



Roles involved in school violence: links with the problematic use of social networking sites, self-esteem, and loneliness in adolescents.

Roles involucrados en la violencia escolar: vínculos con el uso problemático de las redes sociales, la autoestima y la soledad en adolescentes.

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Abstract

The objective was to analyse the relationships between multidimensional self-esteem (academic, social, emotional, family, and physical), loneliness, the problematic use of social networking sites (PUSNS) and the different roles involved in school violence - non-involved, aggressors, victims and victim-aggressors-, depending on sex. Participants included 1,930 adolescents (50.2% girls) aged 12 to 18 years, schooled in the province of Seville (Spain). A MANOVA (4x2) was performed. Significant relationships were observed between the different school violence roles, loneliness, multidimensional self-esteem, and PUSNS. Specifically, depending on the dependent variables analysed, victims-aggressors presented a more negative profile than the rest of the roles observed, and the non-involved showed the best adjustment. It is also remarkable that the groups with the lowest scores in PUSNS are the two groups of non-involved individuals, both boys and girls, and the group of male victims. To finish, we describe the practical implications of the study.

Keywords: school-violence; victim-aggressor; self-esteem; loneliness; social networking

Resumen

El objetivo fue analizar las relaciones entre la autoestima multidimensional (académica, social, emocional, familiar y física), la soledad, el uso problemático de redes sociales (PUSNS, en inglés) y los diferentes roles en la violencia escolar: no involucrados, agresores, víctimas y víctimas-agresoras, según el sexo. Participaron 1,930 adolescentes (50.2% chicas) de 12 a 18 años, escolarizados en la provincia de Sevilla (España). Se realizó un MANOVA (4x2). Se observaron relaciones significativas entre los diferentes roles de violencia escolar, la soledad, la autoestima multidimensional y el PUSNS. Específicamente, según las variables dependientes analizadas, las víctimas-agresores presentaron un perfil más negativo que el resto de los roles observados, y los no involucrados mostraron la mejor adaptación. También es notable que los grupos con las puntuaciones más bajas en PUSNS

son los dos grupos de personas no involucradas, tanto chicos como chicas, y el grupo de víctimas masculinas. Para finalizar, describimos las implicaciones prácticas del estudio.

Palabras clave: violencia escolar, víctima-agresora, autoestima, soledad, redes sociales virtuales

Introduction

School violence, including its various expressions such as bullying and cyberbullying, is a serious social problem that negatively affects the well-being of victims and aggressors, the educational community, and society in general (Estévez-García et al., 2023; Zych et al., 2019). Since Olweus' pioneering work in the 1970s, research has established that school violence is a significant issue with serious implications for the mental and physical health of adolescents, as well as important consequences for their adult lives (Cain, 2021; Fredrick et al., 2021).

School violence is negatively associated with self-esteem, with victimized adolescents reporting lower self-esteem (Ma et al., 2024; van Geel et al., 2018; Wang et al., 2024). Additionally, loneliness is related to school victimization, resulting in negative consequences for the psychological and social well-being of adolescents (Eccles et al., 2020; Hards et al., 2022). Most scientific studies have unequivocally observed significant relationships between school violence and loneliness, indicating that being a victim of bullying is positively associated with loneliness among adolescents (Bayat et al., 2021; Quintana-Orts et al., 2021).

Another relevant variable in the current context is online interaction platforms, particularly since the widespread use of smartphones (Erdem & Sezer Efe, 2022). Adolescents can become particularly absorbed, with their smartphone use online representing an inseparable part of their identity and relationships (Khosravi, 2022), as well as an integral part of their daily life (Edwards et al., 2022). A major motivation for their use is to receive feedback, monitor peers, and interact with them, often as idealized models (Stieger & Wunderl, 2022). The adolescent population, and younger teens in particular, are vulnerable to problematic smartphone use and dependence on social networking sites (Hawk et al., 2019; Martínez-Ferrer et al., 2018).

