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Cybervictimization, suicidal ideation, and positive pedagogical communication: a survey with children in Spain

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Abstract

Online spaces can pose significant risks for children, including easy access to suicide- and self-harm–related content. At the same time, these digital environments are now integral to contemporary socio-technical infrastructure, particularly for young people, who may be more vulnerable to online violence. This study examines the association between cybervictimization and suicidal ideation among children in Spain and tests whether this association is indirectly shaped by perceived positive pedagogical communication and age. We conducted a survey with 745 children in Spain, predominantly from Andalusia. Cybervictimization was significantly associated with a greater risk of suicidal ideation, with stronger associations among girls. Positive pedagogical communication was negatively associated with suicidal ideation; however, this association was found only among girls. These findings contribute to understanding gender differences in children's responses to online victimization and underscore the importance of educational support in mitigating its potential harms. Against this background, the present study contributes to the literature not by reiterating the well-established association between cybervictimization and suicidal ideation, but by specifying how this association is shaped during childhood. By examining positive pedagogical communication as a school-based relational resource and testing its conditional role across age and gender, the study helps clarify when and for whom cybervictimization translates into suicidal ideation.

Keywords Suicidal ideation, Children, Spain, Cybervictimization

Introduction

Childhood, suicidal ideation and cybervictimization

Online spaces have become part of contemporary social infrastructure, especially for young people [1]. At the same time, these environments can expose children to serious risks, including easy access to suicide- and self-harm–related content [2], as well as platform design features that rely on content personalization and emotional contagion [3]. Such accessibility may contribute to the normalization [4] and even glamorization [5] of harmful content. The emergence of "negative filter bubbles" [6] may progressively expose users to increasingly extreme material in pursuit of engagement, contradicting

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established media guidelines aimed at preventing contagion [7]. This algorithmic dynamic is particularly concerning given these platforms' influential role in young people's socialization [8, 9] and their central function in identity formation [10]. Children who spend more time on these platforms may also reduce engagement in physical activities [11] and face greater exposure to online violence [12].

Violence occurring through online channels and platforms—hereafter referred to as "cybervictimization"—can take multiple forms, ranging from direct aggression (e.g., harassment or insults) to indirect aggression (e.g., intentional exclusion from a group) [13]. Quintana-Orts et al. [14] define cybervictimization as "an interpersonal stressful event for adolescents" (p. 946). When such events occur repeatedly, with the direct or indirect participation of the victim [15], they are typically classified as cyberbullying. Beyond persistence over time, cybervictimization and cyberbullying may differ in their consequences. In the former case, it is associated with a higher prevalence of mental disorders [1], whereas the latter, according to the same authors, is more closely linked to educational and personal problems, such as school avoidance and alcohol consumption.

Cybervictimization and cyberbullying have attracted substantial scholarly attention due to their harmful mental health consequences, particularly in relation to suicidal ideation and suicidal behaviours among adolescents and young adults [13, 15–21]. The literature indicates that both forms of victimization can compromise mental health and increase the risk of depression and suicidal thoughts [22–24]. Azizi and Kishi [19] further emphasize that victims of cybervictimization, regardless of modality, show an increased risk of suicidal thoughts, with evidence of gender differences suggesting greater susceptibility among females.

Other factors are also associated with elevated suicidal ideation. For example, exposure to mass media and social media content may contribute to suicidal behaviour through the Werther effect (i.e., a copycat phenomenon) [7]. This phenomenon refers to a potential increase in suicides following media coverage of a celebrity suicide, particularly when reporting fails to follow established guidelines [25], which recommend avoiding sensationalist language and dramatic narratives. Importantly, however, mass media and social media may function as both risk and protective influences with respect to suicidal ideation. In adult populations, prior research has identified the "Papageno effect"—highlighting the protective role of media—in relation to specific content types, such as those promoting spiritual life [26]. Beyond media-related factors, traditional bullying [27], stress [14], depression [28], and hopelessness [29], among others, have been identified as significant mediators in the relationship between cybervictimization and suicidal ideation.

This study examines how cybervictimization is associated with suicidal ideation among Spanish children and whether this association varies as a function of a potential mediating factor, namely positive pedagogical communication. Before presenting our hypotheses, we outline the conceptual framework from the perspective of the key actors involved and describe the Spanish context relevant to this research.

Theoretical framework

Cybervictimization, suicidal ideation, and positive pedagogical communication during late childhood

Online victimization has become an important concern in research on child and adolescent mental health. As noted above, cybervictimization refers to aggression, abuse, or violence experienced through online means and may include both direct aggression, such as insults or harassment, and indirect aggression, such as exclusion from online groups [13]. When these events are repeated over time, they are generally classified as cyberbullying [15]. Although related, cybervictimization and cyberbullying are not fully interchangeable. Prior work suggests that cybervictimization is associated with a higher prevalence of mental disorders [1], whereas cyberbullying has been more closely linked to educational and personal problems such as school avoidance and alcohol consumption. What both phenomena share, however, is their potential to compromise mental health and to intensify psychological distress in children and adolescents. In particular, previous studies have documented a direct positive association between cybervictimization and suicidal ideation [13–15, 18, 19, 29, 30], as well as broader links with depression, hopelessness, and other forms of psychological deterioration [17, 22–24, 28, 29]. The literature reviewed so far establishes the basic relevance of cybervictimization as a risk condition for suicidal thoughts and behaviours.

Within this literature, a key issue is that the consequences of cybervictimization do not arise from the online event alone. Their severity depends on how victimization is embedded in a broader ecology of support, vulnerability, and emotional processing. Prior studies suggest that victims often present characteristics such as low self-esteem, insecurity, anxiety, introversion, and limited assertive skills [31–36]. These traits may make it harder for children to set boundaries or to seek effective support, while concealment, isolation, and social withdrawal may deepen vulnerability over time [2, 4]. Other contextual layers are also relevant. Peer groups may reinforce, normalize, or buffer aggression, since aggressors and victims are often accompanied by helpers, encouragers, defenders, and bystanders [34, 35, 37]. In online

settings, anonymity may further complicate the child's ability to identify the source of aggression and respond to it [20]. Likewise, the child's daily context matters. The literature already highlights that when the support network surrounding a child deteriorates, suicidal attempts or suicide may become more likely [38–45]. Family dysfunction, poor communication, violence, sexual abuse, and broader socioeconomic adversity may all weaken the protective environment in which victimization is interpreted and managed [38–45]. In this sense, cybervictimization is not presented here as an isolated event, but as one stressor whose impact is shaped by the quality of the child's relational environment.

