



Analysis of the relationship between school bullying, cyberbullying, and substance use

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ABSTRACT

The use of alcohol and other substances among underage adolescents continues to cause social concern nowadays, but it is not the only challenge that professionals face while working with this population. School bullying and cyberbullying remain another main issue affecting the well-being and development of the students. The main objective of the present study was to analyse the possible relationship between both school bullying and cyberbullying with substance use. A selective methodology was used, administering a survey among students from state funded Secondary schools in the Autonomous Community of Galicia (Spain), and obtaining a sample of 3,173 adolescents aged 12 to 17 years. The questionnaire included items referring to the consumption of several substances, specific screening scales for the evaluation of risky consumption (Alcohol Use Disorders Identification Test, Cannabis Abuse Screening Test and CRAFFT Abuse Screening Test) and validated multi-item scales to assess school bullying and cyberbullying involvement (European Bullying Intervention Project Questionnaire and European Cyberbullying Intervention Project Questionnaire). The results showed that the most consumed substances were alcohol, tobacco and cannabis, finding also high risky consumption rates. Adolescents involved in either school bullying or cyberbullying in any role (victims, perpetrators and bully-victims) presented significantly higher rates in the consumption habits and risky consumptions analysed. These results highlight the need for a comprehensive prevention approach that addresses both school bullying, cyberbullying, and addictions at the same time.

1. Introduction

1.1. Substance consumption

The use of alcohol and other substances among youngsters continues to be of great social concern nowadays. The World Health Organization [WHO] itself warns about the risks alcohol, tobacco and cannabis use pose for adolescent health (Inchley et al., 2020). At the European level, the European School Survey Project on Alcohol and Other Drugs [ESPAD], reveals that 79% of students aged 15–16 years old have drunk alcohol at least once in their lives and 41% have smoked tobacco (The ESPAD Group, 2020). Cannabis is the third most consumed substance, with 19% of 15–24-year-olds having consumed it in the past year and 10% in the past month (European Monitoring Centre for Drugs and Drug Addiction, 2020). In Spain, alcohol and tobacco consumption rates are

similar, while there seems to be an upward trend in cannabis, with 1 in 4 students (27.5%) using cannabis in the past year and 19.3% in the past month (Plan Nacional sobre Drogas, 2020). Although the rates of consumption among adolescents detected could be worrisome by themselves, these are aggravated by risky consumptions (National Institute on Drug Abuse, 2020). There is a pattern of intensive alcohol consumption or binge drinking, which is characterised by the ingestion of large quantities in short periods of time, despite the serious implications that it may have on the emotional processing (Lannoy et al., 2021) and the maturing brain (Carbia et al., 2018; López-Caneda et al., 2019). In addition, the non-medical use of drugs such as tranquilizers, sedatives and painkillers seems to be rapidly gaining popularity among adolescents (The ESPAD Group, 2020), and the same goes for new ways of accessing certain substances, as in the case of nicotine via e-cigarettes (Boston Children's Hospital, 2021).

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1.2. School bullying and cyberbullying

Substance use is not the sole issue that professionals face when working with adolescents. School violence and bullying represent the most common forms of victimization suffered by young people during childhood and adolescence, generating a major problem worldwide as warned by the United Nations Educational, Scientific and Cultural Organization [UNESCO] (2019). Traditional face-to-face or school bullying has been defined as an aggressive and intentionally harmful act, usually repeated over time, and carried out by one or more minors towards another who cannot easily defend themselves (Olweus, 1993). On the other hand, the widespread use of the Information and Communication Technologies [ICTs] have also implied an increase in the risks associated with the safety and well-being of adolescents, leading to a leap of the traditional face-to-face harassment and victimization behaviours to the digital environment, giving rise to the emergence of a new phenomenon commonly known as cyberbullying (Athanasiou et al., 2018; Hinduja & Patchin, 2018; Livingstone et al., 2016; Tokunaga, 2010). Yet, the extent to which cyberbullying can be considered as a mere extension of this traditional bullying or a completely different phenomenon is a controversial topic (Lazuras et al., 2017; Olweus & Limber, 2018), as it is difficult to fully align its definition with the one of face-to-face bullying (Peter & Pertermann, 2018). The key differences of online bullying are a larger potential audience, the increased scope of humiliation for the victim, the constant nature of victimisation through the extensive presence of the ICTs in daily life, the increased difficulty to identify the perpetrator and the ease of causing the imbalance of power that this creates (O'Higgins Norman, 2020). However, given the high degree of overlap that often occurs between cyberbullying and school bullying, there is a call for more research to examine the extent to which risk and protective factors may differentially affect each one of them, or even when both issues co-occur (Cosma et al., 2020; Kowalski et al., 2019).

