ideation, and suicide attempts (Holt et al., 2015; Strohacker et al., 2019). Besides that, in adulthood, bullies are more likely to exhibit aggressive behavior toward their partners and inflict harsh physical punishments on their own children.

Such behavior differs from other types of violence for occurring repeatedly, among peers, and involving a real or perceived asymmetrical power due to differences in height, age, physical and emotional development or characteristics, other students support, race, or sexuality (Menesini & Salmivalli, 2017).

The Problem-Behavior Theory (Jessor et al., 1968) postulates that problem behavior often co-occurs among adolescents, and the severity of involvement in a behavior problem is related to the likelihood of co-occurrence of others. Based on this theory, adolescents involved with bullying are at greater risk of alcohol use (Gaete et al., 2017; Lee et al., 2019). Several studies have shown the correlations between violence and alcohol use among adolescents (de Carvalho et al., 2017). Many of these studies focused on victimization and applied the Theory of Stress and Coping (Smith & Lazarus, 1990) to explain this association. According to this theory, stressful events can trigger a negative emotional response and can lead to harmful coping activities, such as alcohol use. But the association with other profiles and different degrees of involvement has not yet been fully investigated.

Involvement with bullying, in addition to the negative effects related to alcohol use, may cause several damages to learning and school performance. Bullies often show poor school performance and lack problem-solving skills, whereas victims tend to miss many school days to avoid victimization (Smokowski & Kopasz, 2005; Zych et al., 2019).

Gender and race may also be associated with the risk of victimization and the type of involvement with bullying. According to literature, boys are most likely to engage in physical bullying (Dane et al., 2017), whereas girls are more frequently involved in relational bullying (Gloppen et al., 2018). Non-white students are at high risk for bullying victimization than white students (Gloppen et al., 2018; Vitoroulis & Georgiades, 2017). According to data from the National Student Health Survey (Oliveira et al., 2015), bullying reports were four times more common among black students and twice more common among indigenous students than among those who were white (Silva et al., 2019).

The age range is another characteristic that may influence the prevalence and type of bullying among students. Although there is still no consensus in the literature, studies suggest that the highest bullying rates are found during middle school, and with the increase of age, there seems to be a change from physical forms to indirect and relational forms of bullying (Menesini & Salmivalli, 2017).

However, most studies on bullying have been conducted in developed countries, and more than three quarters of the most cited articles on this subject are from North America and Northern Europe (Zych et al., 2015). Little is known about bullying dynamics and nature among youths in less developed countries, even though several studies have reported that violence and bullying are higher in less developed countries, especially in Latin America (Gaete et al., 2017).

Furthermore, although many studies examined the occurrence of bullying associated with other behaviors, many of these studies employed individual variables constructed from few items, being probably inadequate to evaluate bullying type and severity and unable to distinguish different bullying types (verbal, physical, relational) (Lie et al., 2019). Furthermore, recent studies adopted more advanced methods to investigate behavior problems, such as the latent class analysis (LCA), which enables the identification of behavior patterns within a population (Lanza & Rhoades, 2013), allowing us to better understand the problem and propose more assertive interventions. However, this pattern-centered analysis has been few explored by research on bullying, which often investigate the phenomenon using primarily individual variables, samples of the same age range, and with a victimization focus, failing in exploring perpetration and bully–victim behavior and capturing its complexity (Moore et al., 2017).

We adopted a LCA model to identify involvement patterns in different types of bullying victimization and perpetration, simultaneously, and their association with alcohol use, school performance, and sociodemographic

variables (as gender and race) among students from different ages. We hypothesize that profiles that are more involved with bullying, especially those involved in both victimization and perpetration, have greater strength of association with alcohol use and low school performance, and that being a girl, or a non-white student increases the chances to be in a victimization class.

## **Methods**

This study used baseline (pre-intervention) data from two randomized controlled trials (RCT) on Educational Program for Resistance to Drugs and Violence (PROERD), a Brazilian school-based program for preventing drug use and violence, among students of the fifth and seventh grades from public schools in the city of São Paulo, Brazil. The program has different curricula for each grade, which are adapted versions of Keepin' it REAL (KiR; Kulis et al., 2005). Baseline data were simultaneously collected for both groups in 2019, before any intervention at the schools.