Several authors identify education as a critical protective domain for minors [39]. Teachers and instructors are expected not only to identify, address, and prevent violence-related behaviours, but also to be sufficiently committed for interventions to succeed [36, 46]. Within that framework, teachers' emotional abilities [47], expressed through positive pedagogical communication, may help students regulate negative thoughts. The focus of this study is therefore narrower and more specific than a general discussion of school climate: it concerns the child's perception of teacher communication as a possible school-based resource in the context of cybervictimization. This focus is theoretically plausible because the school is one of the central institutional settings in which children interpret adversity, receive guidance, and encounter emotionally consequential adult responses. In this sense, positive pedagogical communication is treated not as a universal solution, but as one modifiable dimension of the child's relational environment that may help explain variation in suicidal ideation under conditions of cybervictimization.

The literature revised so far also provides reasons to expect that this potential resource does not operate uniformly across development. Age is not included merely as a control variable; rather, the theoretical framework suggests that it may condition the way pedagogical communication is perceived and how relevant it becomes in the association between cybervictimization and suicidal ideation. Prior work cited here indicates that bullying may emerge early and persist over time [48], which makes the age range of this study—10 to 15 years—especially important. This period spans late childhood and the transition into early adolescence, stages in which children's cognitive, emotional, and relational orientations are changing. The article's theoretical logic is that the role of teacher communication may therefore vary across this developmental range, not simply because older and younger children differ in exposure, but because they may differ in how they interpret teacher guidance, how willing they are to perceive it as supportive, and how strongly such communication functions as a buffer within the victimization process. Accordingly, age is framed in this study as a plausible moderator of the relationship between cybervictimization and perceived positive pedagogical communication, rather than as a simple main effect [29, 47, 48].

Gender is also theoretically relevant to this framework. Prior work suggests that the forms and consequences of online aggression may not be identical for boys and girls. Some studies note links between cybervictimization and cyberaggression, particularly among boys, who may move from victimization to perpetration [20]. By contrast, girls are more often described as being exposed to passive or relational forms of violence [49]. Other studies further suggest that females may be more vulnerable to the effects of cyberbullying [16, 19], partly because online aggression can be public, persistent, and emotionally invasive [16]. Taken together, these studies do not warrant deterministic expectations, but they do justify examining whether the association between cybervictimization, perceived pedagogical communication, and suicidal ideation may unfold differently for boys and girls. This is especially relevant to the present study because the variable of interest is not simply exposure to victimization, but the child's perception of a school-based communicative resource in the midst of that exposure. If victimization differs by form, visibility, and emotional impact across gender, then the role attributed to teacher communication may also differ. Gender is therefore treated here as a theoretically meaningful dimension for interpreting differential patterns, rather than as a purely descriptive sample characteristic.

The Spanish case gives this framework additional relevance. In Spain, suicide has become the leading external cause of death [39], and that during and after the COVID-19 pandemic the number of suicides among children aged 15 or younger increased markedly, rising from 14 in 2020 to 22 in 2021 [50–52]. Although the number reportedly declined in 2022 [51], these figures underscore the urgency of examining risk and protective factors related to suicidal ideation in Spanish children. Spain's Ministry of Education and Professional Training reported that 17% of students had experienced bullying, and prior work has called attention to the still insufficient development of research and awareness regarding school violence [53, 54]. This national context strengthens the rationale for examining whether a school-based communicative resource, as perceived by children themselves, is associated with suicidal ideation in the context of cybervictimization. The point is not to imply that pedagogical communication alone can explain suicidal ideation, but rather to determine whether it contributes to specifying how this relationship may be shaped during childhood in a setting where both suicide prevention and school violence are pressing concerns.

Previous research already supports the existence of a positive association between cybervictimization and suicidal ideation. What remains less clear, and what this study addresses, is whether that association is conditioned by a child-perceived communicative resource located within the school environment, and whether such conditioning varies across age and gender. The framework thus leads to a model in which cybervictimization is expected to be associated with suicidal ideation, while positive pedagogical communication is examined as a plausible protective correlate and age as a moderator of the relationship between cybervictimization and perceived communication. Gender, in turn, remains theoretically relevant because the cited literature suggests differentiated patterns in both forms of violence and vulnerability to its consequences. Taken together, this literature leads us to formulate hypotheses regarding how school-based communication may shape the cybervictimization–suicidal ideation link during late childhood.

Model of hypotheses

Several scholars argue that further investigation is needed into the mediating and moderating variables involving family dynamics, social environments, and individual characteristics associated with suicidal ideation [55–59]. Building on this need, we propose a general hypothesis (GH) that there is an association between cybervictimization and suicidal ideation in Spanish children. However, rather than assuming that this association is uniform, the present study examines whether it is shaped by positive pedagogical communication and age.

Prior studies in diverse contexts have suggested that cybervictimization can signal increased suicidal ideation among young people, including evidence from Canadian [27], Chinese [13, 29], Indian [28], Italian [15], Malaysian [30], and Spanish populations [14]. On this basis, we propose:

> H1: There is a positive correlation between cybervictimization and suicidal ideation, such that an increase in cybervictimization is associated with an increase in suicidal ideation.

The literature cited above also indicates that social and educational contexts shape children's experiences of victimization [20], and that teachers' emotional abilities, expressed through positive pedagogical communication, may help students regulate negative thoughts [39, 46, 47]. Accordingly, we propose:

> H2: There is a relationship between cybervictimization and perceived positive pedagogical communication.
> H3: Higher levels of positive pedagogical communication are associated with decreased suicidal ideation.

Finally, because the literature reviewed in this manuscript suggests that bullying may emerge early and persist over time [48], and that age may play a moderating role in these processes [29, 47], we propose:

> H4: Age acts as a negative moderator in the relationship between cybervictimization and perceived positive pedagogical communication.

