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Association between bullying, childhood adversities and social capital among adolescents

Associação entre *bullying*, adversidades na infância e capital social entre adolescentes

Andressa Reisen (https://orcid.org/0000-0003-3916-462X) [1]
Daiene Rosa Gomes (https://orcid.org/0000-0002-1831-1259) [2]
Maria Carmen Viana (https://orcid.org/0000-0002-0464-4845) [1,3]
Luciane Bresciani Salaroli (https://orcid.org/0000-0002-1881-0306) [1]
Edson Theodoro dos Santos Neto (https://orcid.org/0000-0002-7351-7719) [1,3]

Abstract *This study aims to analyze the association between bullying behaviors, adverse childhood experiences and social capital in late adolescence. Secondary school students aged 15-19 of a metropolitan region of Brazil were recruited for a sectional epidemiological survey, with a sample of 2,281 students, stratified by municipality of school location. Descriptive and inferential statistics were performed from three instruments: Olweus Bully/Victim Questionnaire, Childhood Adversity History Questionnaire and Integrated Questionnaire to Measure Social Capital, in adapted versions. The results showed that the factors associated with bullying victims were gender and adversity in childhood. The factors associated to bullying aggressors were gender, childhood adversities, and cognitive social capital. And the factors associated with bullying aggressor-victims were gender, childhood adversities, and cognitive social capital. It is concluded that bullying is associated with adversity in childhood and also with cognitive social capital and they point out the need to address the causes of violence in order to provide a healthy and safe development for children and adolescents, preventing negative outcomes for physical and mental health.*

Key words *Adolescent, Bullying, Exposure to violence, Social capital, School health*

Resumo *O estudo tem como objetivo analisar a associação entre o comportamento de bullying, experiências adversas na infância e capital social no final da adolescência. Foram recrutados estudantes do ensino médio, com idades entre 15 e 19 anos, de uma região metropolitana do Brasil, para uma pesquisa epidemiológica seccional, com uma amostra de 2.281 alunos, estratificada por município de localização da escola. Foram produzidas estatísticas descritivas e inferenciais, com base em três instrumentos: Olweus Bully/Victim Questionnaire, Childhood Adversity History Questionnaire e Integrated Questionnaire to Measure Social Capital, em versões adaptadas. Os resultados mostraram que os fatores associados às vítimas de bullying foram gênero e adversidade na infância. Os fatores associados aos agressores de bullying foram gênero, adversidades na infância e capital social cognitivo. E os fatores associados aos agressores-vítimas de bullying foram gênero, adversidades na infância e capital social cognitivo. Conclui-se que o bullying está associado a adversidades na infância e também ao capital social cognitivo, e apontam para a necessidade de abordar as causas da violência, a fim de proporcionar um desenvolvimento saudável e seguro para crianças e adolescentes, prevenindo resultados negativos para a saúde física e mental.*

Palavras-chave *Adolescente, Bullying, Exposição à violência, Capital social, Saúde escolar*

[1] Programa de Pós-Graduação em Saúde Coletiva, Universidade Federal do Espírito Santo. Vitória ES Brasil.
[2] Universidade Federal do Oeste da Bahia. Barreiras BA Brasil. R. 31 de dezembro 194, Aratu. 47809-164 Barreiras BA Brasil. daiene.gomes@ufob.edu.br
[3] Departamento de Medicina Social, Universidade Federal do Espírito Santo. Vitória ES Brasil.

Introduction

Bullying affects different student populations in the world and is characterized by repetitiveness, intentionality and power inequality, adopted by one or more students against another (or others)[1,2]. In Brazil, the prevalence of bullying can vary from 7.2% to 38.9%[3]. It presents different forms of involvement, in which the individuals are classified into: victims, aggressors, victim-aggressors and witnesses, and it is associated with potentially harmful consequences for those involved[1,4-6]. These consequences range from simple health problems to serious socialization difficulties, including the risk of psychological and physical damage, which can be transported into adult life in different ways[1,2,7].

Bullying is understood as a risk factor for the physical and/or psychological integrity of those involved and it can become an amplifier for the adoption of health risk behaviors[1,7,8] associated with different health risk factors.

Scientific studies on the subject have shown that obese[8] adolescents, aged 14 to 16[3], female[9], of black skin color[10], transgender or non-binary[11] and with a disability are the biggest[12] victims of bullying. In addition, experiencing adverse situations in the home environment during childhood can increase the risk of involvement in bullying behaviors in school settings[14,15]. Such experiences are characterized by exposure to traumatic situations perpetrated against the child or acts of omission and neglect directed at the child, which includes any other conditions that make his/her family environment dysfunctional[16,17]. The exposure to these experiences is considered an important predictor of negative physical and mental health outcomes in adult life, with deleterious short and long-term effects[2,16-19].

In addition to the domestic environment, bullying behaviors may be related to an unfavorable social environment in which the adolescent is inserted. Under this aspect, bullying behaviors are also associated with social capital[20-22]. Social capital is directly connected to the value of social relations and it is based on the way these relations are established[23-25]. It has been associated with bullying among adolescents, indicating that higher levels of social capital would be associated with a reduction in the occurrence of bullying behaviors[20]. Adolescents who have strong ties to the school and who receive support from their close friends and colleagues show lower probability of involvement in bullying, resulting in a reduction in aggressive and delinquent behavior within school settings[20-22].

Considering these propositions and exploring how these risk factors may be associated, in order to extending the knowledge about aggressive behaviors among students and for combat actions to be thought about, the objective of this study was to analyze the association between bullying behaviors, childhood adversities and social capital in late adolescence (15 to 19 years), among students enrolled in secondary schools, located in the Greater Metropolitan Area of Vitória – Espírito Santo (RMGV-ES), Brazil.