This study was registered in the Brazilian Clinical Trials Register (REBEC), under the protocol No. 6q23nk. The study protocol was approved by the Research Ethics Committee of the Universidade Federal de São Paulo (No.1327/2018).

### *Sampling*

In total, 1,742 fifth graders and 2,316 seventh graders from 30 public schools in São Paulo, Brazil, participated in this study. Schools were randomly selected from the universe of schools that did not receive PROERD in the past 3 years.

PROERD has two different curricula designed for each grade (fifth and seventh). Considering that, two different sample sizes were calculated to evaluate PROERD impact in these two grades, conducting two RCTs. For fifth grade, the required sample was 1,820 participants (70 per group), considering a 80% power, 5% significance level, 0.3 effect size, and 0.02 inter-class correlation (Ahn et al., 2014).

As for seventh grade, based on Donner and Klar (2010), the minimum required sample size was 1,608 participants (67 per group), considering a 80% power, 5% significance level, 7% proportions difference, and 0.02 inter-class correlation. Parameters used for calculation were based on results reported by a KiR USA study (Kulis et al., 2007; Marsiglia et al., 2011).

### *Instrument and Measures*

Researches administered a self-reported, audio-guided questionnaire in the classroom without teachers' presence, which was anonymously completed by students

on smartphones provided by the researchers. These devices allow the use of audios and images, which facilitates understanding and made it possible for students with low proficiency in reading and writing—a highly prevalent problem in Brazilian public schools (OECD, 2019)—to participate. Moreover, the collected data was sent directly to the cloud database, eliminating the need to manually enter the responses to the database, and so, avoiding errors during transcription.

For the bullying assessment, the rBVQ (Solberg & Olweus, 2003) was used in its original translated version for the seventh grade, whereas for the fifth grade an adapted version was required. The rBVQ questionnaire contains two global questions on how often students have been bullied and how often they taken part in bullying another student(s), and seven specific questions on bully/victim situations, which enables the identification of different bullying types (verbal, physical or relational), for example: “I was called mean names...”/“I called another student(s) mean names”; “I was hit, kicked...”/“I hit, kicked, pushed, and shoved him/her”. It is a widely used questionnaire (Guilheri, 2016; Kyriakides et al., 2006; Lee & Cornell, 2009) and was validated for Brazilian Portuguese by Guilheri (2016). Response alternatives for both global and specific questions are: “I haven’t bullied/been bullied...”, “only once or twice,” “2 or 3 times a month,” “about once a week,” and “several times a week”. A student is considered victim or bully if he/she answers “2 or 3 times a month” or more. In a pilot study, we found some difficulties during data collection among fifth graders, as they had not yet mastered reading and, consequently, had trouble understanding different answers categories per item. Considering that, the number of answer categories per questions for fifth grade was adapted by replacing the 5-point scale by binary answers (“yes” or “no”) and including, for each specific bullying situation, a question on whether, besides happening recently, it also happened during the last year.

Students from fifth grade were considered victims or bullies if they had any positive answer (yes) on each category (victim or perpetrator) for both “recently” and “past year,” to guarantee recurrency in the event. The original Solberg and Olweus (2003) scale was not modified for seventh grade, and the cut-off point of three or more times for each event frequency in the past month was adopted.

To assess lifetime alcohol use, we adopted a dichotomous measure (yes/no) from the World Health Organization (WHO) questionnaire, used by the Brazilian Center of Information on Psychotropic Drugs (Centro Brasileiro de Informações Sobre Drogas Psicotrópicas—CEBRID) (Carlini et al., 2010) to evaluate substance use among Brazilian students. Data on gender, age, race, and school performance (poor, average, and good) were obtained using questions from the National Student Health Survey (Pesquisa Nacional de Saúde do Escolar – PENSE), employed by the Brazilian Ministry of Health (IBGE, 2012).

## Statistical Analysis

A LCA was conducted to identify groups with similar patterns of bullying. A LCA model was constructed for each sample (fifth and seventh grade students) based on variables from bullying victimization and perpetration observed for the prior month. The enumeration process extracted 1 to 6 classes. Considering the study multilevel sampling, standard errors were corrected according to Asparouhov (Asparouhov, 2006), considering school (second level) as the cluster indicator. Latent classes stopped being extracted when adding a new class provided little additional information. Models were adjusted based on “goodness-of-fit” criteria, considering classes parsimony and interpretability, that is, besides statistical indices, the appropriate number of latent classes was decided based on whether each solution had a substantive interpretation. The goodness-of-fit statistics included: the Akaike information criterion (AIC), the Bayesian information criterion (BIC), the sample-size-adjusted Bayesian information criterion (SSABIC), and the Vuong-Lo-Mendell-Rubin (VLMR) test.