In recent years, smartphone use has been observed to be related to psychosocial well-being (Wacks & Weinstein, 2021), coping with stress (Kuss et al., 2018), addictive behaviour, as well as school violence, including cyberbullying (Blinka et al., 2023; Kircaburun et al., 2019; Martínez-Ferrer et al., 2021). Regarding dependence on virtual social networks based on sex, it has been observed to be higher in boys than in girls (Aparicio-Martínez et al., 2020; Martínez-Ferrer et al., 2021).

Finally, it is noteworthy to highlight the intriguing aspect of this study concerning the roles involved in school violence and their relationships with previously described variables. Traditionally, two of the roles implicated in school violence have been analysed independently: the victims and the aggressors (Vázquez González, 2019). Additionally, a third role has been identified as the victim-aggressor, characterized by experiencing episodes of victimization while also exhibiting violent behaviours. This victimization profile has been identified in previous studies for over twenty years (Olweus, 2001; Schwartz et al., 2001). However, recent research continues to explore the victim-aggressor role, which remains the least studied among all roles involved in school violence (Chow et al., 2022). Authors such as Wu et al. (2021) suggest that victim-aggressors should be

clearly differentiated from pure victims or aggressors. Unlike the traditional role of submissive and passive victim, victim-aggressors behave violently against the aggressors themselves or against third parties (Kennedy, 2021; Sterzing et al., 2020). This victim-aggressor group shows the most negative psychosocial adjustment, as they accumulate negative factors characteristic of both aggressors and victims (Fischer et al., 2022; Gaete et al., 2021; Montero-Montero et al., 2021). In fact, these adjustment issues have been observed in early childhood in the form of more aggressive behaviours (Perren & Alsaker, 2006). Furthermore, they demonstrate less cooperative and sociable behaviours compared to their peers (Walters, 2021; Zhong et al., 2022).

Recent studies have found that compared to pure victims and aggressors, victim-aggressors: present a greater number of behavioural and socio-affective disorders (Kennedy, 2021); more self-control problems (Busch et al., 2015); a larger number of depressive and psychiatric symptoms (Espejo-Siles et al., 2022; Sourander et al., 2016; Wu et al., 2021); and have consistently shown to be the most dysfunctional (Dukes et al., 2009; Husky et al., 2020) and at risk (Kennedy, 2021) of all teenagers involved in school violence.

The current study

Over the last years, studies have focused on the relationships between the variables examined in this study and school violence and victimisation. In a notable study conducted by Guerra et al. (2011) in the United States, low self-esteem was found to be the strongest predictor of school victimization, regardless of gender and age. However, the relationship between violence and self-esteem is not consistent in most studies that analyse the different roles involved in school violence, such as non-involved, aggressors, victims, and victim-aggressors. There is some consensus that victims typically exhibit lower self-esteem compared to aggressors (León-Moreno et al., 2022; Lucas-Molina et al., 2021; Ohtani et al., 2023). However, findings regarding victim-aggressors are inconsistent. Some studies find no significant differences between victims and victim-aggressors in terms of self-esteem (Fanti & Henrich, 2015; Múzquiz et al., 2023). Conversely, other authors suggest that victim-aggressors display poorer psychosocial adjustment and lower self-esteem than any other role, including pure victims, due to the accumulation of risk factors associated with violence and victimization (Coelho & Sousa, 2021; Fischer et al., 2022; Gaete et al., 2021).

Regarding loneliness, researchers have unanimously found that victims of violence show stronger feelings of loneliness (Cañas et al., 2020; León-Moreno et al., 2021). The findings indicate that many victimized adolescents, regardless of gender, report high levels of loneliness due to deficits in peer connectivity (Hong et al., 2015; Quintana-Orts et al., 2021). Furthermore, victim-aggressors often score higher in loneliness than other groups involved in school violence (Georgiou & Stavrinides, 2008; Kennedy, 2021).

In relation to the variables described above, emerging research suggests that problematic use of social networking sites (PUSNS) is associated with higher levels of loneliness and lower self-esteem (Aparicio-Martínez et al., 2020). This condition is also linked to reduced social support (Herrero et al., 2022). Moreover, the relationship between PUSNS and loneliness could be bidirectional (Nowland et al., 2018). Adolescents affected by loneliness generally try to compensate for their lack of interpersonal relationships by taking refuge in social networking sites. This behaviour enhances

the feeling of loneliness and, in turn, represents a risk factor of continued victimisation (Bayat et al., 2021).