Despite said controversy, there is a consensus that school bullying and cyberbullying constitute global public health problems with serious consequences for the lives of the students involved in it (Inchley et al., 2020; Organisation for Economic Co-operation and Development [OECD], 2019; UNESCO, 2019). Moore et al. (2017) concluded in a meta-analytic review that bullying victimization in children and adolescents is associated with a wide range of mental health problems, such as depression, anxiety and even suicide ideation and attempts. In this sense, Ong et al. (2020) have warned that being bullied represents the main cause associated with suicide attempts during childhood. Despite the social concern and severe consequences school bullying and cyberbullying pose, the rates reported by the scientific literature are widely divergent (Foody et al., 2019; Olweus, 2013; Zych et al., 2015), so the need to estimate its true magnitude remains one of the main challenges in this field. The latest edition of the PISA report found that 23% of students have been bullied face-to-face at least several times a month (OECD, 2019), registering an increase over the results of previous editions. This same report finds a victimization rate of 17% in Spain, below the average of the countries in the study. Regarding cyberbullying, a worldwide review has reported victimization rates ranging from 10 and 40% (Kowalski et al., 2014), while another review circumscribed to Spain reported rates that ranged from 5% to 78.31% for cyber-victimization and from 1.37% to 56.5% for cyber-perpetration (Zych et al., 2016).

1.3. Relationship between school bullying, cyberbullying and substance use

There has also been a growing interest for the study of the relationship between school bullying and substance use (Livingston et al., 2019). There is evidence that supports the existence of positive associations between the involvement in bullying dynamics and the use of substances for perpetrators and victimized perpetrators (also known as bully-victims) (Archimi & Kuntsche, 2014; Lambe & Craig, 2017;

Niemelä et al., 2011; Radliff et al., 2012; Ttofi et al., 2016). However, the relationship between victimization and substance use presents much more inconsistent results, with studies finding significant relationships (Richard et al., 2020; Topper et al., 2011; Turner et al., 2018), while others reflect few or no associations (Niemelä et al., 2011; Quinn et al., 2016; Ttofi et al., 2016). It seems important to highlight that the results of a meta-analytic review conducted by Valdebenito et al. (2015) postulate the existence of a link between school bullying and substance use, determining that perpetrators would be three times more likely to use drugs while victims are twice as likely compared to those not involved in school bullying. On the other hand, despite being a much more recent phenomenon, there are also studies finding associations between participation in cyberbullying and the consumption of alcohol and other substances (Cénat et al., 2018; Gámez-Guadix et al., 2013). In a recent longitudinal research by Alonso & Romero (2020), it was found that cyberbullying perpetration predicted increases in monthly alcohol consumption, while cybervictimization predicted alcohol and tobacco consumption in the following year.

The main objection that can be made to the previous literature in this context is that it either focuses in substance consumption and lacks of employment of specific multi-item questionnaires to assess bullying, or it focuses in bullying and fails to screen for risk consumptions with validated tools. In addition, the profile of the bully-victims (those who are both victims and perpetrators at the same time) seems to be the least studied in the literature. Therefore, the present study has been developed with the aim of analysing the possible relationship between school bullying, cyberbullying and substance use, as well as risky consumptions assessed through tools validated both at an international and national level for adolescents in Spain.

2. Material and methods

2.1. Participants

To achieve the aforementioned objective, a selective methodology was employed, administering a survey among Secondary students in the Autonomous Community of Galicia (Spain). An intentional sampling was used trying to access a sample as wide and heterogeneous as possible. A total of 13 state funded schools were approached and 12 of them agreed to participate in the study. The initial number of questionnaires collected was 3431, of which 47 cases were excluded from the database due to an excessive number of missing values or inconsistent response patterns. Another 211 cases were eliminated because they were outside the age range under study (12–17 years), so that all participants were under the legal age for consumption of certain substances. The final sample consisted of 3173 adolescents, 49.6% boys and 50.4% girls, aged between 12 and 17 years ($M = 14.44$; $SD = 1.67$). The 75.3% were studying obligatory secondary education (Grades 7–10), and 24.7% were in post-obligatory levels of secondary education (Grades 11–12).

2.2. Instruments

The data were collected with an ad hoc questionnaire, which included questions distributed in four blocks.

The first block focused on substance use habits. It included dichotomous Yes/No items based in the Survey on Drug Use in Secondary Education in Spain (Plan Nacional sobre Drogas, 2020) referring to the consumption of alcohol, tobacco, cannabis, cocaine, ecstasy, amphetamines and hallucinogens, both in the past year and in the past month. This first block also included three items relating to binge drinking based in studies such as Golpe et al (2017): “having consumed 3 or more alcoholic drinks on the same drinking episode”, “having consumed 6 or more alcoholic drinks on the same drinking episode” and “having got drunk”.