Methods

Research technique and operationalization

This study used a non-experimental, cross-sectional design. Data were collected using a quantitative paper-based questionnaire comprising: (a) anonymized sociodemographic information; (b) the Paykel Suicide Scale (PSS) [60], consisting of five items and validated for minors by Fonseca and Pérez de Albéniz [61]; (c) a pedagogical communication scale with six items, replicated from Garcés-Prettel et al. [62]; and (d) an eight-item cybervictimization scale with validated psychometric

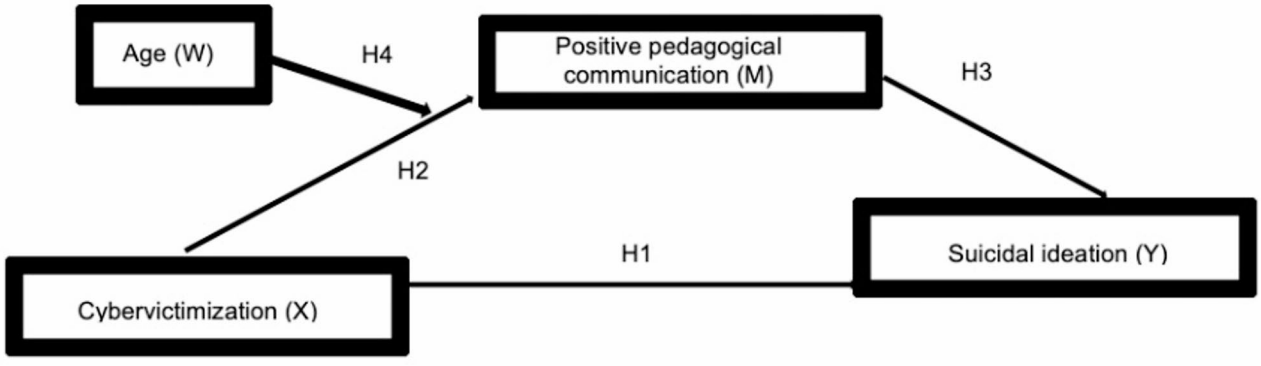

Fig. 1 Hypotheses model of indirect effects. Source: own elaboration

properties [63], designed as a self-report measure of adolescents' experiences of being targeted or harmed—directly or indirectly—during the previous 12 months.

Prior to completing the paper-based questionnaire, written informed consent was obtained from the children's legal guardians. The consent procedure included an assent item embedded in the questionnaire, and the assent text was read aloud to participants by a professional surveyor to support comprehension before data collection. The informed consent document explained the use of personal data; however, no personal identifying information was collected in the questionnaire. Results were reported only in aggregate form (final reports and related publications), preserving anonymity. Participation involved no anticipated risks. If any question was perceived as uncomfortable or compromising, participants were instructed (in the consent document and reiterated by the interviewer on site) that they could omit responses. The study protocol was reviewed and approved by the Internal Review Board (IRB) of the University of Málaga (Report No. 79, Registration No. 129-2023-H), a cross-disciplinary ethics committee chaired by the University's Vice President for Research.

Survey application

Data collection was conducted by Sigma Dos, one of Spain's most prestigious national polling firms. The sampling method was a multistage cluster sampling design, with stratification of the first-stage units for children aged 10 to 15 years. The sampling units were as follows:

- First-stage unit: the school, as a way to access the studied population.
- Second-stage unit: the classroom/group of students.
- Third-stage unit (sampling element): the student. No subsampling was conducted, and all individuals in each selected classroom were included.

Fieldwork began with initial contact with educational centers and Parent-Teacher Associations (AMPAs). In coordination with school administrators and AMPAs—and to ensure full compliance with ethical procedures—data were collected anonymously and confidentially from minors whose parents or legal guardians provided written informed consent and whose own assent indicated willingness to participate. The paper questionnaire opened with a standardized assent confirmation item: after hearing the assent statement read by the interviewer, students indicated whether they voluntarily agreed to participate. Only students who responded affirmatively proceeded to complete the questionnaire, which was administered in the classroom with a maximum completion time of 30 min.

To reach the initial target of 1,041 cases, a preliminary plan identified 104 classrooms across 26 schools, assuming two classrooms per grade. Because primary and secondary schools differ structurally, separate sampling frames were considered for each educational level. The design estimated four classrooms per school, with a constant allocation of two classrooms per grade. The planned sample therefore comprised 13 primary schools contributing 52 groups from 5th grade (26 classrooms) and 6th grade (26 classrooms), and 13 secondary schools contributing 52 groups from 1st year (26 classrooms) and 2nd year (26 classrooms) of ESO. Primary and secondary samples could overlap when a school included both levels, which is common in Spain.

Sample

Following the step-by-step process described above, we contacted a total of 309 schools across ten autonomous communities (Andalusia, Balearic Islands, Canary Islands, Castile and León, Castile-La Mancha, Catalonia, Valencian Community, Extremadura, Galicia, and Madrid). Of these, 17 schools expressed interest in participating, and enough questionnaires were collected to administer them in the classroom. The final number of valid questionnaires was 804, distributed across 67 classrooms. The participation rate per classroom varied by grade, age, and gender.

Among the 804 collected surveys, respondents were aged 10 to 15 years, with the following distribution: 10 years (9%, $n = 72$), 11 years (24.1%, $n = 194$), 12 years (25.4%, $n = 204$), 13 years (26.4%, $n = 212$), 14 years (12.9%, $n = 104$), and 15 years (1.6%, $n = 13$), with a small proportion reporting no age (0.6%, $n = 5$). When grouped developmentally, 58.5% ($n = 470$) fell within early adolescence (10–12 years), and 41.5% ($n = 334$) within middle adolescence (13–15 years). In terms of gender self-identification, 50.6% ($n = 407$) reported female, 47.4% ($n = 381$) male, 1.2% ($n = 10$) selected "other," and 0.7% ($n = 6$) did not answer. After a data quality audit, 59 cases (7.3%) were excluded due to missing values in the main scales. The final analytical sample comprised 745 students. To assess potential attrition bias, we compared included and excluded participants. No significant differences were found in gender ($\chi 2 = 0.144$, p=.704, V=0.01), age ($t = -0.094$, p=.925, $d = -0.01$) and positive pedagogical communication ($t = 1{,}19$; p=.238, d=0.22). While excluded cases showed higher levels of cybervictimization (t=-4,18; p=,0.000, d=-1.17) and suicidal ideation (t=-2,54; p=.01, d=-0.378), the low attrition rate and the high statistical power of the final sample ($N = 745$) ensure the robustness of the estimates.