Materials and methods

Study design

A cross-sectional, school-based epidemiological survey was conducted between 2016 and 2017 with a sample of 2,293 secondary school students aged 15 to 19 in the RMGV-ES. The RMGV-ES is formed by seven municipalities, with Human Development Index (HDI) ranging from 0.686 to 0.845 and Municipal Human Development Index (MHDI) Education of 0.695, with 62,28% of young people from 15 to 17 years old with complete primary education and 48,30% of young people from 18 to 20 years old with complete secondary education[26]. The metropolitan area is home to approximately 1.6 million inhabitants, representing 48% of the population of the State of Espírito Santo and about 148,000 adolescents aged 15 to 19[27]. According to information from the State Department of Education of Espírito Santo (2014), the RMGV-ES had 168 high schools and 65,763 students regularly enrolled. The secondary education concentrates the students from 15 to 19 years old in Brazil (Law 9.394 / 1996), age group that composes the present study. The data used here come from the research "*Vigilância de fatores de risco para doenças e agravos em adolescentes de 15 a 19 anos na RMGV-ES*" (Surveillance of risk factors for diseases and injuries in adolescents aged 15 to 19 years in the RMGV-ES), whose objective was to measure the exposure of adolescents to different risk behaviors, diseases and injuries that can affect their full development and impact on their physical and mental health.

Inclusion and exclusion criteria

This study comprised all the students enrolled in public and private high schools of the RMGV-ES during the morning and afternoon periods, aged 15 to 19 years, who had no cognitive, auditory or visual impairment to impede their active participation. All those who agreed to participate, who provided the terms of consent and/or terms of assent properly signed, and who effectively answered the questions contained in the research instrument were included. The terms of consent were given to students at least one week in advance so that they were aware of the research objectives. All the data were provided by the students themselves. A total of 8,111 terms were distributed, with a 30% adhesion rate.

Sample procedures and data collection

The sample was stratified according to municipality. Proportional sample quotas were calculated to match the distribution of students per municipality of the RMGV-ES. In order to determine the sample size, the following were considered: prevalence of bullying of 56.9% for victimization and 38.5% for aggression, based on Silva et al.[28], 95% confidence interval (95%CI), margin of error of 2.5%, and design effect of 1.5.

According to the proportion of students enrolled per municipality of the RMGV-ES (Cariacica = 19.3%; Fundão = 0.5%; Guarapari = 5.8%; Serra = 23.2%; Viana = 3.7%; Vila Velha = 22.7%; Vitória = 24.8%), the number of adolescents to be interviewed was defined (Figure 1). All schools providing high school education in the RMGV-ES in 2014 were numbered consecutively according to their municipality. A simple random sample selection of schools was performed using the BioEstat version 5.4 program according to the proportion of each municipality.

The final sample included 2,293 participants. Data collection was performed in 54 schools, 43 public and 11 private, and it was carried out by previously trained researchers, through a closed structured interview, in classes selected, during class time. More details on the sampling process can be found in Reisen et al.[29]

The collective reading (aloud) of each question of the instrument, made available in the form of an electronic questionnaire, was carried out by the interviewer in charge, and individual filling out was performed by the students using laptop computers, concomitantly to the reading. Specific software to perform the data collection was developed, allowing the collection online or offline.

Instruments and variables

Bullying

A modified Brazilian version of the Olweus Bully/Victim Questionnaire adapted from Fischer et al.[5] was adopted. The modified version does not present a definition of bullying to the students being surveyed. Victims and bullies are categorized according to the self-reported frequency of attitudes that occurred from weekly to daily during the past 12 months[5]. It totalizes 48 questions, 24 of which investigate the frequency of victimization and 24 of aggression, with responses on a Likert scale, scoring from 0 to 5, from "never happened" to "happened every day". The occurrence of these behaviors was categorized into "Not involved" and "bullying" (occurred more than once a week). Bullying was classified according to the type of behavior experienced by the students in: "Victims" (students who have only been bullied), "aggressor" (practicing bullying only) and "aggressor-victims" (students who have suffered and practiced bullying).

The reliability parameters[30] of the instrument adapted to identify bullying behaviors were analyzed in this sample of 2,281 adolescents and revealed, for the items of the victimization, average score of 0.42 + 0.537dp and for the aggression, mean of 0.26 + 0.432dp. The correlations between each item and the overall value of the scale ranged from 0.284 to 0.689 for victimization and from 0.320 to 0.720 for aggression. Scales indicated high agreement rates (Cronbach's alpha = 0.887, for victimization and Cronbach's alpha = 0.888, for aggression). More details about bullying instrument in Reisen, Viana and Santos-Neto[31].

Childhood adversities

The Portuguese version of the Childhood Adversity History Questionnaire[16], a translation of Silva and Maia[32], was used to evaluate the exposure to childhood adversities. It is composed of 31 items organized into dichotomous and multiple-choice questions. The experiences of adversities experienced in childhood are grouped into the dimensions: abusive experiences against the child (emotional abuse, physical abuse, sexual abuse), dysfunctional family environment (exposure to domestic violence, divorce or parental separation, alcohol and drug abuse in the family environment, arrest, mental illness or suicide of some family member) and neglect (physical and