Then, univariate and multivariate multinomial logistic regressions models (Hosmer et al., 2013) were performed in Mplus, using the R3STEP option of the AUXILIARY command (Asparouhov & Muthén, 2014) with covariant variables affecting bullying latent classes. One regression used data from fifth-grade students and the other from seventh-grade students. All analyses were performed with Mplus version 7.4 (Muthén & Muthén, 2010).

Descriptive statistics are weighted percentages (wgt%) based on random levels of sampling and records of the expected population in each school and at city level, reported by the National Institute for Educational Studies and Research “Anísio Teixeira” (Instituto Nacional de Estudos e Pesquisa Educacionais Anísio Teixeira – INEP). Inferential point estimates are expressed as adjusted odds ratios (aORs) with their respective 95% CIs and *p*-values. The adopted significance level was 5%.

## Results

As shown in Table 1, at baseline, most fifth grade students were boys (51.24%), with mean age of 10.12 (*SD*=0.65), and brown/black (58.23%). The prevalence of bullying victimization was 58.14% and bullying perpetration was 22.11%. In the seventh grade, most students also were also boys (51.62%), with mean age of 12.27 (*SD*=0.72), and black/brown (60.17%). The prevalence of bullying victimization was 30.27% and bullying perpetration was 10.74%.

We examined six latent classes in each sample. Table 2 shows information criteria values. Considering BIC as one of the most reliable measures (Nylund

**Table 1.** Sociodemographic Characteristics of Students Participating in a Study Evaluating a School-based Program for Preventing Drug Use (N = 1,742 Fifth Graders and 2,316 Seventh Graders).

Variables	5th grade			7th grade		
	N	wgt%	wgt95%CI	N	wgt%	wgt%
wgt95%CI						
51.62	<b>Gender</b>	Male	845	49.10–53.37	51.24	1190
48.38	49.86–53.37	Female	887	46.63–50.90	48.76	1116
	46.63–50.14	<b>Age (Mean ± SD)</b>	10.12±0.65			12.27±0.72
<b>Race</b>						
White	653	37.43	35.78–39.10	778	33.61	31.54–35.73
Brown/Black	1003	58.23	55.79–60.63	1382	60.17	57.91–62.39
Others	76	4.34	3.06–6.13	145	6.22	5.24–7.37
<b>Lifetime alcohol use</b>	305	17.42	15.83–19.16	868	37.45	35.13–39.82
<b>School performance</b>						
Good	995	57.89	55.62–60.13	720	31.26	29.51–33.07
Average	702	40.11	37.94–42.33	1417	61.64	59.63–63.60
Poor	35	1.99	1.58–2.52	165	7.10	5.97–8.42
<b>Bullying</b>						
Victimization	991	58.14	56.03–60.23	693	30.27	28.72–31.86
Perpetration	375	22.11	20.60–23.71	245	10.74	9.78–11.79
<b>Bullying victimization</b>						
Verbal	623	36.55	34.60–38.55	514	22.43	21.20–23.71

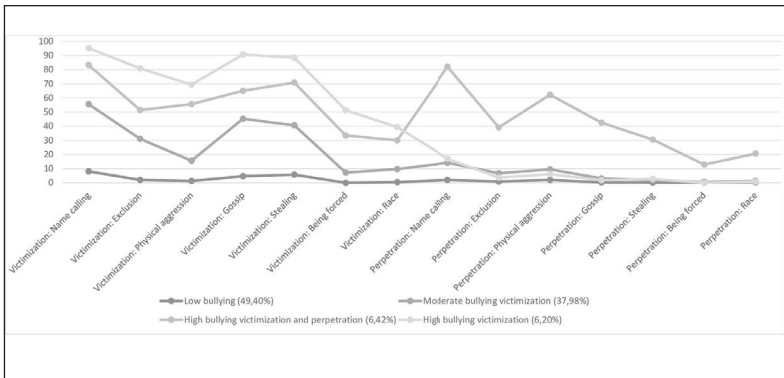
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Table 1. continued