The second block incorporated the Spanish versions of three specific screening tools: the Alcohol Use Disorders Identification Test [AUDIT] (validated by Rial et al., 2017) to estimate alcohol risky consumption,

obtaining in this work a high internal consistency measured by Cronbach's alpha coefficient ($\alpha = 0.84$); the Cannabis Abuse Screening Test [CAST] (Legleye et al., 2011) to estimate risky cannabis consumption, obtaining also a high internal consistency ($\alpha = 0.86$); and the CRAFFT Abuse Screening Test (validated by Rial et al., 2019) for risky use of substances in general, presenting an acceptable internal consistency ($\alpha = 0.70$). These coefficients are similar or even slightly higher than those found by the original authors, and in accordance with Hinton et al. an alpha coefficient between 0.70 and 0.90 shows a high reliability (pp 363, 2004). These screening tools (AUDIT, CAST and CRAFFT) are the ones recommended for early detection of risky substance usage among Spanish adolescents (García-Couceiro et al., 2021), and were coded following the thresholds recommended by the original authors or Spanish validations (Legleye et al., 2011; Rial et al., 2017; Rial et al., 2019).

The third block, conceived to estimate the rates of involvement in school bullying and cyberbullying, incorporated the validated Spanish versions of the European Bullying Intervention Project Questionnaire [EBIPQ] and the European Cyberbullying Intervention Project Questionnaire [ECIPQ] (Del Rey et al., 2015; Ortega-Ruiz et al., 2016), establishing the different roles of victims, perpetrators or bully-victims according to the behaviour and repetition criteria described in Del Rey et al. (2015). The internal consistency of both scales in the present work was high, obtaining in the EBIPQ a Cronbach's alpha of 0.79 for the victimization scale and of 0.79 in the perpetration scale and of 0.80 and 0.78 respectively in the ECIPQ.

Finally, a fourth block incorporated questions related to socio-demographic variables, such as sex (understood as being a boy or a girl), age and academic grade.

2.3. Procedure

Collaboration with the management of the educational centres was secured prior to data collection. The principals delivered letters to the adolescent participants explaining the objective and date of the data collection and asking their parents for consent to include their children in the study. The data were collected in the classroom setting in small groups (between 15 and 20 individuals) with a questionnaire that each adolescent had to fill out individually. The data collection was carried out by a team of psychologists with experience and specific training on the matter. Each subject was informed about the purpose of the study, as well as the confidentiality and anonymity of their answers. The participation was totally voluntary and the time to fill in the questionnaire was approximately 40 min. The study was approved by the Bioethics Committee of the University of Santiago de Compostela under registry USC-35/2021/08/07.

2.4. Data analysis

A first analysis was conducted to identify and eliminate questionnaires with high percentages of missing values (more than 15%), and crossed tabulations were employed to identify inconsistent response patterns (i.e. first reporting not having consumed a substance and then indicating a consumption pattern). The group comparisons were analysed by means of a bivariate tabulation with the application of contrasts χ^2 for the comparison of percentages, and Cramér's V or Contingency Coefficients (CC) to estimate effect sizes. To try to deepen the analysis of the relationship between school bullying, cyberbullying and substance consumption, different logistic regression analyses were performed, using the risky consumptions measured with AUDIT, CAST and CRAFFT as dependent variables and the roles of involvement in school bullying and cyberbullying behaviours as independent variables. Sex and age were also taken into account for the multiple predictor models. The analyses were carried out using the IBM SPSS Statistics 25 statistical package (IBM Corp. Released, 2017).

3. Results

3.1. Consumption habits and risky consumption

Alcohol was the most consumed substance among the adolescents in the sample, followed by tobacco and cannabis. An analysis by sex revealed differences in tobacco consumption, with significantly higher percentages among girls. There were also differences in the levels of alcohol consumption and having got drunk in the past year, with slightly higher rates among girls. Boys had significantly higher rates of cannabis use and risky consumption of cannabis. By age range, there were a significant increase in consumption levels and risky consumption among older participants. A detailed listing of the consumption rates found is presented in Table 1.

3.2. Involvement in school bullying and cyberbullying behaviour

In global terms, 1 in 3 adolescents (34.4%) has been directly involved in any kind of school bullying role in the past 2 months. Results did not reveal differences between girls and boys in the roles of victims and perpetrators, however, significant differences were obtained for the role of bully-victim, with significantly higher percentages among boys. By age range, no relevant differences in victimization rates were found, but there seemed to be a significant increase in perpetrators and bully-victims, reaching a threefold increase among 16–17-year-olds. In comparison, the rates of involvement in any kind of cyberbullying role were lower (14.1%). Although none of the cyberbullying roles showed differences by sex, there was a significant increase in the rates as age increased. All these results are presented in Table 2.

3.3. Relationship between school bullying, cyberbullying and substance use

To analyse the relationship between school bullying and substance use, the sample was divided according to the role of involvement (not involved, victims, perpetrators and bully-victims), obtaining the consumption habits in the past year, in the past month and the risk consumption for each role. The results shown in Table 3 revealed that adolescents not involved in school bullying presented significantly lower levels in each of the consumption habits and risky consumption analysed. Although the rates obtained were also high among victims, the consumption levels and risky consumption increased even more among perpetrators and especially among bully-victims.

The results reflected a similar trend between cyberbullying and substance use. As shown in Table 4, the roles involved in cyberbullying presented significantly higher rates of substance use and risky consumption than those not involved. However, unlike school bullying, in this case the perpetrators were the role that presented higher rates, followed closely by the group of bully-victims.