While these studies have demonstrated the association between peer violence-victimization dynamics and variables such as loneliness, self-esteem, and PUSNS, further examination is needed to thoroughly investigate the relationships with the different roles of school violence analysed in the current study (Balluerka et al., 2023).

In short, the study objective was to analyse the relationships between multidimensional self-esteem variables – academic, social, family, physical and emotional aspects of self-esteem –, loneliness, and the problematic use of social networks, across the different roles involved in school violence – the non-involved, aggressors, victims, and victims-aggressors –, according to sex.

H1: Lower levels of self-esteem, higher levels of loneliness, and greater PUSNS are expected among victim-aggressors compared to other analysed adolescent groups.

H2: Lower levels of self-esteem and higher levels of loneliness and PUSNS are expected in female victim-aggressors compared to all other subgroups of violence roles analysed by sex.

Materials and method

Participants

The analysis in the current investigation is grounded in data derived from a representative cohort of high school students, procured via random cluster sampling across high schools situated in the province of Seville (Spain). The primary sampling units encompassed both urban and rural areas, while the secondary units comprised public secondary schools within this zone. Notably, classrooms were not treated as tertiary units, as all classrooms spanning the first to fourth grades of the selected schools were encompassed within the study. Preliminary analyses, examining mean differences in the study's target variables, were systematically conducted contingent upon the school's geographic location. However, these analyses did not reveal any statistically significant differences. The fieldwork was exhaustive, with each instrument battery administered on paper being reviewed both during and immediately after application. Consequently, there were very few missing data points. The initial sample consisted of 1,937 adolescents. From this sample, 7 participants were removed due to incomplete responses or exceeding 20% of missing data. Subsequently, regression imputation was used to obtain the values for 23 participants (1.19%), provided that they did not exceed 20% missing data on one or more variables and that the missing data were random (Schafer & Graham, 2002). Finally, the sample comprised 1,930 adolescents (50.2% girls) who participated in the present study. Participants' ages ranged from 12 to 18 years ($M = 14.71$, $SD = 1.82$). The adolescents attended 1st through 4th years of compulsory secondary education (ESO), corresponding to ages 12 to 16 years in Spain, across eight public secondary schools in the province of Seville. The sample size was determined using the software G*Power v. 3.1.9.7 (Faul et al., 2007, 2009) by means of a prior power analysis - $\alpha = .05$ and $1-\beta = .90$. Additionally, a small effect size ($f^2 = .01$) was assumed for the MANOVA test, based on the hypothesized interaction effect between the independent variables. This analysis indicated that the minimum sample size should be 1,158 participants. The subsequent calculation of the final sample of 1,930 participants using the G*Power programme determined very

high statistical power ($1-\beta = .99$), with a low effect size and a type I error value of $\alpha = .05$. Finally, the sensitivity analysis of the test indicated that the minimum effect size detected was $f^2 = .006$, which corresponds to a very small effect size.

Measures

School victimization. The School Victimization Scale (Mynard & Joseph, 2000; two-way translation) was used. This Likert-type scale is composed of 20 items, scored from 1 (never) to 4 (always), which measure the frequency of violent behaviours experienced by the adolescent. It consists of three dimensions: relational victimization (e.g., "A classmate has told my secrets to others"), overt physical victimization (e.g., "A classmate has hit me") and overt verbal victimization (e.g., "A classmate has insulted me"). In this work, the global victimization score was used, which had a reliability coefficient of $\alpha = .92$ in this research.