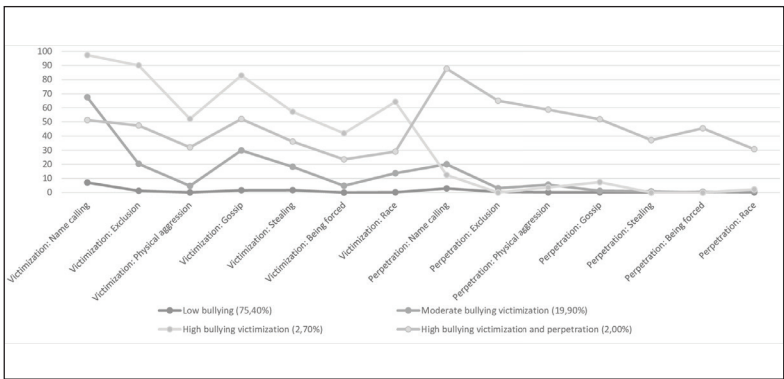
Variables	5th grade			7th grade		
	N	wgt%	wgt95%CI	N	wgt%	wgt%
Social exclusion	363	21.43	19.75–23.21	192	8.38	7.59–9.15
Physical	248	14.55	12.98–16.26	71	3.14	2.64–3.72
Rumor spreading	502	29.25	27.32–31.26	239	10.32	9.41–11.32
Taking money/belongings	486	28.54	26.56–30.61	165	7.30	6.33–8.39
Threatening	139	7.95	6.90–9.14	59	2.58	2.15–3.11
Racial	142	8.43	7.58–9.37	120	5.25	4.59–6.01
<b>Bullying perpetration</b>						
Verbal	218	12.71	11.57–13.95	189	8.35	7.41–9.39
Social exclusion	99	5.88	5.15–6.71	59	2.24	1.77–2.83
Physical	154	9.04	8.11–10.06	53	2.59	2.16–3.10
Rumor spreading	71	4.24	3.49–5.15	37	1.64	1.36–1.98
Taking money/belongings	50	2.99	2.51–3.58	21	0.93	0.69–1.25
Threatening	18	1.04	0.75–1.42	21	0.92	0.69–1.22
Racial	34	2.00	1.58–2.51	25	1.06	0.76–1.49



et al., 2007) and based on theoretical interpretation criteria, we selected the four latent classes model as the most parsimonious. Both grades presented the same four classes: *Low bullying* (49.40% for 5th grade and 75.40%, for 7th), *Moderate bullying victimization* (37.98%; 19.90%), *High bullying victimization* (6.20%; 2.70%), and *High bullying victimization and perpetration* (6.42%; 2.0%; see Figure 1 and 2 ).



**Figure 1.** Weighted probabilities of bullying victimization and perpetration occurrence over the past month, according to the four-latent class model among 5th graders who participated in the baseline phase of a study evaluating a school-based program for preventing drug use (N = 1,716).



**Figure 2.** Weighted probabilities of bullying victimization and perpetration occurrence over the past month, according to the four-latent class model among 7th graders who participated in the baseline phase of a study evaluating a school-based program for preventing drug use (N = 2,300).

**Table 2.** Goodness-of-Fit Statistics for the Number of Latent Bullying Classes Among 5th and 7th Graders Participating in the Baseline Phase of a Study Evaluating the Effect of a School-based Program for Preventing Drug Use.

	Factor Correction	Log Likelihood	AIC	BIC	SSBIC	VLMR-LRT	LMR Adjusted LRT	Entropy
<b>5th grade students</b>								
	1 class	-8.081.700	16,191,400	16,267,669	16,223,192			
	2 classes	-7.072.606	14,203,211	14,361,196	14,269,066	0.0000	0.0000	0.802
	3 classes	-6.942.559	13,973,118	14,212,819	14,073,036	0.2219	0.2253	0.782
	4 classes	-6.874.741	13,867,482	14,188,900	14,001,463	0.3085	0.3113	0.746
	5 classes	-6.824.945	13,797,891	14,201,024	13,965,935	0.5893	0.5893	0.740
	6 classes	-6.796.657	13,771,319	14,256,169	13,973,426	0.4957	0.4963	0.723
<b>7th grade students</b>								
	1 class	-6051.583	12,131,165	12,211,534	12,167,054			
	2 classes	-5107.651	10,273,303	10,439,782	10,347,644	0.0000	0.0000	0.871
	3 classes	-4948.493	9,984,986	10,237,575	10,097,779	0.1488	0.1508	0.897
	4 classes	-4883.397	9,884,793	10,223,492	10,036,039	0.2907	0.2933	0.833
	5 classes	-4839.416	9,826,831	10,251,640	10,016,529	0.2731	0.2757	0.867
	6 classes	-4811.497	9,800,994	10,311,913	10,029,144	0.5253	0.5263	0.877