3.4. Results of the logistic regression analysis

Logistic regression analysis models, one for school bullying and another for cyberbullying, revealed that the roles of victims, perpetrators and bully-victims seemed to be strongly associated with a pattern of alcohol abuse. In both phenomena, the profile of victim presented a higher prognosis to develop a risky consumption of alcohol compared to those not involved, being much more accentuated for the roles of pure perpetrators and bully-victims. These associations, although slightly attenuated, continued to reach statistical significance in multiple predictor models that incorporated the variables sex and age (Multiple Model 1) as well as in the model that incorporated both school bullying and cyberbullying together (Multiple Model 2). Regarding the risk consumption of cannabis, the models at univariate level reflected significantly higher Odds Ratio (OR) for the different profiles of people involved in school bullying and cyberbullying, implying proneness of

Table 1
Substance use habits and risk consumption.

Substance use habits (past year)	Overall <i>n</i> (%)	Sex		χ^2	Cramér's V	Age (years)			χ^2	CC
		Girls <i>n</i> (%)	Boys <i>n</i> (%)			12–13 <i>n</i> (%)	14–15 <i>n</i> (%)	16–17 <i>n</i> (%)		
Alcohol	1501 (47.3)	787 (49.3)	711 (45.3)	4.99*	0.04	159 (14.5)	542 (50.2)	800 (80.2)	911.34**	0.47
3 or more consumptions/episode	939 (29.6)	494 (30.9)	442 (28.2)	2.77	0.03	50 (4.6)	284 (26.3)	605 (60.7)	798.02**	0.45
6 or more consumptions/episode	478 (15.1)	237 (14.8)	240 (15.3)	0.09	0.01	14 (1.3)	116 (10.8)	348 (34.9)	485.41**	0.36
Having got drunk	816 (25.7)	445 (27.9)	370 (23.6)	7.37*	0.05	37 (3.4)	243 (22.5)	536 (53.8)	702.93**	0.43
Tobacco	786 (24.8)	437 (27.4)	348 (22.2)	11.13**	0.06	69 (6.3)	258 (23.9)	459 (46)	443.47**	0.35
Cannabis	456 (14.4)	213 (13.3)	243 (15.5)	2.80	0.03	13 (1.2)	122 (11.3)	321 (32.2)	420.66**	0.34
Cocaine	38 (1.2)	14 (0.9)	24 (1.5)	2.32	0.03	1 (0.1)	14 (1.3)	23 (2.3)	21.81**	0.08
Ecstasy/amphetamines/hallucinogens	54 (1.7)	18 (1.1)	36 (2.3)	5.75*	0.05	0 (0)	18 (1.7)	36 (3.6)	40.72**	0.11
Substance use habits (past month)										
Alcohol	786 (24.8)	410 (25.7)	374 (23.8)	1.34	0.02	49 (4.5)	206 (19.1)	531 (53.3)	695.58**	0.42
3 or more consumptions/episode	464 (14.6)	240 (15)	222 (14.1)	0.42	0.01	19 (1.7)	108 (10)	337 (33.8)	458.13**	0.35
6 or more consumptions/episode	196 (6.2)	95 (5.9)	100 (6.4)	0.18	0.01	5 (0.5)	40 (3.7)	151 (15.1)	211.68**	0.25
Having got drunk	354 (11.2)	193 (12.1)	161 (10.3)	2.47	0.03	15 (1.4)	82 (7.6)	257 (25.8)	334.85**	0.31
Tobacco	473 (14.9)	266 (16.7)	206 (13.1)	7.48*	0.05	32 (2.9)	139 (12.9)	302 (30.3)	313.82**	0.30
Cannabis	244 (7.7)	102 (6.4)	142 (9.1)	7.52*	0.05	8 (0.7)	65 (6)	171 (17.2)	204.83**	0.25
Cocaine	15 (0.5)	5 (0.3)	10 (0.6)	1.14	0.02	1 (0.1)	4 (0.4)	10 (1)	9.59*	0.05
Ecstasy/amphetamines/hallucinogens	16 (0.5)	6 (0.4)	10 (0.6)	0.62	0.02	0 (0)	7 (0.6)	9 (0.9)	9.16*	0.05
Risky consumption										
AUDIT	738 (23.3)	384 (24.1)	352 (22.5)	1.06	0.02	45 (4.1)	220 (20.4)	473 (47.4)	555.98**	0.39
CAST	157 (4.9)	64 (4)	93 (5.9)	5.79*	0.04	7 (0.6)	44 (4.1)	106 (10.6)	113.55**	0.19
CRAFFT	642 (20.3)	343 (21.5)	298 (19)	2.81	0.03	47 (4.3)	188 (17.5)	407 (40.8)	438.67**	0.35

* $p \leq 0.05$; ** $p \leq 0.001$.

Table 2
School bullying and cyberbullying involvement.