After data cleaning to address missing responses, the final analytic sample comprised 745 children aged 10 to 15 years ($M = 12.15$; $SD = 1.23$). Of these participants,

48.2% were boys ($n = 359$) and 51.8% were girls ($n = 386$). Geographically, the sample was concentrated in Andalusia (57%), with the remaining participants distributed across other autonomous communities: Community of Madrid (16.6%), Castilla-La Mancha (8.9%), Balearic Islands (8.5%), Valencian Community (4.4%), Canary Islands (2.6%), and Catalonia (2.0%).

Data analysis

SPSS 29 statistical software and the Process macro were employed for data analysis. First, frequencies and their corresponding risk levels were examined using the 33rd and 66th percentiles of the sample distribution. Variables were transformed using percentile-based standardization, formerly referred to as weighted average percentile standardization. This approach was used to categorize participants into three levels (low, medium, and high) to facilitate comparative analysis, given the absence of standardized clinical cut-offs for this specific age group [62]. For suicidal ideation (PSS), the levels were defined as: low risk or never (score: 0), medium risk or occasional (1–2), and high risk or frequent (3–5). For cybervictimization (CYBVICS), the categories were: low (score of 8), medium (9–16), and high (17–32) [63]. To do this, the percentages of responses for the total scores of each scale were computed.

Second, we tested the internal coherence of the scales used. We measured cybervictimization using the Direct Cybervictimization (DCV) subscale of the CYBVICS questionnaire. Within this framework, 'direct' refers to any action where an aggressor uses technological means to personally impact the victim, through either verbal language (e.g., insults) or social status manipulation (e.g., relational exclusion). The scale therefore consists of eight items rated on a 4-point Likert-type scale ranging from 1 (never) to 4 (very frequently). A fifth value was used exclusively as a missing-data code ("no response") and was not included in scale scoring or analyses. Items were summed to compute a total cybervictimization score ranging from 8 to 32, with higher scores indicating greater exposure to direct cybervictimization. In our sample, the observed range was 8.00 to 32.00, with a mean of 11.00 (SD = 4.09). Internal consistency for the DCV dimension was high (Cronbach's $\alpha = 0.894$). Example items include: "They have insulted or ridiculed me on social networks or groups like WhatsApp to really hurt me" and "They criticized or mocked comments, photos, or videos I posted on social networks".

The Paykel Suicide Scale [60] was used to assess the severity of suicidal manifestations (e.g., thoughts of death, ideation, and suicide attempts). The assessment referred to the previous year. This scale, composed of five dichotomous items (yes/no with respective scores of 1/0), was calculated by summing the items to obtain a global measure of suicidality severity in non-clinical settings. It has proven to be a tool with adequate levels of reliability, showing in our sample a Cronbach's alpha of 0.728. We used the positive pedagogical communication subscale from the Pedagogical Communication Scale designed by Garcés-Prettel et al. [62], selecting only items attributed to positive aspects: E1 ('Most of my teachers help me strengthen discipline when communicating with me'), E2 ('…highlight achievements rather than errors in my life'), E3 ('…make me see the importance of studying and learning'). An exploratory factor analysis (EFA; principal components, Varimax rotation) on our sample ($N = 745$) confirmed a unidimensional factor (KMO = 0.665; Bartlett $\chi^2(3) = 448.96$, $p < .001$; explained variance = 64.1%; loadings = 0.757–0.837; communalities = 0.57–0.70), with Cronbach's $\alpha = 0.719$ (adequate and consistent with the original).

In the preliminary analyses, descriptive statistics (means and standard deviations) were calculated, as well as Pearson correlations between the study variables, including age. Student's t-test for independent samples was used to determine gender differences. Data were analysed using a multi-step approach. First, Little's MCAR test was performed to assess the missing data mechanism. Second, a unique group identifier was created to address the clustered nature of the data, representing school, grade, and classroom level. The Intraclass Correlation Coefficient (ICC) for suicidal ideation was calculated. As a further robustness check, key models were re-executed using Multi-Level Modelling (MLM) with Maximum Likelihood (ML) estimation to ensure the stability of gender-based coefficients. Additionally, linear regression analyses were performed to predict suicidal ideation, considering age, positive pedagogical communication and cybervictimization as predictor variables, separately for boys and girls, as we assume —based on previous literature [49]—, that these predictive models should include possible gender perceptions. Prior to the stratified analysis, a formal interaction power test was conducted in a combined model, including interaction terms (Gender × Cybervictimization and Gender × Pedagogical Communication) to statistically validate whether the coefficients differed significantly between groups.

The moderated mediation analysis was performed through the Model 7 [64] using the PROCESS macro. To examine gender differences in the predictive models, the analysis was conducted separately for boys and girls. In both models, Cybervictimization was entered as the independent variable (X), Suicidal Ideation as the dependent variable (Y), and Positive Pedagogical Communication as the mediator (M). Age was included as the moderator (W) of the relationship between cybervictimization and pedagogical communication (*path a*). We also calculated the Index of Moderated Mediation to test

Table 1 Levels of suicidal ideation and cybervictimization

	Suicidal ideation				Cybervictimization			
Level	**Frequency**	**Percentage**	**Boys**	**Girls**	**Frequency**	**Percentage**	**Boys**	**Girls**
Low / Never	483	64,8%	44%	37,3%	302	40,5%	71,6%	58,5%
Medium / Sometimes	129	17,3%	48,5%	56,5%	350	47%	26,8%	34,8%
High / Frequently	133	17,9%	7,5%	6,2%	93	12,5%	1,6%	6,7%
	745	100%	100%	100%	745	100%	100%	100%

Source: own elaboration

Table 2 Descriptive statistics, Pearson correlations, and t-test results

Variables		**M**	**SD**	**1**	**2**	**3**	**4**
1. Age		12.15	1.23	-			
2. Cybervictimization		11.01	4.09	0.307**	-		
3. Positive pedagogical communication		8.16	2.16	−0.179**	−0.115**	-	
4. Suicidal manifestations		0.68	1.15	0.077*	0.397**	−0.109**	-
B/G = boys/girls	M			12.16/12.15	10.58/ 11.40	8.12 / 8.19	0.48 / 0.87
	SD			1.24 /1.23	3.72 / 4.38	2.12 /2.20	0.92 /1.31
t -value				-1.121	2.77**	0.487	4.655***