Violent behaviour at school. An adapted version of the Likert-type Violent Behaviour at School Scale (Little et al., 2003; two-way translation) was used, consisting of 25 items that assess adolescent participation in violent behaviours toward peers with a response range of 1 (never) to 4 (always). It has six dimensions: pure overt aggression (e.g., "I am a person who hits, kicks, and punches others"), reactive overt aggression (e.g., "When someone threatens me, I threaten them too"), proactive overt aggression (e.g., "I hit, kick, or punch to get what I want"), pure relational aggression (e.g., "I am a person who tells friends not to hang around or hang out with others"), reactive relational aggression (e.g., "If someone hurts me or hurts me, I don't let that person be part of my group of friends"), and proactive relational aggression (e.g., "To get what I want, I tell my friends not to hang around or hang out with others"). The total scale score was used for this study, with a reliability coefficient of $\alpha = .83$ in this research.

Problematic use of social networking sites. The scale used was the Problematic Use of Social Networking Sites Scale (Martínez-Ferrer et al., 2018). This Likert-type scale is composed of 13 items with a response range from 1 (never) to 4 (always) that assesses problematic use of social networks in adolescents (e.g., "I need to be connected to my social networks continuously"). The reliability of the scale was $\alpha = .84$ in this research.

Self-esteem. The Multidimensional Self-Esteem Scale AF5 - Self-Esteem Form 5 - by García & Musitu (1999) was used and measures the adolescent's perception of him/herself in the school, social, emotional, family and physical dimensions. It is composed of 30 items, 6 for each dimension, with a response scale from 1 to 99. Self-esteem is measured into five dimensions: academic self-esteem (e.g., "I do well in school", "My teachers consider me intelligent and hardworking"), social self-esteem (e.g., "I make friends easily", "I find it hard to talk to strangers"), emotional self-esteem (e.g., "I am afraid of some things", "When adults tell me something, I get very nervous"), family self-esteem (e.g., "I am criticized a lot at home", "My family would help me in any kind of problem") and physical self-esteem (e.g., "I take care of myself physically", "I like the way I look physically"). The reliability of the scale for each of the dimensions in this research was: academic self-esteem $\alpha = .90$, social self-esteem $\alpha = .76$, emotional self-esteem $\alpha = .74$, family self-esteem $\alpha = .73$, and physical self-esteem $\alpha = .77$.

Loneliness. The Loneliness Scale (Russell, 1996, Version 3) was used. This Likert-type scale consists of 20 items assessing the feeling of loneliness experienced by the adolescent (e.g., "How

often do you feel lonely?“), with responses ranging from 1 (never) to 4 (always). In this research the reliability coefficient was $\alpha = .87$.

Procedure

After selecting the secondary schools, we contacted them to request their collaboration and explained to them the objectives and scope of the study. Once the schools agreed to take part in the research, an explanatory letter was sent to the students' families asking for their signed consent for their children to participate in the study. A battery of paper-based instruments was administered on the scheduled dates, and the students completed them in approximately 40 minutes. To apply the instruments, we followed the instructions of researchers previously trained in this type of fieldwork. The instruments were administered in the classroom of each educational group involved in the study during normal classroom hours. The students were informed of the voluntary and anonymous nature of their participation, as well as of their right to withdraw from the study at any time. The study met the ethical criteria necessary to conduct research with human beings, set out in the Declaration of Helsinki and in the Organic Law on the Protection of Personal Data (LOPD) 3/2018, of 5 December. The study was conducted under the ethical approval code 22/3, as part of the research project titled P18-RT-1487 'Cyberviolence and Peer Relationships: Power, Reputation, and Popularity Among Adolescents'.

Data Analysis

A multivariate factorial design (multivariate analysis of variance [MANOVA], 4×2) was carried out with the SPSS statistical package (version 24). In this design, the roles of school violence were taken into account as fixed factors, with 4 dimensions: not involved, victims, offenders, victim-offenders, and sex, with the conditions boy and girl, to analyse possible interaction effects. The groups of non-involved, victims, aggressors and victim-aggressors, corresponding to the 4 conditions of the IV were formed by crossing the scales of School Victimization and Violent Behaviour at School, using the 75th percentile to divide the scores of each case in both scales. The resulting four groups were identified as follows: a) non-involved, with scores below the third quartile in victimization ($M = 1.25$, $SD = 0.16$) and violent behaviour at school ($M = 1.28$, $SD = 0.14$); b) victims, with scores above and equal to the third quartile in victimization ($M = 1.89$, $SD = 0.35$) and below in violent behaviour at school ($M = 1.29$, $SD = 0.14$); c) aggressors, with lower third quartile scores in victimization ($M = 1.28$, $SD = 0.17$) and higher and equal scores in violent behaviour at school ($M = 1.73$, $SD = 0.20$); and d) victim-aggressors, with higher and equal third quartile scores in victimization ($M = 1.88$, $SD = 0.28$) and violent behaviour at school ($M = 1.76$, $SD = 0.22$).