School bullying	Overall <i>n</i> (%)	Sex		χ^2	Cramér's V	Age (years)			χ^2	CC
		Girls <i>n</i> (%)	Boys <i>n</i> (%)			12–13 <i>n</i> (%)	14–15 <i>n</i> (%)	16–17 <i>n</i> (%)		
Victims	520 (16.4)	276 (17.3)	243 (15.5)	1.732	0.024	180 (16.4)	180 (16.7)	160 (16)	0.152	0.007
Perpetrators	188 (5.9)	99 (6.2)	87 (5.5)	0.500	0.014	31 (2.8)	58 (5.4)	99 (9.9)	48.175**	0.122
Bully-victims	384 (12.1)	164 (10.3)	218 (13.9)	9.463*	0.056	70 (6.4)	142 (13.2)	172 (17.3)	59.744**	0.136
Total Involvement	1092 (34.4)	539 (33.8)	548 (34.9)	0.435	0.012	281 (25.6)	380 (35.2)	431 (43.2)	72.263**	0.149
Cyberbullying										
Victims	166 (5.2)	93 (5.8)	72 (4.6)	2.198	0.028	41 (3.7)	69 (6.4)	56 (5.6)	8.183*	0.051
Perpetrators	147 (4.6)	75 (4.7)	72 (4.6)	0.003	0.003	16 (1.5)	42 (3.9)	89 (8.9)	67.964**	0.145
Bully-victims	135 (4.3)	62 (3.9)	71 (4.5)	0.661	0.016	27 (2.5)	56 (5.2)	52 (5.2)	13.239*	0.064
Total Involvement	448 (14.1)	230 (14.4)	215 (13.7)	0.265	0.010	84 (7.7)	167 (15.5)	197 (19.8)	65.574**	0.142

* $p \leq 0.05$; ** $p \leq 0.001$.

risky consumption of that substance. Although these associations were maintained in the multiple logistic regressions for each of the profiles, they were still particularly high among perpetrators involved in cyberbullying, as reflected in the Multiple Model 2 (OR = 4.07 [95% CI: 2.47–6.71]). Finally, associations between involvement in school bullying and cyberbullying behaviours with overall substance abuse estimated through the CRAFFT were also found. In this sense, the various models analysed reflected higher associations between involvement in school bullying with substance use, and more markedly in the role of bully-victim. All these results are presented in [Tables 5–7](#).

4. Discussion

The main objective of the present study was to analyse the relationship between school bullying, cyberbullying and substance use. This research also represented a great opportunity to obtain actualized data about the consumptions and risk consumptions, and also the rates of school bullying and cyberbullying among the adolescents in the sample under study, considering the different roles of those involved in both dynamics.

5. Substance consumption

The results showed that the most consumed substances were alcohol, secondly tobacco and thirdly cannabis. In the case of alcohol, the data of the present study supports the trend found in other studies reporting a decline in alcohol consumption ([Inchley et al., 2020](#); [Plan Nacional sobre Drogas, 2020](#)), yet it remains considerably high, especially for heavy drinking, with 25.7% of the sample having got drunk in the past year and 23.3% presenting risky consumption (AUDIT). Tobacco was the second most consumed substance, with 24.8% having consumed it in the past year and 14.9% in the past month. The levels of cannabis use among youngsters are also noteworthy (14.4% in the past year; 7.7% in the past month), with 4.9% of underage people showing risky consumption (CAST). There should be noted that most substances are already being used at the age of 12–13, and the usage increases significantly as adolescents get older. Regarding sex differences, there seems to be a preference for alcohol and tobacco among girls, while boys use more cannabis and amphetamines or hallucinogens.

5.1. Involvement in school bullying and cyberbullying

The application of multi-item specific tools has made it possible to

Table 3
Substance use habits and school bullying.

Substance use habits (past year)	School Bullying				χ^2	CC
	Not involved n (%)	Victim n (%)	Perpetrator n (%)	Bully-victim n (%)		
Alcohol	784 (37.7)	281 (54)	140 (74.5)	296 (77.1)	279.138**	0.284
3 or more consumptions/episode	440 (21.1)	182 (35)	102 (54.3)	215 (56)	261.895**	0.276
6 or more consumptions/episode	209 (10)	87 (16.7)	57 (30.3)	125 (32.6)	168.105**	0.224
Having got drunk	384 (18.5)	152 (29.2)	91 (48.4)	189 (49.2)	222.525**	0.256
Tobacco	365 (17.5)	156 (30)	79 (42)	186 (48.4)	211.461**	0.250
Cannabis	191 (9.2)	84 (16.2)	53 (28.2)	128 (33.3)	188.324**	0.237
Cocaine	14 (0.7)	6 (1.2)	4 (2.1)	14 (3.6)	25.679**	0.090
Ecstasy/amphetamines/hallucinogens	12 (0.6)	15 (2.9)	8 (4.3)	19 (4.9)	51.612**	0.127
Substance use habits (past month)						
Alcohol	368 (17.7)	143 (27.5)	88 (46.8)	187 (48.7)	225.132**	0.257
3 or more consumptions/episode	215 (10.3)	89 (17.1)	48 (25.5)	112 (29.2)	116.260**	0.188
6 or more consumptions/episode	79 (3.8)	32 (6.2)	26 (13.8)	59 (15.4)	95.279**	0.171
Having got drunk	154 (7.4)	55 (10.6)	45 (23.9)	100 (26)	146.613**	0.210
Tobacco	202 (9.7)	96 (18.5)	53 (28.2)	122 (31.8)	161.789**	0.220
Cannabis	91 (4.4)	53 (10.2)	34 (18.1)	66 (17.2)	114.258**	0.186
Cocaine	6 (0.3)	3 (0.6)	2 (1.1)	4 (1)	5.662	0.042
Ecstasy/amphetamines/hallucinogens	4 (0.2)	5 (1)	2 (1.1)	5 (1.3)	12.251*	0.062
Risky consumption						
AUDIT	328 (15.8)	137 (26.4)	87 (46.5)	186 (48.4)	261.186**	0.276
CAST	57 (2.7)	31 (6)	20 (10.6)	49 (12.8)	85.501**	0.162
CRAFFT	252 (12.1)	136 (26.3)	76 (40.4)	178 (46.5)	306.720**	0.297