Table 3 shows the descriptive statistics for the four classes and the univariate multinomial logistic regression model results and Table 4 the multivariate multinomial logistic regression model results for fifth and seventh grade students, both using the latent classes as outcomes and the *Low bullying* latent class as reference.

In fifth grade, the strongest association was between students who self-reported poor school performance and the *High bullying victimization and perpetration* class (aOR = 10.12, 95% CI = 4.19; 24.41), compared to students who self-reported good performance. The second strongest association was between alcohol use and *High bullying victimization and perpetration* (aOR = 5.63, 95% CI = 3.05; 10.38). Girls were more likely to fit into *High bullying victimization* and to *Moderate bullying victimization* than boys (aOR = 1.75, 95% CI = 1.02; 3.01 and aOR = 1.47 95% CI = 1.16; 1.87, respectively). Each one-year increase in students' age decreases by 29% (aOR = 0.71, 95% CI = 0.53; 0.97) their likelihood of belonging to *High bullying victimization*. As for race, the strongest association was between black or brown students and *High bullying victimization* (aOR = 3.35 95% CI = 1.34; 8.37).

The only statistically significant outcome among seventh graders was alcohol use. Adolescents that reported using alcohol are likely to belong to all bullying latent classes, but 3.3 times more likely to belong to the *High bullying victimization and perpetration* (95% CI = 1.28; 8.43).

## Discussion

We identified the same four latent bullying classes in the school context for both grades: *Low bullying*, *Moderate bullying victimization*, *High bullying victimization*, and *High bullying victimization and perpetration*. All bullying types are more prevalent among 5th graders. Lifetime alcohol use was the only variable associated with all bullying classes in both grades. In fifth grade, the different bullying latent classes were also associated with gender, race, and school performance.

Recent studies identified similar latent classes of victimization as distinguished in our study (Ashrafi et al., 2020; Wu et al., 2015), but none of them investigated simultaneously the perpetration pattern, what limits the validity of the results since we have an important and peculiar group of victims that are also aggressors. Our study did not identify an exclusively class of bullies, but we verified the existence of a class where students who perpetrate were also victimized—*High bullying victimization and perpetration* class. These students had a behavior similar to described in the literature as provocative victims or reactive bully (Rose et al., 2011; Smokowski & Kopasz, 2005). Kennedy (2018) and Rose et al. (2011) state that some

**Table 3.** Characteristics of Bullying Perpetration and Victimization Identified by Latent Class Analysis in a Sample of 5th and 7th Graders Participating in the Baseline Phase of a Study Evaluating the Effect of a School-based Program for Preventing Drug Use, According to Inferential and Univariate Analysis.

	Inferential Analysis						Univariate Analysis									
	Moderate Bullying Victimization		High Bullying Victimization		High Bullying Victimization and Perpetration		Low Bullying vs. Moderate Bullying Victimization		Low Bullying vs. High Bullying Victimization		Low Bullying vs. High Bullying Victimization and Perpetration					
	%	%	%	%	%	p	cOR	95%CI	p	cOR	95%CI	p	cOR	95%CI	p	
5 <sup>th</sup> grade students (N = 1,716)																
Gender						<.001										
Boy	52.88	46.87	42.35	69.23			I	I	I	I	I					
Girl	47.12	53.13	57.65	30.77			1.40	[1.11; 1.77]	.004	1.71	[1.09; 2.70]	.020	0.43	[0.20; 0.90]	.025	
Age	10.11±0.64	10.15±0.63	9.99±0.50	10.22±0.74	.005		1.17	[0.91; 1.49]	.216	0.78	[0.56; 1.09]	.141	1.37	[1.01; 1.87]	.046	
Race						.001										
White	41.24	33.67	22.35	44.23			I	I	I	I	I					
Brown/Black	55.13	60.58	74.12	52.89			1.43	[1.03; 1.98]	.032	3.01	[1.46; 6.24]	.003	0.85	[0.54; 1.36]	.508	
Others	3.63	5.75	3.53	2.88			2.50	[1.55; 4.02]	<.001	2.14	[0.53; 8.70]	.286	0.71	[0.13; 4.01]	.701	
Lifetime alcohol use	12.39	19.97	25.88	41.35	<.001		1.92	[1.11; 3.34]	.020	2.77	[1.41; 5.48]	.003	6.35	[3.60; 11.19]	<.001	