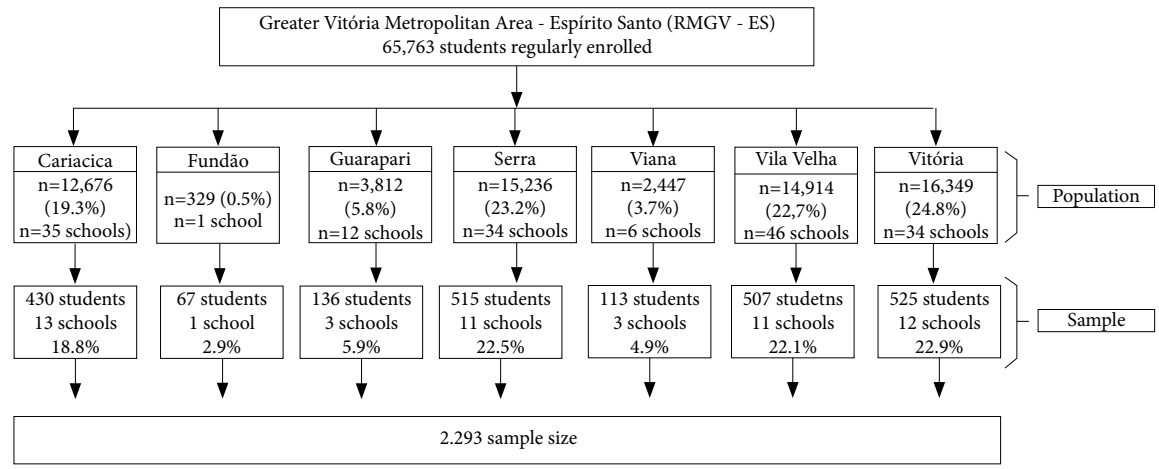

Figure 1. Percentage distribution of students enrolled in high schools of RMGV-ES.

Source: Reisen et al. 2019[29].

emotional neglect). The classification criteria for exposure to childhood adversities are available in Silva and Maia[32]. Exposure to childhood adversity was calculated by summing each occurrence among the adversities assessed, classified as not exposed/exposed[32]. In the sequence, total childhood adversity was categorized into "not exposed", "1 to 3 adversities" and "4 to 10 adversities", adapted from Felitti et al.[16]

The instrument of childhood adversity was previously tested by means of the test and retest method, in two steps with a 21-day interval between the applications. In the first phase, it was administered to 46 adolescents aged between 15 and 19 (not included in the main study); and in the second phase, it was re-administered to the same students in order to verify inconsistencies regarding the adolescents' responses. By analyzing the responses obtained in both occasions, using the Kappa test[33] adjusted for prevalence, the results showed a variation between 0.71 and 1.0. The McNemar test was also applied to the answers, in order to evaluate the existence of a tendency of discordance in the administrations. It was verified that there was no statistically significant discordance, except in the variable: "I knew there was someone to take care of me and protect me," which showed a significant discordant tendency ($p = 0.04$).

Social capital

In order to evaluate social capital (SC), the short version of the World Bank's Integrated Questionnaire for Measuring Social Capital (IQ-MCS)[23] was used. It consists of six dimensions that allow the creation of SC indicators: structural (groups and networks), cognitive (trust and solidarity) and underlying (collective action and cooperation, information and communication, cohesion and social inclusion, empowerment and political action), adapted from Grootaert et al.[23] All items of the instrument (structural social capital indicator composed of nine items, cognitive social capital with seven items and underlying social capital with 17 items), had their response options recoded in values ranging from 0 to 10, where zero referred to the lower availability of social capital and 10, the biggest. At the end of the recoding of the response options, the variables with more than one response option other than zero were divided by the number of different categories from zero, so that each of the total of 33 items ranged from 0 to 1. To evaluate the indicators in each dimension, the responses that pointed to the existence of social capital were added, generating a discrete quantitative variable. The medians were calculated and the quartiles were defined to classify SC levels. From this analysis, the sample of adolescents was classified into three groups: 1) Low SC, 25% of the lowest values; 2) Moderate SC, from 25% to 75%

of the intermediate values; and, High SC, for values above 75%[24,25].

The instrument of SC was previously tested by means of the test and retest method, in two steps with a 21-day interval between the applications. In the first phase, it was administered to 46 adolescents aged between 15 and 19 (not included in the main study); and in the second phase, it was re-administered to the same students in order to verify inconsistencies regarding the adolescents' responses. When analyzing the responses obtained on both occasions by the prevalence-adjusted Kappa tests[33], the results showed that, among the total of 33 social capital variables analyzed, eight presented almost perfect agreement (Kappa coefficient: 0.80-1.0), 15 had substantial agreement (Kappa coefficient: 0.60-0.79), six of them moderate agreement (Kappa Coefficient: 0.40-0.59) and three, weak agreement (Kappa Coefficient: 0.20-0.39). Only one variable presented very weak agreement (Kappa coefficient: 0-0.19). The McNemar test was also applied to the answers, in order to evaluate the existence of a tendency of discordance in the applications. It was verified that there was no statistically significant discordance, except in the variable: "How many groups do you, or someone in your household, belong to?", which showed a significant discordance tendency (p = 0.025).

Socio-demographic characteristics

In the present study, the variables for control were included, since they could be associated to the three phenomena (bullying, adversities and social capital): age (15 to 29), gender (male, female); race-color (white, black, brown, yellow, indigenous); school network (public, private); shift (morning, afternoon) and high school year (first, second, third/fourth year); adolescent has a paid job (yes, no); time of residence at the current address (up to 10 years, over 10 years); basic sanitation: set of services for access to piper water and the collection and treatment of sewage (no, yes); number of people living in the home (up to 5 people, more than 5 people); parental divorce (no, yes); head of household's educational background (elementary, secondary, higher) and total family income (up to a minimum wage (R$ 954,00); more than one up to three minimum wages, more than 3 to 10, more than 10). More information and classification criteria available at Brazilian Institute of Geography and Statistics (https://www.ibge.gov.br/).

Statistical analysis

The participants were characterized by descriptive analyses, including the absolute and relative frequencies of the analyzed variables. Differential distributions among socio-demographic characteristics, childhood adversity, social capital, and bullying behaviors were assessed using the chi-square test. Multinomial logistic regression techniques were performed to enable an analysis of the association between bullying behaviors, childhood adversity, social capital and sociodemographic characteristics. The Statistical Package for Social Sciences (SPSS), version 21.0 was used for the statistical analysis of the data collected.

Ethical aspects

This study was approved by the Research Ethics Committee with under registration number 971.389/2015, and it complies with all the ethical parameters. All the participants signed the Informed Consent Term and/or Term of Assent.