As dependent variables, PUSNS, loneliness and the five dimensions of AF5 Self-esteem -academic, social, family, physical and emotional- were considered. Finally, univariate tests (ANOVAs) were performed to study the differences of statistically significant variables, in addition to Bonferroni post hoc tests with a criteria of $\alpha = .05$ for multiple comparisons.

Results

First, we examined whether the four studied roles are related to the sex variable. As shown in Table 1, significant differences were found in relation to this variable ($\chi^2(3) = 60.17, p < .001$), which implies that both variables are related to each other. All adjusted standardized residuals (ASR) for a significance level of $p = .05$ were outside the interval $[-1.96, +1.96]$, indicating significance. These results revealed that there were more girls not involved in violence than expected (ASR = 5.3) compared to boys (ASR = -5.3). Additionally, there was a higher number of girls in the role of pure victims (ASR = 2.1) compared to boys (ASR = -2.1). Conversely, there were more boys in the role of pure aggressors (ASR = 5.5) compared to girls (ASR = -5.5), as well as more boys in the role of victim-aggressors (ASR = 4.7) compared to girls (ASR = -4.7).

Table 1

Socio-demographic variables

Variables	Sample	N.I.	School Violence Roles			χ^2
			Victims	Aggressors	V-A	
Sex						$\chi^2(3) = 60.17^{***}$
Boys	961 (49.8%)	517 (53.8%)	132 (13.7%)	189 (19.7%)	123 (12.8%)	
Girls	969 (50.2%)	635 (65.5%)	167 (17.2%)	104 (10.7%)	63 (6.5%)	

Note: χ^2 = Chi-Cuadrado. *** $p < .001$; N.I. = Not Involved; V-A = Victims-Aggressors

Correlations

Table 2 shows the means, standard deviations and Pearson correlations between the dependent variables studied. From this, the existence of significant relationships between them is confirmed.

Table 2

Correlations between the variables studied

Variables	1	2	3	4	5	6	7	
1. PUSNS								
2. Academic Self-esteem	-.180***							
3. Social Self-esteem	.023	.168***						
4. Emotional Self-esteem	-.134***	-.152***	.114***					
5. Family Self-esteem	-.193***	.421***	.280***	-.034				
6. Physical Self-esteem	-.041	.362***	.372***	.063***	.305***			
7. Loneliness	.128***	-.188***	-.506***	-.182***	-.350***	-.320***		
Total	M	1.81	61.26	74.31	53.23	82.35	62.40	1.85
	SD	(0.46)	(21.37)	(15.32)	(19.28)	(16.77)	(19.55)	(0.43)

*** Correlation is significant at the level of .001 (bilateral)

Multivariate analysis

In the MANOVA, statistically significant differences were found in the main effects of school violence roles (Pillai's $V = .217, F(21, 5754) = 21.314, p < .001, \eta_p^2 = .07$), and sex (Pillai's $V = .158, F(7, 1916) = 51.399, p < .001, \eta_p^2 = .16$). In addition, a statistically significant interaction effect was obtained between school violence roles and sex [Pillai's $V = .020, F(21, 5754) = 1.851, p = .01, \eta_p^2 = .007$].