(continued)

Table 3. continued

	Inferential Analysis						Univariate Analysis								
	Moderate Bullying Victimization			High Bullying Victimization and Perpetration			Low Bullying vs. Moderate Bullying Victimization			Low Bullying vs. High Bullying Victimization					
	%	%	%	%	p	cOR	95%CI	p	cOR	95%CI	p	cOR	95%CI	p	
School performance															
Good	62.18	52.62	54.12	48.08		1			1			1			
Average	36.54	45.35	43.53	44.23	.002	1.64	[1.20; 2.26]	.002	1.44	[0.84; 2.46]	.176	1.70	[0.99; 2.90]	.051	
Poor	1.28	2.03	2.35	7.69	.310	1.94	[0.54; 7.04]	.310	2.14	[0.31; 14.81]	.442	9.80	[4.24; 22.69]	<.001	
7 <sup>th</sup> grade students (N = 2,300)															
Gender															
Boy	52.05	49.37	40.32	57.78		1			1			1			
Girl	47.95	50.63	59.68	42.22	.282	1.12	[0.91; 1.39]	.282	1.75	[0.92; 3.34]	.088	0.78	[0.40; 1.53]	.469	
Age	12.25±0.71	12.32±0.71	12.37±0.61	12.57±0.10	<.001	1.15	[0.99; 1.33]	.065	1.25	[0.88; 1.76]	.206	1.61	[1.16; 2.26]	.004	
Race															
White	34.40	30.19	29.03	40.00	.264	1			1			1			

(continued)

**Table 3. continued**

	Inferential Analysis						Univariate Analysis							
	Moderate Bullying Victimization			High Bullying Victimization and Perpetration			Low Bullying vs. Moderate Bullying Victimization			Low Bullying vs. High Bullying Victimization				
	%	cOR	95%CI	%	p	cOR	95%CI	p	cOR	95%CI	p	cOR	95%CI	p
Brown/Black	59.04	65.41	61.29	53.33	.108	1.33	[0.93; 1.89]	.108	1.25	[0.58; 2.69]	.569	0.77	[0.40; 1.50]	.449
Others	6.56	4.40	9.68	6.67	.389	0.68	[0.28; 1.63]	.389	1.91	[0.52; 7.11]	.330	0.84	[0.25; 2.85]	.787
Lifetime alcohol use	34.35	51.26	51.61	62.22	<.001	2.29	[1.69; 3.10]	<.001	2.18	[1.24; 3.84]	.007	3.49	[1.51; 8.07]	.004
School Performance					.058									
Good	31.47	30.50	33.87	26.67		1			1			1		
Average	62.03	60.69	54.84	55.56	.913	1.02	[0.71; 1.47]	.913	0.79	[0.38; 1.64]	.525	1.06	[0.38; 2.95]	.902
Poor	6.50	8.81	11.29	17.77	.297	1.45	[0.72; 2.94]	.297	1.70	[0.54; 5.39]	.366	3.47	[1.23; 9.77]	.018

**Table 4.** Characteristics of Bullying Perpetration and Victimization Identified by Latent Class Analysis in a Sample of 5th and 7th Graders Participating in the Baseline Stage of a Study Evaluating the Effect of a School-based Program for Preventing Drug Use Prevention, According to Multivariate Analysis.