Results

Among the 2281 adolescent students who composed the final sample of this study, more than half were between 15 and 16 years old (mean age = 16.42 ± 1.14 standard deviation), the majority were female (n = 1,368, 60.0%) and the predominant self-reported race-color was brown (n = 1,036, 45.4%). Among the participants, 88.0% (n = 2005) were students of the public school system, more than 80% (n = 1,861) were enrolled in the morning shift and almost half of them attended the first year of high school. The majority of the students (n = 1,752, 76.8%) had no type of paid job, they lived with up to five people at home (n = 86.2%) and had basic sanitation in the household (n = 1,674, 76.1%). More than half of them had lived at the same address for more than 10 years (n = 1,158, 51.3%) and the parents were not divorced (n = 1,323, 58.5%). The total family income (it is the sum of the individual income of the residents of the same household) of 44.6% (n = 791) of the students was between one and three minimum wages and the educational background of the head of the family of 46.9% (n = 1,048) was elementary education. Most participants reported exposure to at least one adverse experience

during childhood (n = 1,887, 89.9%) and moderate-level of social capital (intermediate values of social capital according to the classification adopted, between percentile 25 and 75) (Table 1).

The differential distribution between bullying behaviors and associated factors are presented in Table 1. Observing the age of participants, it is noted that younger students indicated greater involvement in bullying behaviors than older ones ($p = 0.002$). This is similar to the high school year they attended ($p < 0.001$), which is age-related. Female students reported greater involvement as victims of bullying, while male students indicated more involvement as victims-aggressors ($p < 0.001$). Those students whose parents were not divorced showed greater involvement in bullying, either as victim, perpetrator, or victim-aggressor ($p = 0.008$). Students who reported exposure to 1 to 3 childhood adversities indicated greater involvement as both, victims of bullying and aggressors, while victims-aggressors had similar percentages of bullying in either the 1 to 3 adversities group or 4 to 10 adversities ($p < 0.001$). Students with moderate cognitive social capital were more involved in bullying behaviors. It was noted that other variables analyzed did not present a significant differential distribution.

The multinomial logistic regression technique was applied to test the bullying behaviors with associated factors that showed a differential distribution smaller than 0.20 ($p < 0.20$). The results are presented in Table 2. They remained associated with the category victims of bullying: Female gender ($p < 0.001$), with OR = 0.6 (95%CI = 0.47-0.81); parental divorce ($p = 0.047$), with OR = 1.3 (95%CI = 1.00-1.75); and childhood adversities (1 to 3 adversities: $p < 0.001$, OR = 2.8 (95%CI = 1.67-4.55) and 4 to 10 adversities: $p < 0.001$, OR = 7.7, 95%CI = 4.43-13.26).

Bullying perpetrators remained associated to: female gender ($p < 0.001$), OR = 0.5 (95%CI = 0.33-0.67), childhood adversities (1 to 3 adversities: $p = 0.043$, with OR = 1.9 (95%CI = 1.02-3.72) and 4 to 10 adversities: $p < 0.001$, OR = 6.0, 95%CI = 2.99-12.14) and cognitive social capital (low social capital: $p < 0.001$, with OR = 3.2 (95%CI = 1.91-5.32) and moderate social capital: $p = 0.014$, OR = 1.7, 95%CI = 1.12-2.73) (Table 2).

Students involved in bullying as victim-aggressors remained significant associated with age: 15 and 16 ($p = 0.036$) with OR = 1.7 (95%CI = 1.04-2.89); female gender ($p < 0.001$), with OR = 0.3 (95%CI = 0.19-0.39). In addition to: adversities in childhood ($p < 0.001$), with OR = 7.1 (95%CI = 2.51-20.21) for the 1 to 3 adversities group and OR = 27.3 (95%CI = 9.34-80.02) for group 4 to 10 adversities in childhood and cognitive social capital (low: $p < 0.001$, OR = 3.3, 95%CI = 1.97-5.42 and moderate: $p = 0.025$, OR = 1.7, CI 95% = 1.07-2.58) (Table 2).

The multinomial logistic regression technique was also applied to social capital and adversities in childhood, in order to verify the association between such variables. Low social capital was significantly associated with the 4 to 10 adversities group ($p < 0.001$), with OR = 2.4 (95%CI = 1.55-3.67), as well as moderate social capital was associated with the same group of adversities ($p < 0.001$), with OR = 2.1 (95%CI = 1.46-3.02), when compared to high-level social capital (Table 3).

Discussion

This study analyzed the different roles regarding in engaging in bullying behaviors in a population (adolescents from 15 to 19 years old) with limited scientific research on the subject. It also explored the combination of bullying with potentially harmful risk factors to the physical and mental health of adolescents, contributing locally and nationally with information about aggressive behaviors among students.

When evaluating the results of the regression analysis, it was verified that the variables gender, age, parental divorce, childhood adversities and cognitive social capital remained associated with the final adjusted model of bullying behaviors. With regard to the gender variable, it was observed that its relationship was statistically significant with all bullying behaviors analyzed (victims, aggressors and victims-aggressor, $p < 0.001$), which shows that female adolescents are less likely to be involved in any bullying behaviors evaluated, since the results of the analyses indicated that being female avoided 40.0% involvement as victims of bullying, in 50.0% involvement as perpetrators and in 70.0% involvement as victim-aggressors. These findings confirm the results found by different Brazilian researchers[28,34-39] who reported greater involvement in bullying behaviors by male adolescents. This situation may be related to a greater inability to deal with conflict by male adolescents, feelings of threat or difficulties in discerning aggression, socially expected behaviors, and the tendency to violence among such individuals, reproducing the macho social model[1,5,13,35,37,38].

Table 1. Distribution of bullying behaviors according to associated factors among adolescents. RMGV-ES, 2016/2017.