Source: own elaboration

B/G boys/girls, *M* mean, *SD* Standard deviation, *t* Student's t-test

*$p < .05$, **$p < .01$, ***$p < .001$

the significance of the full conditional indirect effect, and Conditional indirect effects were also estimated (Simple Slopes Plot), considering the levels of the moderator. This approach allows an understanding of how age influences the protective role of communication in each gender group. It 95% confidence interval and 10,000 bootstrap samples were used. The estimates of each analysis were calculated through their respective unstandardized regression coefficients (coeff), and the Index of Moderated Mediation, their standard errors (SE), the t-values and their significance levels (p), as well as the different values of the lower limit (LLCI) and upper limit (ULCI) of the confidence interval. The interpretation of statistical significance was carried out through the values of each lower and upper limit of the confidence interval, so that, if the number 0 was found between the interval limits, we confirmed that the analysis was not significant.

Results

Descriptive statistics and regression models

To better understand the risk levels of suicidal thoughts and cyberbullying experiences among the children in this sample aged 10 to 15, we analysed the data from the Paykel Suicide Scale and the CYBVICS Scale. Following the percentile-based categorization (Weighted Average) described in the methods section, participants were grouped into three levels. For Suicidal Ideation, 'Low risk or never' (score of 0) represents the absence of ideation, 'Medium risk' (1–2) represents mild or occasional thoughts, and 'High risk' (3–5) indicates the most severe manifestations in the sample. Similarly, for Cybervictimization, 'Low' (8) indicates no victimization, 'Medium' (9–16) occasional exposure, and 'High' (17–32) indicates frequent victimization Table 1.

Our findings reveal that 64.8% of the participants are at low risk of suicide, while 17.3% are at medium risk and 17.9% are at high risk. Within the latter group, 1.5% of the sample ($n = 11$ participants) obtained a maximum score of 5 on the PSS scale, and 2.8% ($n = 21$ participants) achieved a score of 4. Regarding cybervictimization, approximately 40.5% of children reported never having experienced any form of online aggression. 47% indicated having suffered some type of verbal or social cyberbullying on occasion (e.g.,, insults in forums or exclusion from online groups). Finally, 12.5% of children reported being frequent victims of cyberbullying. Table 2 presents the correlation matrix of the study variables, as well as the means, standard deviations, and results of the independent-sample t-test by gender to examine possible differences between boys and girls. The two control variables —age and gender—have also been tested in similar studies [15]:

The correlational analysis reveals statistically significant correlations among all variables considered in this study. Direct cybervictimization was found to be positively correlated with age and suicidal ideation, while it was negatively correlated with positive pedagogical communication. Furthermore, there were significant negative correlations between pedagogical communication and both suicidal ideation and age. Lastly, a positive correlation between age and suicidal ideation scores was observed. Regarding gender differences, the data indicated statistically significant differences in cybervictimization and suicidal ideation, but not in age or

Table 3 Regression models predicting suicidal ideation by gender

Model by gender	*R*	R^2	Predictor variables	Beta	t
Girls	0.453	0.205			
			Age	0.043	0.892
			Cybervictimization	0.412	8,621***
			Positive pedagogical communication	−0.095	-2,034*
Boys	0.311	0.096			
			Age	−0.109	-2,075*
			Cybervictimization	0.317	6,108***
			Positive pedagogical communication	−0.008	-0,155

Source: own elaboration

B/G boys/girls, *M* mean, *SD* Standard deviation, *t* Student's t-test

*$p < .05$, **$p < .01$, ***$p < .001$

pedagogical communication. Girls had significantly higher mean scores in all these variables, except for age, for which boys had a higher mean.

The regression models for both genders are significant with respect to the risk of suicidal ideation among children in this sample aged 10 to 15 years, based on the predictor variables included in the study (age, positive pedagogical communication, and cyberbullying). In the model for girls, the adjusted R^2 is 0.199 ($F = 32.786$; $p < .001$). These analyses indicate that 19.9% of the variability in suicidal manifestations in girls can be explained by the variables considered and therefore that these variables play a relevant role. In the case of boys, the adjusted $R^2 = 0.089$ ($F = 12.630$; $p < .001$), indicating that approximately 8.9% of the variability in suicidal manifestations can be explained by the model's variables. Although it is a smaller percentage than in girls, it is still statistically significant.

Beyond separate group significance tests, a formal interaction model was tested to directly compare coefficients across genders. Results indicated a significant interaction ($F(5, 739) = 34.54$, $p < .001$, $R^2 = 0.189$). A significant interaction was found between gender and cybervictimization ($B = 0.053$, $p = .006$), while the interaction between gender and pedagogical communication showed a marginal trend ($B = -0.063$, $p = .077$). To facilitate the interpretation of these gender-specific patterns and ensure the stability of the estimates, results for each group are detailed in Table 3. These interaction results confirm that gender functions as a key moderator, leading to distinct patterns of relationships within each group.

For both girls and boys, cybervictimization is a significantly related factor in relation to suicidal manifestations, with a positive effect in both cases. This indicates that the greater the online violence perceived, the higher the score in suicidal ideation. For girls, positive pedagogical communication has a significant negative effect on the dependent variable. However, for boys, this effect is very weak and not significant. As for age, a positive effect is shown, but it is not significant for girls, while for boys it has a weak and significant negative effect.