	Low Bullying vs. Moderate Bullying Victimization			Low Bullying vs. High Bullying Victimization			Low Bullying vs. High Bullying Victimization and Perpetration		
	aOR	95%CI	p	aOR	95%CI	p	aOR	95%CI	p
5 <sup>th</sup> grade students (N = 1,716)									
Gender									
Boy	1			1			1		
Girl	<b>1.47</b>	<b>[1.16; 1.87]</b>	<b>.001</b>	<b>1.75</b>	<b>[1.02; 3.01]</b>	<b>.043</b>	<b>0.57</b>	<b>[0.27; 1.17]</b>	<b>.129</b>
Age	1.17	[0.89; 1.51]	.216	<b>0.71</b>	<b>[0.53; 0.97]</b>	.031	1.17	[0.86; 1.61]	.316
Race									
White	1			1			1		
Brown/Black	1.35	[0.97; 1.89]	.079	<b>3.35</b>	<b>[1.34; 8.37]</b>	<b>.010</b>	0.88	[0.52; 1.50]	.642
Others	<b>2.01</b>	<b>[1.29; 3.11]</b>	<b>.002</b>	2.35	[0.53; 10.35]	.260	0.60	[0.10; 3.74]	.585
Lifetime alcohol use	<b>1.90</b>	<b>[1.05; 3.39]</b>	<b>.031</b>	<b>3.26</b>	<b>[1.56; 6.83]</b>	<b>.002</b>	<b>5.63</b>	<b>[3.05; 10.38]</b>	<b>&lt;.001</b>
School performance									
Good	1			1			1		
Average	<b>1.63</b>	<b>[1.17; 2.27]</b>	<b>.004</b>	1.38	[0.82; 2.34]	.229	1.51	[0.85; 2.71]	.162
Poor	1.87	[0.49; 7.08]	.356	1.37	[0.02; 101.70]	.886	<b>10.12</b>	<b>[4.19; 24.41]</b>	<b>&lt;.001</b>

(continued)

Table 4. continued

	Low Bullying vs. Moderate Bullying Victimization		Low Bullying vs. High Bullying Victimization		Low Bullying vs. High Bullying Victimization and Perpetration	
	aOR	95%CI	p	aOR	95%CI	p
7 <sup>th</sup> grade students (N = 2,300)						
Gender						
Boy	1			1		
Girl	1.08	[0.85; 1.38]	.521	1.72	[0.88; 3.37]	.115
Age	1.06	[0.89; 1.26]	.534	1.19	[0.81; 1.76]	.375
Race						
White	1			1		
Brown/Black	1.31	[0.90; 1.92]	.156	1.18	[0.54; 2.60]	.679
Others	0.70	[0.29; 1.70]	.440	1.87	[0.52; 6.76]	.340
Lifetime alcohol use	<b>2.27</b>	<b>[1.65; 3.13]</b>	<b>&lt;.001</b>	<b>1.99</b>	<b>[1.07; 3.70]</b>	<b>.029</b>
School performance						
Good	1			1		
Average	0.97	[0.66; 1.42]	.895	0.75	[0.36; 1.55]	.433
Poor	1.34	[0.61; 2.96]	.462	1.52	[0.41; 5.58]	.523
				2.35	[0.73; 7.66]	.153
				0.88	[0.13; 1.38]	.818
				0.99	[0.27; 3.68]	.998
				<b>3.29</b>	<b>[1.28; 8.43]</b>	<b>.013</b>

Note. *p* < 0.05.



victims may develop bullying characteristics when exposed to victimization, this group often presents the worst mental health outcomes, and should be a target group for prevention programs.

Although alcohol use is frequently associated with violence among students, most studies only approach victimization (Maniglio, 2016) so that different forms of bullying involvement, as perpetration, are poorly investigated. In our study, alcohol use for both grades was associated with all bullying latent classes, and this association was higher according to bullying involvement. Recent studies have indicated that the association between bullying and alcohol use appears to be bidirectional (Azevedo da Silva et al., 2020; Moore et al., 2017). We know alcohol use can facilitate that adolescents assume violent behavior and engage in fights, as can also contribute to the risk of victimization for reducing vigilance, causing disinhibition, and making teenagers more vulnerable (Andrade et al., 2012; Maniglio, 2011). In turn, alcohol can also be used as an attempt of self-medication to deal with stressful feelings associated with victimization experience (Maniglio, 2016; Moore et al., 2017).