	Not involved n = 1,192 (57.3%)			Victims n = 567 (24.9%)			Aggressors (n = 237; 10.4%)			Victim-aggressors (n = 285; 12.5%)			P-value[b]
	N	%	95%CI	N	%	95%CI	N	%	95%CI	N	%	95%CI	
Age (n = 2,281)	1,192	100.0		567	100.0		237	100 0		285	100.0		0.002
15 and 16 years old (n = 1,268)	620	52.0	45.4 – 58.6	340	60.0	53.5 – 66.5	129	54.4	47.8 – 61.0	179	65.8	59.5 – 72.1	
17 years old (n = 576)	322	27.0	21.1 – 32.9	131	23.1	17.5 – 28.7	69	29.1	23.1 – 35.1	54	19.0	13.8 – 24.2	
18 and 19 years old (n = 437)	250	21.0	15.6 – 26.4	96	16.9	11.9 – 21.9	39	16.5	11.6 – 21.4	52	18.2	13.1 – 23.3	
Gender (n = 2,281)	1,192	100.0		567	100.0		237	100.0		285	100.0		< 0.001
Female (n = 1,368)	801	67.2	61.0 – 73.4	334	58.9	52.4 – 65.4	122	51.5	44.9 – 58.1	111	39.0	32.5 – 45.5	
Male (n = 913)	391	32.8	26.6 – 39.0	233	41.1	34.6 – 47.6	115	48.5	41.9 – 55.1	174	61.0	54.5 – 67.5	
Race-color (n = 2,279)	1,192	100.0		567	100.0		236	100.0		284	100.0		0.364
White (n = 653)	341	28.6	22.6 – 34.6	169	29.8	23.7 – 35.9	60	25.4	19.6 – 31.2	83	29.2	23.2 – 35.2	
Black (n = 403)	197	16.5	11.6 – 21.4	105	18.5	13.3 – 23.7	51	21.6	16.1 – 27.1	50	17.6	12.5 – 22.7	
Multiracial (n = 1,036)	547	45.9	39.3 – 52.5	251	44.3	37.7 – 50.9	105	44.5	37.9 – 51.1	133	46.8	40.2 – 53.4	
Yellow (n = 145)	86	7.2	3.8 – 10.6	35	6.2	5.6 – 6.8	14	6.0	2.8 – 9.2	10	3.5	1.1 – 5.9	
Indigenous (n = 42)	21	1.8	0.0 – 3.6	7	1.2	-0.2 – 2.6	6	2.5	0.4 – 4.6	8	2.8	0.6 – 5.0	
School network (n = 2,280) [a]	1,192	100.0		567	100.0		236	100.0		285	100.0		0.297
Public (n = 2,005)	1,063	89.2	85.1 – 93.3	490	86.4	81.8 – 91.0	204	86.4	81.8 – 91.0	248	87.0	82.5 – 91.5	
Private (n = 275)	129	10.8	6.7 – 14.9	77	13.6	9.0 – 18.2	32	13.6	9.0 – 18.2	37	13.0	8.5 – 17.5	
High-school year (n = 2,281) [a]	1,192	100.0		567	100.0		237	100.0		285	100.0		< 0.001
First year (n = 1,088)	521	43.7	37.1 – 50.3	298	52.5	45.9 – 59.1	118	49.8	43.1 – 56.5	151	52.9	46.3 – 59.5	
Second year (n = 615)	318	26.7	20.8 – 32.6	156	27.5	26.3 – 28.7	65	27.4	26.2 – 28.6	76	26.7	20.8 – 32.6	
Third and fourth years (n = 578)	353	29.6	28.4 – 30.8	113	20.0	14.7 – 25.3	54	22.8	17.2 – 28.4	58	20.4	15.0 – 25.8	
Shift (n = 2,268) [a]	1,184	100.0		565	100.0		235	100.0		284	100.0		0.437
Morning (n = 1,861)	965	81.5	76.3 – 86.7	461	81.6	76.4 – 86.3	192	81.7	76.6 – 86.8	243	85.6	80.9 – 90.3	
Afternoon (n = 407)	219	18.5	13.3 – 23.7	104	18.4	13.2 – 23.6	43	18.3	13.2 – 52.4	41	14.4	9.7 – 19.1	
Adolescent's paid job (n = 2,281)	1,192	100.0		567	100.0		237	100.0		285	100.0		0.431
No (n = 1,752)	931	78.1	72.6 – 83.6	430	75.8	70.1 – 81.5	180	75.9	70.2 – 81.6	211	74.0	68.2 – 79.8	
Yes (n = 529)	261	21.9	20.8 – 23.0	137	24.1	18.4 – 29.8	57	24.1	18.4 – 29.8	74	26.0	20.2 – 31.8	
Years living at that address (n = 2,258) [a]	1,178	100.0		564	100.0		234	100.0		282	100.0		0.675
Up to 10 years (n = 1,100)	570	48.4	41.8 – 55.0	280	49.6	42.9 – 56.3	107	45.1	38.5 – 51.7	143	50.7	44.0 – 57.4	
Over 10 years (n = 1,158)	608	51.6	45.0 – 58.2	284	50.4	43.7 – 57.1	127	54.9	47.5 – 62.3	139	49.3	42.6 – 56.0	
Basic sanitation (n = 2,199) [a]	1,154	100.0		543	100.0		227	100.0		275	100.0		0.177
No (n = 525)	257	22.3	16.8 – 27.8	147	27.1	21.2 – 33.0	57	25.1	19.3 – 30.9	64	23.3	17.7 – 28.9	
Yes (n = 1,674)	897	77.7	72.2 – 83.2	396	72.9	67.0 – 78.8	170	74.9	69.1 – 80.7	211	76.7	71.7 – 82.3	
Number of residents in the household (n = 2280) [a]	1,192	100.0		566	100.0		237	100.0		285	100.0		0.387
Up to 5 people (n = 1,965)	1027	86.2	81.6 – 90.8	480	84.8	80.0 – 89.6	212	89.5	85.4 – 93.6	246	86.3	81.7 – 90.9	
Over 5 people (n = 315)	165	13.8	12.9 – 14.7	86	15.2	67.0 – 78.8	25	10.5	6.4 – 14.6	39	13.7	9.1 – 18.3	

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Table 1. Distribution of bullying behaviors according to associated factors among adolescents. RMGV-ES, 2016/2017.