* $p \leq 0.05$; ** $p \leq 0.001$.

Table 4
Substance use habits and cyberbullying.

Substance use habits (past year)	Cyberbullying				χ^2	CC
	Not involved n (%)	Victim n (%)	Perpetrator n (%)	Bully-victim n (%)		
Alcohol	1170 (42.9)	109 (65.7)	120 (81.6)	102 (75.6)	156.025**	0.216
3 or more consumptions/episode	697 (25.6)	76 (45.8)	90 (61.2)	76 (56.3)	158.759**	0.218
6 or more consumptions/episode	344 (12.6)	33 (19.9)	54 (36.7)	47 (34.8)	110.801**	0.184
Having got drunk	605 (22.2)	62 (37.3)	84 (57.1)	65 (48.1)	140.936**	0.206
Tobacco	568 (20.8)	66 (39.8)	81 (55.1)	71 (52.6)	171.205**	0.226
Cannabis	319 (11.7)	36 (21.7)	58 (39.5)	43 (31.9)	131.631**	0.200
Cocaine	23 (0.8)	4 (2.4)	8 (5.4)	3 (2.2)	28.520**	0.094
Ecstasy/amphetamines/hallucinogens	33 (1.2)	5 (3)	8 (5.4)	8 (5.9)	32.320**	0.100
Substance use habits (past month)						
Alcohol	583 (21.4)	55 (33.1)	84 (57.1)	64 (47.4)	142.684**	0.207
3 or more consumptions/episode	338 (12.4)	35 (21.1)	55 (37.4)	36 (26.7)	93.149**	0.169
6 or more consumptions/episode	137 (5)	17 (10.2)	24 (16.3)	18 (13.3)	49.001**	0.123
Having got drunk	250 (9.2)	25 (15.1)	45 (30.6)	34 (25.2)	96.296**	0.172
Tobacco	331 (12.1)	41 (24.7)	55 (37.4)	46 (34.1)	126.722**	0.196
Cannabis	169 (6.2)	18 (10.8)	37 (25.2)	20 (14.8)	83.756**	0.160
Cocaine	10 (0.4)	2 (1.2)	3 (2)	0 (0)	10.862*	0.058
Ecstasy/amphetamines/hallucinogens	11 (0.4)	1 (0.6)	4 (2.7)	0 (0)	15.664**	0.070
Risky consumption						
AUDIT +	524 (19.2)	61 (37)	81 (55.1)	72 (53.7)	195.023**	0.241
CAST +	90 (3.3)	14 (8.4)	32 (21.8)	21 (15.6)	140.703**	0.206
CRAFFT +	450 (16.5)	58 (35.2)	68 (46.3)	66 (49.3)	177.135**	0.230

* $p \leq 0.05$; ** $p \leq 0.001$.

estimate the rates of involvement in both school bullying and cyberbullying among the sample under study. In this regard, the data indicated that 1 in 3 adolescents (34.4%) was involved in school bullying (16.4% victims, 5.9% perpetrators and 12.1% bully-victims). In relation to the rates of involvement in cyberbullying, 14.1% of adolescents have been involved in some way (5.2% victims, 4.6% perpetrators and 4.3% bully-victims). Despite being on the line of previous reviews (Modecki et al., 2014; Zych et al., 2015), these results support that bullying is a problem on the rise (OECD, 2019). In addition, the high victimization rates found in the 12–13 years' age group support the idea that school bullying and cyberbullying are problems that are spreading to younger ages (Machimbarrena & Garaigordobil, 2018). Another outstanding fact

is the high degree of concurrence detected between victimization and perpetration, reflected in high rates of bully-victims for both phenomena. This evidence supports the hypothesis of the presence of a spiral or escalation of violence in which victimization and perpetration influence each other (Gámez-Guadix et al., 2015).