Roles of school violence

As shown in Table 3, the ANOVA showed significant differences in all dependent variables. Likewise, Bonferroni tests ($\alpha = .05$) indicated that in PUSNS the non-involved group obtained the lowest scores compared to all other groups studied. Regarding the variable loneliness, victims and victim-offenders achieved the highest scores compared to non-involved and offenders. In relation to academic self-esteem, victim-offenders obtained lower scores than non-involved and pure victims, although no differences were found with the group of aggressors. Regarding social and emotional self-esteem, those adolescents grouped as victims and victim-offenders obtained lower scores compared to aggressor and non-involved adolescents. With respect to family self-esteem, it is the group of adolescents not involved who scored higher in comparison with all the other groups analysed. Finally, in the case of physical self-esteem, it was the aggressors who obtained the highest levels in this variable.

Table 3

Means, Standard Deviations, and Differences in Dependent Variables in School Violence Roles

	N.I. (Group 1)	Victims (Group 2)	Aggressors (Group 3)	V-A (Group 4)	F (3,1922)	η_p^2	Post hoc
PUSNS	1.71(0.38)	1.86(0.53)	2.01(0.48)	2.07(0.53)	75.87 ***	.11	1<2,3,4 2<3,4
Academic Self-esteem	63.33(21.04)	60.47(21.70)	58.39(21.41)	54.23(20.80)	10.53 ***	.02	1>3,4 2>4
Social Self-esteem	75.41(14.30)	71.02(17.97)	76.11(13.28)	70.00(18.09)	13.78 ***	.02	1>2,4 3>2,4
Emotional Self-esteem	55.24(18.96)	46.96(20.53)	54.60(17.54)	48.68(19.01)	22.69 ***	.03	1>2,4 3>2,4
Family Self-esteem	84.92(14.74)	79.07(19.90)	79.22(18.36)	76.66(17.41)	21.01 ***	.03	1>2,3,4
Physical Self-esteem	62.43(19.01)	59.39(21.08)	66.67(18.65)	62.40(19.55)	6.62 ***	.01	3>1,2,4
Loneliness	1.76(0.38)	2.08(0.52)	1.81(0.41)	2.09(0.39)	69.30 ***	.10	1<2,4 3<2,4

*** $p < .05$; N.I. = Not Involved; V-A = Victims-Aggressors; PUSNS = Problematic use of Social Networking Sites

Demographic variable: sex

Regarding the sex variable, the ANOVA showed statistically significant differences in PUSNS [$F(1, 1922) = 46.23, p < .001, \eta_p^2 = .02$]; academic self-esteem, [$F(1, 1922) = 4.37, p = .037, \eta_p^2 = .002$]; emotional self-esteem, [$F(1, 1922) = 98.61, p < .001, \eta_p^2 = .05$]; physical self-esteem, [$F(1, 1922) = 138.41, p < .001, \eta_p^2 = .07$]; and loneliness, [$F(1, 1922) = 4.10, p = .043, \eta_p^2 = .002$]. Girls scored higher on PUSNS, academic self-esteem, and loneliness, while boys scored higher on emotional self-esteem and physical self-esteem.

Table 4

Means, Standard Deviations, and Differences in problematic Use of Social Networking Sites in School Violence Roles by Sex

Sex	N.I.	Victims	Aggressors	V-A	F (3, 1986)	η_p^2	Post-hoc
Boy	Group 1 1.67 (0.37)	Group 2 1.74 (0.47)	Group 3 1.93 (0.45)	Group 4 2.01 (0.53)	4.88 **	.002	1<3,4,6,7,8 2<3,4,6,7,8
	PUSNS						3<7,8
Girl	Group 5 1.73 (0.38)	Group 6 1.95 (0.55)	Group 7 2.17 (0.51)	Group 8 2.18 (.50)			5<3,4,6,7,8 6<7,8
	PUSNS						

** $p < .05$; N.I. = Not Involved; V-A = Victims-Aggressors; PUSNS = Problematic Use of Social Networking Sites

Interactions analysis

A statistically significant interaction effect was obtained between the independent variables, school violence roles and sex, in PUSNS [$F(3, 1922) = 4.88, p = .002, \eta_p^2 = .008$] a posteriori analyses showed that victim-offender girls had higher levels of PUSNS than all the other groups analysed, except for the groups of victim-offenders boys, victims girls and offenders girls, with which no differences were found. It is also remarkable that the groups with the lowest scores in PUSNS are the two groups of non-involved individuals, both boys and girls, and the group of male victims. There are also no significant differences between these 3 groups (see Table 4).