We also found negative effects of bullying on school performance, which was more strongly associated with *High bullying victimization and perpetration*. Among bullying involvement types, bully–victim is the most associated with psychiatric disorders, learning difficulties, and poor problem-solving skills (Mutiso et al., 2019). Besides many bully–victims are also diagnosed with development delay, oppositional-defiant disorder, ADHD, and/or conduct disorder (Hysing et al., 2019)—psychopathologies known for their impact on school performance.

Sociodemographic variables show that black and brown fifth grade students are more likely to fit into *High bullying victimization*. Studies approaching race differences in bullying were most conducted in the United States, which has a racial identification model different from Brazil where race is historically based on physical appearances rather than ancestry (Daniel, 2006). In countries where racial disparities are strongly marked in society, race and ethnicity markers (e. g., skin color, hair types) are often used to establish a relationship of superiority/inferiority (Thijs et al., 2014; Vervoort et al., 2010), constructing a possible scenario for bullying to occur. Prevention programs besides being theory driven should be informed by an intersectional approach to ethnic and racial relations existing in each territory since situations of violence and drug use may be experienced differently by students from different racial identities (Marsiglia et al., 2019).

In our study, fifth-grade girls were more likely to belong to all bullying victimization classes than boys. According to the literature, bullying varies considerably according to gender: boys are more likely to be bullies and be involved in physical forms of bullying than girls; in turn, girls are more likely to involve in

relational or verbal forms (Dane et al., 2017; Gloppen et al., 2018). Recent studies comparing bullying prevalence over the years in the United States found that the prevalence of victimization significantly decreased among male students but not among female (Kessel Schneider et al., 2015; Pontes et al., 2018). During cultural adaptation, prevention programs must consider each place gender norms and gendered communication patterns to propose gender-specific interventions responding to such differences (Marsiglia et al., 2019; Pontes et al., 2018).

Our study has some limitations. As we employed baseline data of two RCTs evaluating a prevention program, other independent variables, as mental disorders, parenting styles, and childhood trauma, could not be included in our questionnaire because they are not part of the theoretical model of our program evaluation, but they would represent an important possibility for future longitudinal studies. Besides that, schools were randomly selected from those that did not receive the evaluated program in the 3 years prior to our study, and all of these schools were located in peripheral regions, deemed as of low socioeconomic development. Considering that, we point the sample as a limitation of our study, but emphasizing that many drug and violence prevention programs target this population, which stress the importance of investigating this particular population as a way to help understanding the phenomenon and creating more effective interventions. Moreover, as this is a cross-sectional analysis, no causal inference can be drawn.

Compared with international studies, we found a victimization prevalence higher than reported in other regions of the world (Biswas et al., 2020; Juvonen & Graham, 2014). Besides that, different from reported in the international literature, where bullying rates increase according to age and peak in middle school (i.e., 12–15 years; Hymel & Swearer, 2015), in our study, the bullying prevalence (victimization and perpetration) among seventh-grade students were about 50% lower than those observed among fifth-grade students. Our findings corroborate with previous studies that reported that violence and bullying are higher in less developed countries, especially in Latin America (Gaete et al., 2017), and may indicate that the way bullying occurs here is different from other countries.

Similarly, the strong association between being a black/brown student in the fifth grade and belonging to the class of High bullying victimization, also corroborates the hypothesis raised in other studies that bullying in Brazil is rooted in prejudice and in the student difficulty in dealing with differences (Pigozi & Machado, 2015). Taking also into account the association with gender in the likelihood of belonging to the victimization classes, we consider that preventive efforts can only be effective if, in addition to addressing the problem of violence, programs also address the stereotypes imposed by society, aiming at reducing social and racial intolerance, which in turn would reduce violence.

Our study reports interesting findings about school bullying patterns. Unlike previous studies that used individual variables, we adopted latent classes of bullying victimization and perpetration, which allow us to identify common characteristics among individuals and investigate associations according to their bullying involvement level. Based on these findings, we emphasize the importance of including drug use prevention among the components of bullying prevention actions and programs, as our results show a strong association between alcohol use and all bullying classes in both samples, which increase according to bullying involvement level. We also suggest that, besides the age of the target audience, the racial and gender relations should be taken into account for the development of a prevention program, as students may experience bullying in different intensities according to their gender and race. Finally, we recommend that teachers consider the possibility of bullying when they identify students with poor school performance, as this may be an important indicator of bullying involvement.


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