5.2. Relationship between school bullying, cyberbullying and substance use

Beyond estimating the levels of substance use and bullying in a sample of adolescents, the main finding of this study was the confirmation of certain associations between both phenomena. Given the

Table 5

Logistic regression models to predict risky alcohol consumption (AUDIT+) based on school bullying and cyberbullying roles.

	Total n (%)	Risky alcohol consumption n (%)	One predictor Model			Multiple predictor Model 1 ^a			Multiple predictor Model 2 ^b		
			OR	95% CI	χ^2	OR	95% CI	χ^2	OR	95% CI	χ^2
School Bullying											811.346**
Not involved	2080 (65.6)	328 (15.8)									
Victims	518 (16.4)	137 (26.4)	1.92	(1.53–2.41)		1.99	(1.54–2.57)		1.77	(1.36–2.30)	
Perpetrator	187 (5.9)	87 (46.5)	4.65	(3.41–6.34)	238.043**	3.12	(2.21–4.42)	781.519**	2.56	(1.79–3.66)	
Bully-victim	384 (12.1)	186 (48.4)	5.02	(3.98–6.33)		4.16	(3.21–5.39)		2.82	(2.10–3.81)	
Cyberbullying											
Not involved	2723 (85.9)	524 (19.2)									
Victims	165 (5.2)	61 (37)	2.46	(1.77–3.42)		2.39	(1.65–3.46)		1.62	(1.09–2.39)	
Perpetrator	147 (4.6)	81 (55.1)	5.15	(3.67–7.23)	168.086**	3.34	(2.30–4.86)	748.532**	2.16	(1.45–3.21)	
Bully-victim	134 (4.3)	72 (53.7)	4.87	(3.43–6.93)		5.09	(3.41–7.60)		2.59	(1.65–4.04)	

** $p \leq 0.001$; OR = Odds ratio; CI: Confidence Interval.^a Multivariate Model 1 includes the variables Sex and Age.^b Multivariate Model 2 includes the variables Sex, Age and the school bullying and cyberbullying roles.**Table 6**

Logistic regression models to predict risky cannabis consumption (CAST+) based on school bullying and cyberbullying roles.

	Total n (%)	Risky cannabis consumption n (%)	One predictor Model			Multiple predictor Model 1 ^a			Multiple predictor Model 2 ^b		
			OR	95% CI	χ^2	OR	95% CI	χ^2	OR	95% CI	χ^2
School Bullying											1029.842**
Not involved	2081 (65.6)	57 (2.7)									
Victims	520 (16.4)	31 (6)	2.25	(1.44–3.53)		2.18	(1.37–3.45)		1.81	(1.12–2.93)	
Perpetrator	188 (5.9)	20 (10.6)	4.23	(2.48–7.20)	71.905**	2.68	(1.54–4.65)	186.683**	1.76	(0.98–3.17)	
Bully-victim	384 (12.1)	49 (12.8)	5.19	(3.49–7.74)		3.67	(2.43–5.53)		2.08	(1.28–3.39)	
Cyberbullying											
Not involved	2725 (85.9)	90 (3.3)									
Victims	166 (5.2)	14 (8.4)	2.70	(1.50–4.85)		2.53	(1.38–4.64)		1.85	(0.98–3.49)	
Perpetrator	147 (4.6)	32 (21.8)	8.15	(5.22–12.71)	92.401**	5.32	(3.34–8.47)	208.668**	4.07	(2.47–6.71)	
Bully-victim	135 (4.3)	21 (15.6)	5.39	(3.24–8.99)		4.62	(2.71–7.87)		2.98	(1.62–5.49)	

** $p \leq 0.001$; OR = Odds ratio; CI: Confidence Interval.^a Multivariate Model 1 includes the variables Sex and Age.^b Multivariate Model 2 includes the variables Sex, Age and the school bullying and cyberbullying roles.**Table 7**

Logistic regression models to predict risky use of substances in general (CRAFT +) based on school bullying and cyberbullying roles.

	Total n (%)	Risky substance consumption n (%)	One predictor Model			Multiple predictor Model 1 ^a			Multiple predictor Model 2 ^b		
			OR	95% CI	χ^2	OR	95% CI	χ^2	OR	95% CI	χ^2
School Bullying											724.414**
Not involved	2078 (65.6)	252 (12.1)									
Victims	518 (16.4)	136 (26.3)	2.58	(2.04–3.27)		2.76	(2.13–3.58)		2.51	(1.92–3.28)	
Perpetrator	188 (5.9)	76 (40.4)	4.92	(3.57–6.77)	278.656**	3.42	(2.41–4.86)	708.640**	3.00	(2.09–4.30)	
Bully-victim	383 (12.1)	178 (46.5)	6.29	(4.95–8.00)		5.30	(4.08–6.90)		3.96	(2.93–5.35)	
Cyberbullying											
Not involved	2721 (85.9)	450 (16.5)									
Victims	165 (5.2)	58 (35.2)	2.74	(1.96–3.83)		2.66	(1.84–3.85)		1.53	(1.04–2.26)	
Perpetrator	147 (4.6)	68 (46.3)	4.34	(3.09–6.10)	149.932**	2.75	(1.90–3.97)	617.063**	1.60	(1.08–2.37)	
Bully-victim	134 (4.3)	66 (49.3)	4.90	(3.44–6.98)		4.92	(3.32–7.30)		2.07	(1.33–3.22)	