Discussion

The objective of this work was to analyse the relationships between the different dimensions of self-esteem – academic, social, family, physical and emotional –, loneliness and the PUSNS, depending on different forms of involvement in school violence – the non-involved, aggressors, victims, and victims-aggressors roles – taking into account participant sex.

Significant relationships were observed between the different school violence roles, loneliness, multidimensional self-esteem, and PUSNS. Interestingly, depending on the dependent variables analysed, victims-aggressors presented a more negative profile than the rest of the roles observed, and the non-involved showed the best adjustment. These results are compatible with those of other studies (Fischer et al., 2022; Gaete et al., 2021; Zhong et al., 2022) and allow us to confirm the first hypothesis. One finding observed when testing H1 is that aggressors presented the highest values in physical self-esteem and values similar to the non-involved in social, emotional self-esteem and loneliness. These results indicate that pure aggressors demonstrate high scores in these dimensions, which presumably contribute to a more favorable self-evaluation. This finding could be interpreted in the light of “the disputed self-esteem hypothesis” (Baumeister et al., 2000). Though it was not fully tested, the hypothesis would help us to understand the reason for high self-esteem scores in aggressors. It sets out that adolescent aggressors with high self-esteem behave violently when they perceive that their self-esteem is threatened or questioned by significant people in their environment, including peers. In fact, aggressors who perceive negative evaluations from their peers experience an impact on their egotism (Baumeister et al., 1996). This can trigger violent behaviours aimed at enhancing and preserving a favorable self-image (Choi & Park, 2021). These significant results warrant further exploration through longitudinal studies that investigate the underlying motivations for adolescents’ use of violence and its relationship with self-esteem. Another notable

result observed when testing H1 is that victim-aggressors and pure victims experienced higher feelings of loneliness. These findings are consistent with those obtained in other studies (Cañas et al., 2020; Hong et al., 2015; León-Moreno et al., 2021; Quintana-Orts et al., 2021).

Regarding the relationship between PUSNS and different roles in violence, it was observed that non-involved individuals exhibited lower problematic use compared to all other roles. Pure victims also showed lower levels of PUSNS compared to pure aggressors and victim-aggressors. This PUSNS has significant social implications, as increased use correlates with fewer opportunities for adolescents to engage in constructive and enhancing social interactions (Blinka et al., 2023). For victim-aggressors, issues stemming from PUSNS are exacerbated due to their difficulties in constructive socialization, which, coupled with socio-emotional, behavioural, relational, and self-control issues (Busch et al., 2015; Kennedy, 2021; Schwartz, 2001), contribute to poor self-regulation (Gioia et al., 2021; Wang & Jiang, 2022).

This poor regulation, both cognitive—excessive concern about being connected—and behavioural—abusive use of social networks—and the negative consequences in adolescents' lives (difficulties in school, family, and peer relationships, etc.), constitute two of the four central components of the cognitive-behavioural model of Internet addiction. The other components include preference for online social interaction and mood regulation through the Internet (Caplan, 2002, 2003, 2010; Davis, 2001; Yildiz Durak, 2020). From this perspective, mood regulation through the Internet is considered a dysfunctional regulator used to alleviate feelings of sadness and loneliness (Davis, 2001, Davis et al., 2002, Gámez-Guadix & Villa-George, 2015, Muñoz-Rivas et al., 2010). Additionally, low self-esteem has been observed as the most important predictor of problematic Internet use (Meerkerk et al., 2010). This theoretical perspective enriches the significance of these results, which are considered highly relevant for socio-educational intervention (Gámez-Guadix & Villa-George, 2015).