	Not involved n = 1,192 (57.3%)			Victims n = 567 (24.9%)			Aggressors (n = 237; 10.4%)			Victim-aggressors (n = 285; 12.5%)			P-value[b]
	N	%	95%CI	N	%	95%CI	N	%	95%CI	N	%	95%CI	
Parental divorce (n = 2,262)	1,182	100.0		559	100.0		236	100.0		285	100.0		0.008
No (n = 1323)	728	61.6	55.1 – 68.1	319	57.1	50.5 – 63.7	126	53.4	46.8 – 60.0	150	52.6	46.0 – 59.2	
Yes (n = 939)	454	38.4	31.9 – 44.9	240	42.9	36.3 – 49.5	110	46.6	40.0 – 53.2	135	47.3	40.7 – 53.9	
Head of the family's educational background (n = 2,234) [a]	1,171	100.0		554	100.0		233	100.0		276	100.0		0.248
Elementary (n = 1,048)	571	48.8	42.1 – 55.5	255	46.0	39.4 – 52.6	99	42.5	35.9 – 49.1	123	44.6	38.0 – 51.2	
Secondary (n = 765)	400	34.1	27.8 – 40.4	180	32.5	26.3 – 38.7	86	36.9	30.5 – 43.3	99	35.9	29.5 – 42.3	
Higher (n = 421)	200	17.1	12.1 – 22.1	119	21.5	16.0 – 27.0	48	20.6	15.2 – 26.0	54	19.5	14.2 – 24.8	
Total family income (n = 1,772) [a]	913	100.0		442	100.0		199	100.0		218	100.0		0.150
Up to 1 minimum wage (n = 224)	124	13.6	12.7 – 14.5	56	12.7	8.3 – 17.1	19	9.6	5.7 – 13.5	25	11.5	7.3 – 15.7	
Between 1 and 3 minimum wages (n = 791)	430	47.1	40.5 – 53.7	194	43.9	37.3 – 50.5	83	41.7	35.1 – 48.3	84	38.5	32.0 – 45.0	
Between 3 and 10 minimum wages (n = 639	303	33.2	26.9 – 39.5	160	36.2	29.8 – 42.6	82	41.2	34.7 – 47.7	94	43.1	36.5 – 53.6	
Over 10 minimum wages (n = 118)	56	6.1	2.9 – 9.3	32	7.2	3.8 – 10.6	15	7.5	4.0 – 11.0	15	6.9	3.5 – 10.3	
Adversity in childhood (n = 2,099) [a]	1,093	100.0		522	100.0		220	100.0		264	100.0		< 0.001
Not exposed (n = 212)	158	14.5	9.8 – 19.2	29	5.5	2.5 – 8.5	15	6.8	3.5 – 10.1	10	3.8	1.3 – 6.3	
1 to 3 adversities (n = 1,189)	679	62.1	55.6 – 68.6	275	52.7	46.1 – 59.3	111	50.5	43.8 – 57.2	124	47.0	40.4 – 53.6	
4 to 10 adversities (n = 698)	256	23.4	17.8 – 29.0	218	41.8	35.2 – 48.4	94	42.7	36.1 – 49.3	130	49.2	42.5 – 55.9	
Structural Social Capital (n = 2,281)	1,192	100.0		567	100.0		237	100.0		285	100.0		
Low (n = 570)	297	25.0	19.2 – 30.8	144	25.4	19.6 – 31.2	61	25.7	14.7 – 36.7	68	23.9	13.2 – 34.6	0.786
Moderate (n = 1,151)	612	51.3	44.6 – 58.0	282	49.7	43.9 – 55.5	121	51.1	38.6 – 63.6	136	47.7	35.2 – 60.2	
High (n = 560)	283	23.7	18.0 – 29.4	141	24.9	19.9 – 29.9	55	23.2	12.6 – 33.8	81	28.4	17.1 – 39.7	
Cognitive Social Capital (n = 2,281)	1,192	100.0		567	100.0		237	100.0		285	100.0		
Low (n = 454)	198	16.6	11.6 – 21.6	100	17.6	12.5 – 22.7	73	30.8	24.7 – 36.9	83	29.1	23.1 – 35.1	< 0.001
Moderate (n = 1228)	637	53.4	46.8 – 60.0	319	56.3	49.7 – 62.9	125	52.7	46.1 – 59.3	147	51.6	45.0 – 58.2	
High (n = 599)	357	30.0	23.9 – 36.1	148	26.1	20.3 – 31.9	39	16.5	11.6 – 21.4	55	19.3	14.0 – 24.6	
Underlying Social Capital (n = 2,281)	1,192	100.0		567	100.0		237	100.0		285	100.0		
Low (n = 561)	270	22.6	17.0 – 28.2	157	27.7	21.7 – 33.7	60	25.3	19.5 – 31.1	74	26.0	20.2 – 31.8	0.056
Moderate (n = 1145)	598	50.2	48.9 – 51.5	276	48.7	42.0 – 55.4	115	48.5	41.9 – 55.1	156	54.7	48.1 – 61.3	
High (n = 575)	324	27.2	21.3 – 33.1	134	23.6	18.0 – 29.2	62	26.2	60.9 – 63.1	55	19.3	14.0 – 24.6	

[a] The variables that did not totalize n = 2,281 refer to the absence of valid answers for analysis. [b] Pearson's chi-square test.

Source: Authors.

Table 2. Multivariate analysis of bullying behaviors according to associated factors among adolescents aged 15 to 19. RMGV-ES. 2016/2017.