** $p \leq 0.001$; OR = Odds ratio; CI: Confidence Interval.^a Multivariate Model 1 includes the variables Sex and Age.^b Multivariate Model 2 includes the variables Sex, Age and the school bullying and cyberbullying roles.

controversy suggesting that cyberbullying is a construct with distinctive characteristics with respect to traditional bullying (Hinduja & Patchin, 2018; Tokunaga, 2010), in this study their relationship with substance use has been analysed separately and jointly. The results obtained reveal significantly higher levels of substance use and risky consumption among the students involved in either school bullying or cyberbullying, with rates up to three times higher among the groups of perpetrators and bully-victims. Logistic regression analysis showed that the various roles of involvement in bullying (whether victims, perpetrators or bully-victims) have predictive associations with risky consumption of

alcohol, cannabis and drugs in general, both for single predictor and multiple predictor models. This supports the growing literature linking the roles of school bullies and bully-victims with alcohol and substance use (Archimi & Kuntsche, 2014; Lambe & Craig, 2017; Niemelä et al., 2011; Radiiff et al., 2012; Tofí et al., 2016). Regarding the profile of victims, the results have pointed out that their consumption rates are significantly higher than those not involved in bullying, although these group present lower consumption rates than the perpetrators and bully-victims. Previous studies have raised the hypothesis that victims of school bullying could present a higher propensity towards substance use

(Richard et al., 2020; Turner et al., 2018; Zsila et al., 2018). In this sense, longitudinal studies have found that bullying victimization could be linked to alcohol-related problems as a coping strategy (Topper et al., 2011), and distress caused by victimization may explain a greater predisposition to future tobacco use (Niemelä et al., 2011). Although involvement in cyberbullying was less frequent compared to school bullying, it should also be noted that all roles seemed to be related to substance use, as previous studies suggested (Alonso & Romero, 2020; Cénat et al., 2018; Fisher et al., 2016; Kowalski et al., 2014). In this case, the perpetrator role was the one that presented the higher rates, whereas in school bullying it was the bully-victims. The high consumption rates found among bully-victims emphasise the need to further study this profile more neglected by the literature.

5.3. Limitations

However, the results obtained in this study should be interpreted with caution, as it presents a few limitations. Firstly, a non-probabilistic sample was employed, making it difficult to extrapolate the results to the general population. Secondly, the cross-sectional nature of this study has not allowed the establishment of causal relationships between the variables assessed. Recent works such as Da Silva and Martins (2020) found that associations between bullying perpetration and substance use appeared to be bidirectional, although the mechanisms underlying these associations have not yet been studied in detail. Finally, as the variables were self-reported, adolescents may be underestimating or overestimating the behaviours they are asked about. Yet, previous studies have shown that self-report measures seemed to be reliable and even better than other methods in assessing levels of substance use (Babor et al., 1989; Winters et al., 1990), and the guarantee of anonymity and the voluntary nature of participation in the study contribute to mitigate the effects of social desirability.

6. Conclusion

Despite the aforementioned limitations, the results of the present study contribute to pointing out that substance use may be part of a broader pattern of behavioural problems in adolescence, such as anti-social peer relationships or involvement in violent behaviour (Gámez-Guadix et al., 2013). School bullying, cyberbullying, drug use and other problematic behaviours would be interrelated, highlighting the need to address these issues jointly by implementing prevention strategies from a comprehensive approach (Alonso and Romero, 2020; Díaz-Geada et al., 2020; Ttofi et al. 2016; Valdebenito et al. 2015). In this sense, schools play a prominent role in minimising bullying involvement, as they are the main setting in which it takes place (Garmendia et al., 2019), and a school safety approach such as the one proposed by Kingston et al. (2018) is encouraged. Safe, respectful and caring learning environments can act as a protective factor for students, preventing the occurrence of maladaptive behaviours, such as truancy, smoking, drinking alcohol, drug use and other deviant conducts such as school bullying and cyberbullying behaviours (OECD, 2019). Furthermore, prevention and intervention efforts need to be carried out from an early age, as if 12 year olds are already engaging in bullying and drug consumption, beginning prevention in Secondary Education may be too late.

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CRedit authorship contribution statement

Rafael Pichel: Data curation, Methodology, Formal analysis, Writing – original draft, Writing – review & editing. **Sandra Feijóo:** Data curation, Methodology, Writing – original draft, Writing – review & editing. **Manuel Isorna:** Conceptualization, Methodology, Writing – review & editing. **Jesús Varela:** Conceptualization, Funding acquisition, Supervision, Writing – review & editing. **Antonio Rial:** Conceptualization, Funding acquisition, Methodology, Formal analysis, Supervision, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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