Given the significant gender differences in cybervictimization and suicidal ideation, it is plausible that there are distinct patterns of relationships between variables for boys and girls, as suggested by previous literature [23]. Therefore, separate regression analyses for each gender were conducted to identify and predict the specific factors that influence suicidal ideation in each group (see Table 3). In the regression model for girls, cybervictimization showed a significant positive coefficient ($\beta = 0.412$, $p < .001$), indicating that an increase in cybervictimization is associated with with a higher risk of suicidal ideation. This finding aligns with prior studies documenting

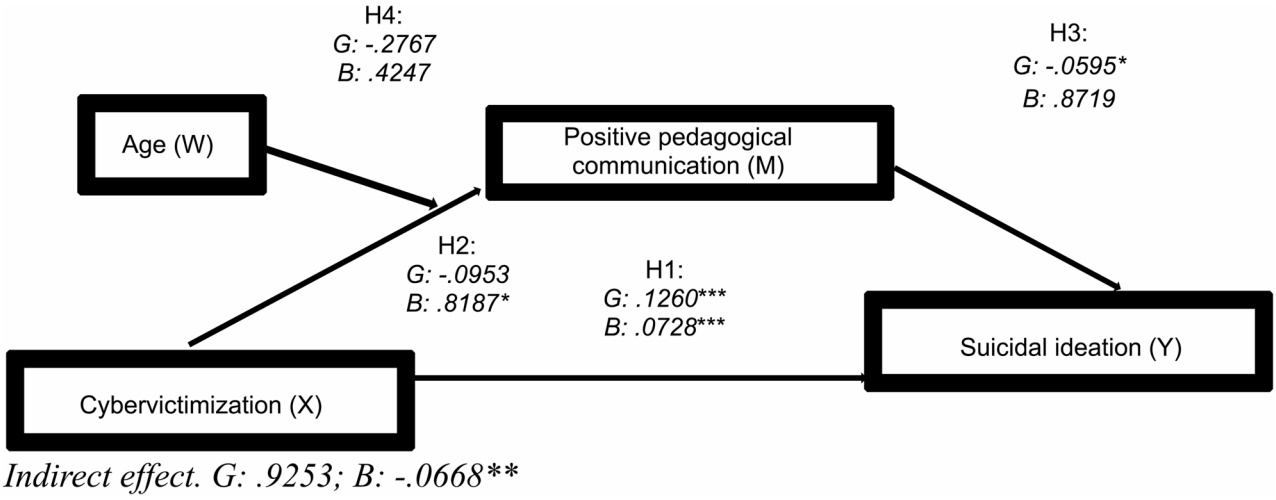

Fig. 2 Hypotheses model of indirect effects with empirical contrast. Source: own elaboration; Girls: G; Boys: B; Note: *p < 0.05; **p < 0.01; ***p < 0.001

greater emotional vulnerability among girls to online victimization [23]. For positive pedagogical communication, the negative coefficient (β = – 0.095, $p < .05$) indicates that a favorable perception of pedagogical support reduces suicidal ideation in this group, possibly due to an emotionally supportive environment that diminishes the adverse effects of bullying. For boys, cybervictimization was also positively associated with with suicidal ideation (β = 0.317, $p < .001$), though with a lower intensity than observed in girls. Positive pedagogical communication does not show a significant effect in this group (β = – 0.008, $p = .87$). Other factors, potentially related to family context or individual characteristics, may exert a more substantial protective influence in boys.

Before testing the moderated mediation model, several diagnostic analyses were conducted to ensure the robustness of the inferences. To address the clustered nature of the data—with students nested within *schools*, *grades*, *and classrooms*. The *Intraclass Correlation Coefficient* for suicidal ideation was *0.033*, and the Wald test for random intercept variance was non-significant ($Z = 1.51$, $p = .131$). As a further robustness check, the MLM results fully ratified the original findings: cybervictimization remained a significant predictor for both girls ($B = 0.122$, $p < .001$) and boys ($B = 0.078$, $p < .001$), while the protective role of positive pedagogical communication was confirmed exclusively for the female group ($B = – 0.070$, $p = .012$), remaining non-significant for boys ($p = .995$). In both segmented models, the cluster variance was again non-significant (Girls: $p = .070$; Boys: $p = .342$). These results indicate that the variance attributable to the hierarchical structure is negligible, justifying the use of single-level models via the PROCESS macro.

Model of moderated mediation

Gender may be a decisive predictor of cybervictimization, as suggested by previous literature [49]. The longitudinal study by Coyne et al. [12], conducted over a 10-year period, found that high social media or television use in early adolescence, followed by a significant increase over time, was a predictor of suicide risk in girls. For boys, video game use was linked to suicide risk when paired with high levels of cyberbullying. The authors therefore suggested that certain media consumption patterns could pose a greater risk than others when explaining suicidal behaviour for each gender. Based on the regression results for both genders, a moderated mediation model is proposed to delve deeper into the complex relationship between cybervictimization, positive pedagogical communication, age, and suicidal ideation in Spanish children. This hypothesized model represents the effect of X on Y through M, along with the moderation of the indirect effect, assessed through the Index of Moderated Mediation, which indicates whether the strength of the indirect effect varies across levels of W. Conditional indirect effects were also calculated, considering the levels of the moderator. In that sense, there is a direct and positive effect (c') of cybervictimization (X) on suicidal ideation (Y), so H1 is confirmed for both girls and boys:

The direct association of M with Y ($b1$) was also analysed to assess whether positive pedagogical communication has a direct impact on suicidal ideation. Regarding H2, we found a positive effect of cybervictimization on positive communication exclusively among boys (b = 0.8187; $p < .05$). This suggests that, for boys, experiences of cybervictimization are positively associated with a perception of increased pedagogical communication, possibly reflecting a help-seeking response. However, this association was not significant for girls.

Furthermore, for boys, H4 is supported, as age significantly moderated the effect of cybervictimization on perceived positive communication (interaction $b = – 0.0668$; $p < .01$). This interaction indicates that the positive association between victimization and communication is stronger in younger boys and weakens as age increases. More specifically, we have found that the role of perceived positive pedagogical communication differed in relation to suicidal ideation, so H3 is partially supported. For girls, we detected a significant negative direct association ($b = – 0.0597$; $p < .05$), meaning that higher perceived positive communication is associated with fewer suicidal thoughts. However, this effect is not supported by our data for boys (see Table 4).

As described, a direct and positive effect between cybervictimization and suicidal ideation was found for both genders. This indicates that higher levels of victimization experiences, both via mobile devices and online, are associated with an increased probability of experiencing suicidal thoughts among both boys and girls.

For girls, positive pedagogical communication exhibited a significant direct protective effect on suicidal ideation ($b = – 0.060$, $p < .05$), although the indirect pathway did not reach statistical significance. For boys, age significantly moderated the association between cybervictimization and positive communication (interaction- b = -0.067, $p < .01$) (see Fig. 3). In other words, for younger participants, the increase in cyberbullying could be related to a slight increase in positive communication (possibly due to seeking help or connection). However, this association becomes negative for older participants (low level age = -1.6740, age coefficient: b = 0.1184, t = 1.9667, $p = .05$; high level of age = 1.1778 age coefficient: b = -0.0722, t = -1.9967, $p = 05$).