	Bullying behaviors [a]		Gross OR	95%CI		p-value	Adjusted OR	95%CI		p-value
				Lower threshold	Higher threshold			Lower threshold	Higher threshold	
Victims	Age	15 and 16	1.4	1.09	1.87	0.010				
		17 years	1.1	0.78	1.45	0.716				
		18 and 19	1							
	Gender	Female	0.7	0.57	0.86	0.001	0.6	0.47	0.81	< 0.001
		Male	1				1			
	High-school year	First year	1.8	1.39	2.31	< 0.001				
		Second year	1.5	1.15	2.04	0.003				
		Third/Fourth years	1							
	Basic sanitation	No	1.3	1.03	1.64	0.031				
		Yes	1							
	Parental divorce	No	0.8	0.68	1.02	0.072	1.3	1.00	1.75	0.047
		Yes	1				1			
	Total family income	Up to 1 minimum wage	0.8	0.46	1.35	0.390				
		Between 1 and 3 minimum wages	0.8	0.5	1.26	0.321				
		Between 3 and 10 minimum wages	0.9	0.58	1.49	0.744				
		Over 10 minimum wages	1							
	Adversity in childhood	4 to 10	4.6	3.00	7.17	< 0.001	7.7	4.43	13.26	< 0.001
		1 to 3	2.2	1.45	3.36	< 0.001	2.8	1.67	4.55	< 0.001
		Not exposed	1				1			
	Cognitive social capital	Low	1.2	0.90	1.66	0.208				
		Moderate	1.2	0.96	1.53	.0114				
		High	1							
	Underlying social capital	Low	1.4	1.06	1.86	0.018				
		Moderate	1.1	0.87	1.43	0.383				
		High	1							

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Regarding age, it was observed that students aged 15 and 16 presented a 70.0% greater chance of being victim-aggressors when compared to those aged 18 and 19 years. Victim-aggressors are characterized by a combination of low self-esteem, aggressive and provocative attitudes, and behavioral problems in which they seek to humiliate their schoolmates to cover up their limitations, while at the same time becoming victimizing of them[1,39]. The typical immaturity of early adolescence also seems an explanatory possibility, since as students advance in age and years of schooling, the frequency of bullying behaviors tends to decrease[5,40].

The variable parental divorce remained associated with victimization of bullying, demonstrating that students who were children of non-divorced parents presented a 30.0% higher chance of being victims of bullying than the children of divorced parents. This may be related to overprotection by their parents or to overcontrolling parental figures and, consequently, related to bullying victimization, since overprotective behaviors can affect individual development, impeding the building of healthy group and social relationships[2,41]. However, this point should be analyzed more carefully, since the statistical significance found was borderline, requiring further investigation.

Table 2. Multivariate analysis of bullying behaviors according to associated factors among adolescents aged 15 to 19. RMGV-ES. 2016/2017.

Bullying behaviors[a]			Gross OR	95%CI		p-value	Adjusted OR	95%CI		p-value
				Lower threshold	Higher threshold			Lower threshold	Higher threshold	
Aggressors	Age	15 and 16	1.3	0.91	1.96	0.145				
		17 years	1.4	0.90	2.10	0.144				
		18 and 19	1							
	Gender	Female	0.5	0.39	0.69	< 0.001	0.5	0.33	0.67	< 0.001
		Male	1				1			
	High-school year	First year	1.5	1.04	2.10	0.028				
		Second year	1.3	0.90	1.98	0.147				
		Third/Fourth years	1							
	Basic sanitation	No	1.2	0.84	1.63	0.351				
		Yes	1							
	Parental divorce	No	0.7	0.54	0.95	0.019				
		Yes	1							
	Total family income	Up to 1 minimum wage	0.6	0.27	1.21	0.143				
		Between 1 and 3 minimum wages	0.7	0.39	1.34	0.297				
		Between 3 and 10 minimum wages	1.0	0.54	1.88	0.974				
		Over 10 minimum wages	1							
	Adversity in childhood	4 to 10	3.9	2.17	6.91	< 0.001	6.0	2.99	12.14	< 0.001
		1 to 3	1.7	0.98	3.03	0.060	1.9	1.02	3.72	0.043
		Not exposed	1				1			
	Cognitive social capital	Low	3.4	2.21	5.17	< 0.001	3.2	1.91	5.32	< 0.001
		Moderate	1.8	1.23	2.63	0.003	1.7	1.12	2.73	0.014
		High	1				1			
	Underlying social capital	Low	1.2	0.79	1.72	0.452				
		Moderate	1.0	0.72	1.41	0.977				
		High	1							

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As for adversities in childhood, the results of the analyses showed that bullying behaviors were significantly associated with them, indicating that being exposed to adversity during childhood impacts on the risk of bullying in late adolescence, whether as a victim, aggressor or victim-aggressor. Students exposed to 4-10 childhood adversities were more likely to be victims, aggressors, or victims-aggressors when compared to those who were not exposed to adversity. A similar situation found for the group 1 to 3 adversities, whether among victims, aggressors or victim-aggressors. These results indicate that the greater the exposure to childhood adversities, the greater the chances of occurrence of bullying behaviors.

Scientific studies have suggested that childhood adversities, in addition to being related to physical, mental and behavioral disorders in the future, do not happen in isolation[15,16,42]. Exposure to one episode of adversity tends to increase the likelihood of repetition or exposure to other adversity, which points to the existence of hostile and dysfunctional housing environments, problems at the family level, the coexistence between different types of adversity and individual abuses[2,15,16,18,42]. And, even if adversities in childhood are also present in environments outside the family members, the occurrences linked to the family group and within them indicate greater impact on the development of children and adolescents.

Table 2. Multivariate analysis of bullying behaviors according to associated factors among adolescents aged 15 to 19. RMGV-ES. 2016/2017.