Regarding H2, it was only partially confirmed. Lower levels of self-esteem and higher levels of loneliness were expected in female victim-aggressors, but these variables were not significant by sex. However, an interesting and novel aspect when testing this research hypothesis was the discovery of the interaction between the roles involved in school violence and PUSNS based on participants' sex. Specifically, the subgroup of female victim-aggressors showed higher levels of PUSNS than all the other subgroups analysed, except for the male victim-aggressors, the pure female victims, and the pure female aggressors with whom no differences were encountered. This finding is innovative in nature, as its interpretation and tentative explanation can be explored by referencing and relating to findings observed by other authors who have documented relationships between PUSNS and gender. Contradictory results have been observed regarding sex. Some studies show that teenage girls tend to be the worst affected by the Internet (Casaló & Escario, 2019, Machimbarrena et al., 2019, Reiner et al., 2017), while other works indicate that boys undergo the greatest negative impact (Chi et al., 2020, Tomaszek & Muchacka-Cymerman, 2019) or that there are no differences between the sexes (Peterka-Bonetta et al., 2019, Vally et al., 2020). The key seems to lie in the type of software or application on which the study focuses. For example, boys appear to have greater difficulties in the case of online games and massively multiplayer online games (MMOG). However, when focusing on virtual social networks, which constitute the basis of this study, it is girls who experience more problems (Dufour et al., 2017, Winds et al., 2024). Social networking

sites essentially fulfil a social function as they foster communication and relationships among peer relationships. In turn, these social networking sites are extremely addictive because they are powerfully immersive and vehicle acceptance and social gratification, to which girls seem to be more sensitive in adolescence (Dufour et al., 2017). In this regard, the findings obtained appear to confirm this outcome, indicating that girls exhibit higher PUSNS, with the addition that the problematic roles involved in violence—pure victims, pure aggressors, and victim-aggressors—showed an even higher level. The only violence role that achieved a similar score to girls in PUSNS was that of male victim-aggressors.

Ultimately, it has been established that victim-aggressors, both boys and girls, as well as girls who are pure aggressors and pure victims, show higher levels of PUSNS. These roles, which inherently represent a significant psychosocial issue as victims and/or perpetrators of school violence, coupled with high levels of loneliness and low self-esteem, may further engage in maladaptive behaviours and cognitions in their interactions on online social network. Therefore, it could be argued that the set of findings obtained in the present study represents an enrichment and also an invitation to incorporate these ideas into designs or psychoeducational intervention programs for adolescents facing issues of social adaptation and Internet use and abuse.

The present study offers pertinent insights into understanding the emotional well-being of adolescents engaged in different roles within school violence. We must nonetheless remember that a *cross-sectional* design was applied, and by definition, this method does not allow establishing causal relationships or identifying behavioural patterns. Given the nature of the variables, we cannot rule out any possible bidirectional influences either. The complexity of school violence is visible precisely in this multifactorial relationship (Farrington et al., 2002). The study underscores the importance of conducting research using structural equation modeling (SEM) to test the process and directionality of the variables analysed within a hypothetical theoretical model. Along with SEM, it is essential to perform multi-group analyses to identify potential differences between the roles involved in violence. To establish causal relationships between the dimensions analysed in this work, it would be necessary to conduct a longitudinal study over different periods of time. The study instrument used to measure the different variables was self-reports. Despite being an important source of data in these types of studies, self-reports can present certain limitations due to biases, e.g., social desirability. Additionally, future studies should include non-binary gender categories to provide a more inclusive and accurate understanding of sexual identity, as non-heteronormative identities may be more vulnerable to various forms of violence.

Conclusions

In the present study, we sought to better understand the roles involved in school violence and to do so, we explored the variables of loneliness, self-esteem, and problematic use of social networks, as well as psychosocial adjustment. Significant relationships were observed between the variables. Main effects were found between the different roles of school violence, loneliness, self-esteem and the PUSNS. One notable result was that victim-aggressors presented a more negative profile than all the other groups analysed, particularly those not involved in violence. This result has been interpreted using the cognitive-behavioural model for problematic Internet use, which has been

effectively validated in the analysis of this issue (Gámez-Guadix & Villa-George, 2015; Guzman-Holst et al., 2022). Additionally, the finding regarding the interaction between the different roles of violence and sex in relation to PUSNS would be highlighted. Finally, the findings of this study have important practical implications for intervening in these issues during adolescence, providing relevant information to enhance prevention programs and educational interventions related to school violence and problematic Internet use.

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