Specifically, cybervictimization positively predicted positive communication at younger ages, but this relationship turned negative among older participants. In other words, for younger participants, an increase in perceived aggression may be associated with a slight increase

Table 4 Empirical evidence of the studied model

Model by gender	Path	Coefficient	SE	BootLLCI	BootULCI	t	*p*
Girls	Direct Effect						
	c'	0.1260	0.0138	0.0989	0.1531	9.1277	0.000
	a1	−0.0953	0.3087	−0.7022	0.5116	−0.3087	0.7577
	a2	−0.2767	0.2852	−0.8375	0.2841	−0.9703	0.3325
	b1	−0.0595	0.0274	−0.1137	−0.0058	-2.176	0.0301
	Indirect effects						
	*ab*W*	0.0023	0.0248	−0.0464	0.0510	0.0939	0.9253
	Index of Mod. Mediation	−0.0001	0.0017	−0.0034	0.0038		
Boys	Direct Effect						
	c'	0.0728	0.0126	0.0480	0.0976	5.763	0.000
	a1	0.8187	0.3196	0.1902	1.4473	2.5617	0.0108
	a2	0.4247	0.2787	−0.1234	0.9728	1.5238	0.1284
	b1	0.0036	0.0221	−0.0399	0.0471	0.1613	0.8719
	Indirect effects						
	*ab*W*	−0.0668	0.0254	−0.1168	−0.0169	-2.6308	0.0089
	Index of Mod. Mediation	−0.0002	0.0015	−0.0034	0.0028		

Source: own elaboration

c' direct effect, *a1* effect of cybervictimization on pedagogical communication, *a2* effect of age on pedagogical communication, *b1* effect of pedagogical communication on suicidal ideation, *ab*W* (Interaction) represents how the effect of pedagogical communication on cybervictimization varies according to the child's age and Index of Mod. *Med* Index of Moderated Mediation determines if the indirect effect is significantly moderated by Age. *SE* Standard Error, *BootLLCI/ULCI* 95% bootstrap confidence interval

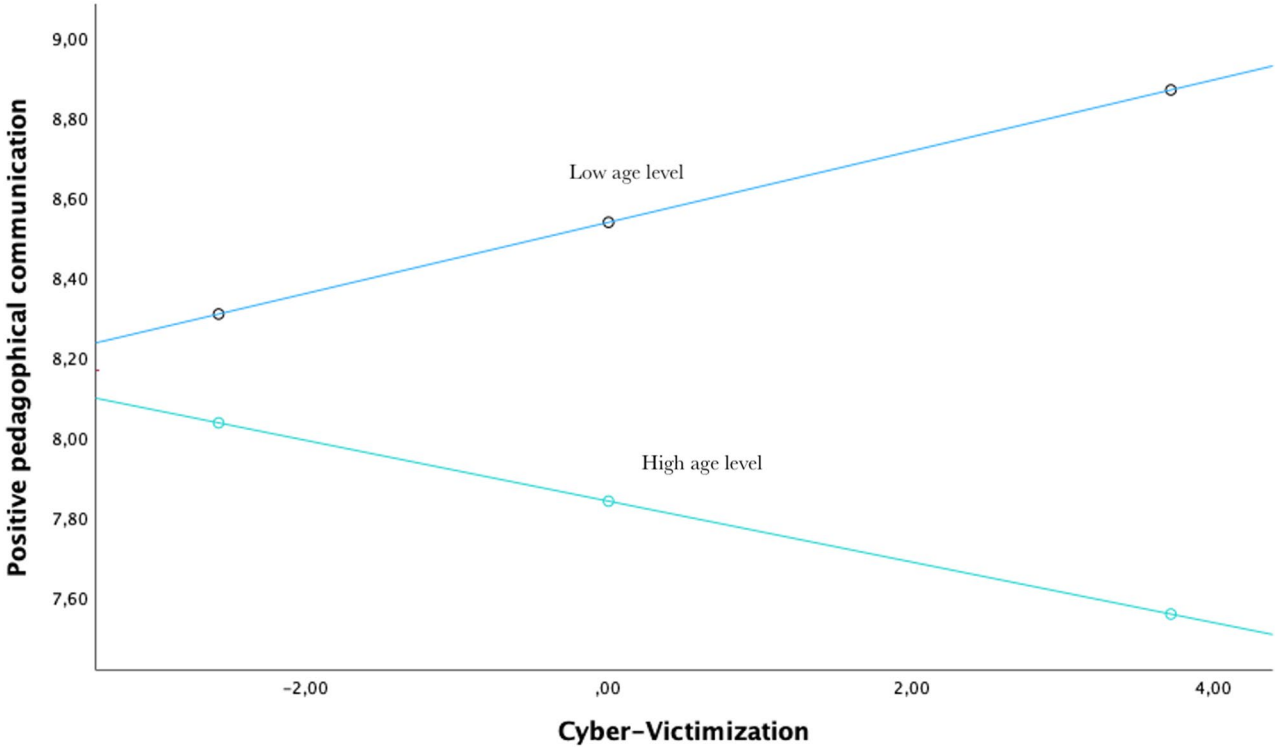

Fig. 3 Age on the relationship between cybervictimization and positive pedagogical communication, by boys

in positive communication (possibly due to help- or connection-seeking behaviours). This association weakens or disappears for older participants, and positive pedagogical communication did not mediate the relationship between cybervictimization and suicidal ideation in boys.

Discussion

This study identifies positive pedagogical support as a novel and significant factor associated with lower levels of suicidal ideation in girls affected by cybervictimization, while underscoring the need for other protective

factors for boys, potentially stemming from family or social contexts. These findings may inform educational leaders and policymakers in designing tailored interventions—strengthening teacher support for girls and exploring alternative protective resources for boys.