Bullying behaviors [a]			Gross OR	95%CI		p-value	Adjusted OR	95%CI		p-value
				Lower threshold	Higher threshold			Lower threshold	Higher threshold	
Victim-aggressors	Age	15 and 16	1.4	0.99	1.95	0.060	1.7	1.04	2.89	0.036
		17 years	0.8	0.53	1.22	0.309	0.8	0.48	1.35	0.417
		18 and 19	1				1			
	Gender	Female	0.3	0.24	0.41	< 0.001	0.3	0.19	0.39	< 0.001
		Male	1				1			
	High-school year	First year	1.8	1.27	2.46	0.001				
		Second year	1.5	1.00	2.11	0.049				
		Third/fourth years	1							
	Basic sanitation	No	1.1	0.78	1.5	0.720				
		Yes	1							
	Parental divorce	No	0.7	0.53	0.90	0.006				
		Yes	1							
	Total family income	Up to 1 minimum wage	0.8	0.37	1.54	0.435				
		Between 1 and 3 minimum wages	0.7	0.39	1.35	0.315				
		Between 3 and 10 minimum wages	1.2	0.63	2.14	0.640				
		Over 10 minimum wages	1							
	Adversity in childhood	4 to 10	8.0	4.09	15.73	< 0.001	27.3	9.34	80.02	< 0.001
		1 to 3	2.9	1.48	5.6	0.002	7.1	2.51	20.21	< 0.001
		Not exposed	1				1			
	Cognitive social capital	Low	2.7	1.86	3.99	< 0.001	3.3	1.97	5.42	< 0.001
		Moderate	1.5	1.07	2.10	0.018	1.7	1.07	2.58	0.025
		High	1				1			
	Underlying social capital	Low	1.6	1.10	2.37	0.015				
		Moderate	1.5	1.10	2.15	0.012				
		High	1							

[a] Reference category: "not involved". Results obtained from multinomial logistic regression (level of statistical significance less than 5%).

Source: Authors.

The findings associated with bullying behaviors, possibly, are related to the fact that experiencing adverse situations in the domestic environment during childhood may increase the risk of occurrence of bullying episodes in the school environment[7,14,15].

Regarding cognitive social capital, it was observed that students with low and moderate levels of social capital were more likely to be aggressors and victim- aggressors when compared to students who had high social capital, indicating that the lower the social capital, the higher the chance of bullying occurring. Low-level cognitive social capital demonstrated a three-fold greater chance of involvement in bullying, as either aggressor or victim-aggressor, while the moderate level of social capital showed a 70.0% greater chance of involvement in bullying than non- involvement students (reference category). Considering that social capital is a collective asset and that cognitive social capital is related to aspects and behaviors that involve interpersonal trust and solidarity[23,24], a possible explanation for the findings relates to the fact that collectivities with higher levels of social capital spread information more rapidly within the community and that high lev-

Table 3. Multivariate analysis of social capital. according to the exposure to adversity during the childhood of adolescents aged 15 to 19 years. RMGV-ES. 2016/2017.

Social capital*	Exposure to adversity in childhood	p-value	OR	95%CI	
				Lower threshold	Higher threshold
Low structural	1 to 3	0.225	1.3	0.85	1.97
	4 to 10	0.037	1.6	1.03	2.48
	Not exposed		1		
Moderate structural	1 to 3	0.308	1.2	0.85	1.68
	4 to 10	0.293	1.2	0.85	1.75
	Not exposed		1		
Low cognitive	1 to 3	0.525	1.2	0.75	1.77
	4 to 10	0.037	1.6	1.03	2.54
	Not exposed		1		
Moderate cognitive	1 to 3	0.113	1.3	0.94	1.83
	4 to 10	0.023	1.5	1.06	2.16
	Not exposed		1		
Low underlying	1 to 3	0.780	1.1	0.70	1.60
	4 to 10	0.008	1.8	1.17	2.79
	Not exposed		1		
Moderate underlying	1 to 3	0.687	1.1	0.76	1.51
	4 to 10	0.039	1.5	1.02	2.13
	Not exposed		1		

* Reference category: "High". Results obtained from multinomial logistic regression (level of statistical significance less than 5%).

Source: Authors.

els of trust encourage the adoption of new behaviors,[43] including bullying behaviors. High levels of social capital could favor the creation of strong social connections among students, creating reliable and safe environments, preventing the occurrence of episodes of bullying[22].

For the present study, some limitations have to be considered. The data were collected through self-report in a single moment, which can produce socially expected responses and differences in interpretation. Age groups can influence judgment and ways of self-perception, repeating patterns generated by the trivialization of violence. Another gap is the low participation of schools in the private school system. The report of adversity may also have been influenced by memory bias or by the fact that students are unwilling to report traumatic situations experienced. The method applied in this study may have been very specific to some measures, such as social capital. The comparison with scientific studies already performed was limited since similar analyses to those proposed here are scarce in both Brazilian and international literature. Although the multistage sampling design was used, it was not possible to correct for the effect of the study design, but there was an approximate proportion of the total number of students for each municipality. Despite the limitations related to the instrument itself, however, the study addressed unprecedented relationships in exploring the associations between different risk factors and bullying behaviors in late adolescence.

Conclusions

Evidence has shown that bullying is associated with adversity in childhood and social capital, mediated by gender, age and parental divorce. In addition to the fact that experiences of adversities in childhood show an alarming possibility of association with bullying behaviors, which indicates the association between two risk factors for the physical and mental health of adolescents, cognitive social capital was also associated with bullying. It shows that as social capital reduces in level, the behaviors of bullying increase, demonstrating its influence in the adolescence. School environments are primary spaces of protection in which aspects of human differences, whatever they may be, should be respected and inclu-

sive, however, they have been transformed into environments that reproduce family and social violence. The findings of this study demonstrated the potential association among underexploited risk factors for adolescents' health, highlighting the need for systematic interventions in order for schools to function as agents of health and prevention of violence, so that adolescents have full and healthy development in environments characterized by a culture of peace. The healthy coexistence, balance and intercommunication between the different spaces of coexistence of adolescents, which include household environments, social environments and school environments, seem to point to a possible way to create environments free of violence.

Collaborations

A Reisen, DR Gomes, MC Viana, LB Salaroli and ET Santos Neto participated in the conception, design, analysis, writing of the article and critical review. All authors approved the version to be published.

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