Although the scientific literature on suicidal ideation remains limited [13], research on child suicide and suicidal ideation linked to cybervictimization in Spain is particularly scarce. Prior studies have already documented a direct, positive association between cybervictimization and suicidal ideation [13–15, 18, 19, 29, 30], and our data likewise support H1. At the same time, our study extends this line of inquiry by situating cybervictimization within a broader discussion of mental health risks associated with online aggression [20, 21]. As noted in the literature, when mental health problems are not adequately addressed, symptoms may worsen, and the severity and frequency of harassment can amplify psychological harm, increasing suicide risk among adolescents and young adults. In this regard, previous research has highlighted the potential value of emotional training both for individuals—such as mindfulness [29]—and for teachers, as part of preventive efforts [47].

Consistent with this perspective, our findings indicate that positive pedagogical communication shows a direct protective association with suicidal ideation among girls, helping to reduce suicidal thoughts linked to cybervictimization in this group, even though the indirect pathway through pedagogical communication was not statistically supported as a mediator in our models. However, the formal interaction test suggests that we should be cautious about labeling pedagogical communication as a gender-specific protective factor. Although separate models showed different significance levels, the marginal interaction result in the combined model indicates that these differences, while present, are modest. This aligns with a conservative reading of cross-sectional data, highlighting that gender-specific patterns are present but should not be over-interpreted as definitive causal shields. Among boys, age significantly moderated the association between cybervictimization and pedagogical communication; however, positive pedagogical communication did not mediate the link between cybervictimization and suicidal ideation.

One possible interpretation is that teachers may provide younger boys with emotional tools that shape how pedagogical communication is perceived in the context of cybervictimization. However, this developmental pattern remains exploratory and should be interpreted with caution. These findings might be influenced by alternative factors, such as measurement artifacts in how different age groups perceive the survey items, or cohort effects related to the transition from primary to secondary education, which typically involves a significant shift in the nature of teacher-student interactions. Additionally, a differential willingness to endorse sensitive items across developmental stages may affect self-reported data, as older adolescents might be more reluctant to report teacher support compared to younger children. Values such as benevolence [14] have been identified as important for managing the impact of cybervictimization and may help reduce negative thoughts. Children with poorer mental health may spend more time on social media [28], potentially reinforcing a cycle that undermines healthier routines. Online environments may also expose young people to harmful content [2] that can influence identity development and imaginaries [10].

Regarding direct effects, our analyses suggest that cybervictimization may be associated with perceived positive pedagogical communication in this sample, with this association varying by gender (H2) and further moderated by age only among boys (H4), but without a significant indirect effect on suicidal ideation. Positive dialogue with teachers is associated with fewer negative thoughts among girls (H3), but not among boys, which may relate to girls' greater susceptibility to cybervictimization [16] and higher reported incidence of online aggression [27]. This suggested gender difference may also reflect the distinct forms of aggression experienced by boys and girls: boys more often face direct bullying/cyberbullying, whereas girls are more likely to encounter indirect or relational violence [49].

Regarding the model's predictive power, the R^2 values obtained indicate that pedagogical communication and cybervictimization explain a modest portion of the variance in suicidal ideation, particularly among boys (20.5% for girls and 9.6% for boys). These results should be interpreted with caution, as they suggest that a substantial amount of variance remains unexplained by the variables included in this study. This highlights the multicausal nature of suicidal ideation in children, where omitted factors—such as family context, offline bullying, pre-existing mental health difficulties, and socio-economic indicators—likely play a significant role. Consequently, while pedagogical communication is identified as a relevant school-based resource, its impact should be viewed as one component within a broader array of influences.

Furthermore, the absence of a significant mediating effect of pedagogical communication among girls constitutes a specific limitation for the generalizability of the proposed model. This discrepancy may reflect differences in the nature of violence experienced: while boys more often face direct cyberbullying, girls may experience indirect or relational aggression that could be less responsive to teacher-led communication. In terms of data quality, reliance on self-reported measures may introduce social desirability bias. Moreover, although attrition was addressed statistically, results showed that participants

with higher risk profiles were more prone to incomplete responses. This suggests a potential underrepresentation of the most vulnerable cases. Future studies should consider implementing strategies to minimize missing data, thereby enhancing the scope and robustness of the findings. With regard to the sample structure, although the hierarchical nature of the data (students nested within schools, grades, and classrooms) was controlled and tested, future research could explore specific school-level variables that might capture the minimal variance observed.

Nevertheless, this topic remains highly relevant for informing intervention strategies [24], particularly in a digital environment where information and communication technologies have become central to young people's socialization. Future research would benefit from longitudinal or experimental designs to strengthen causal claims. In addition, this study also faces limitations in sample representativeness: the low school participation rate (17/309) raises the possibility of selection bias, and the geographic concentration in Andalusia (57%) may reduce generalizability to other Spanish regions given differences in educational policies, socioeconomic conditions, and digital practices. Incorporating qualitative approaches could also deepen understanding of the mechanisms underlying the observed relationships. Finally, the multifactorial nature of suicidal ideation and the diversity of user experiences reinforce the need for further research [65].

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s40359-026-04578-3.

Supplementary Material 1.

Human ethics and consent to participate

Prior to participating in the study, all legal guardians of the participants provided written informed consent. Additionally, all participants were read an age-appropriate assent statement before the questionnaire was administered, to confirm their voluntary participation. All personal data collected were anonymized.

Authors' contributions

D.B.I. and A.M.C. wrote the main manuscript text, S.V.S., J.A.C. and L.C.C. developed the theoretical parts, while M.G.P. and Y.S.M. contributed both with the design of the work and the interpretation of data. All authors reviewed the manuscript.

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Data availability

The dataset used in this study is available upon request, as is the interpretation protocol, which can be obtained from the corresponding author.

Declarations

Ethics approval and consent to participate

Clinical trial number: not applicable. This is a non-experimental study; therefore, no experimental data from humans has been included. As an observational study, the empirical data analysed is based on a survey used as the main research instrument. According to Article 24(2) of the Charter of Fundamental Rights of the European Union (2010/C83/02), "the best interests of the child must be a primary consideration" in all public and private actions. The 2015 European legal handbook on the rights of the child, published by the Council of Europe, emphasizes the importance of collaboration and cooperation between states and social agents in promoting these rights. As this study involved minors, the protocol was reviewed and approved by the Internal Review Board (IRB) of the University of Málaga (Report No. 79, Registration No. 129-2023-H). The IRB functions as a cross-disciplinary Ethics Committee chaired by the University's Vice President for Research. This approved protocol ensured the protection of children's rights and ethical standards, including confidentiality.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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