

Article

Development and Validation of Schadenfreude in Bullying and Cyberbullying Scale (SBCS)

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ABSTRACT

Background: Schadenfreude is a moral emotion consisting of enjoyment when seeing other people suffer, and whose activation has been related to transgressive behaviour in adulthood. Despite this, the study of this emotion in aggression phenomena among schoolchildren has received little scientific attention, possibly due to a lack of instruments. We aimed to design and provide evidence of the validity and reliability of a scale for measuring schadenfreude in situations of online and offline bullying. **Methods:** The sample consisted of 3,183 primary and secondary school pupils (48.4% girls; $M_{age} = 12.76$; $SD = 1.52$). **Results:** The data confirmed that the two-dimensional model was the best fit (χ^2 S-B = 81.800; CFI = .984; SRMR = .036; RMSEA = .049). Scale scores were shown to be invariant with regard to gender and age, and evidence was provided of predictive validity, with a clear relationship found between schadenfreude, bullying and cyberbullying. **Conclusions:** These findings confirm the validity of the instrument scores, which may be useful for measuring this emotion in educational contexts and guiding psycho-educational interventions aimed at improving moral emotion regulation and preventing bullying and cyberbullying.

Desarrollo y Validación de la Escala de Schadenfreude en Bullying y Cyberbullying (SBCS)

RESUMEN

Antecedentes: La alegría maliciosa es una emoción moral que conlleva el disfrute ante el sufrimiento ajeno y cuya activación se ha relacionado con conductas transgresoras en la edad adulta. Pese a ello, el estudio de esta emoción en fenómenos de agresión entre escolares ha tenido una menor atención científica, posiblemente por la falta de instrumentos. Se propuso diseñar y proporcionar evidencias de validez y fiabilidad de una escala que midiera la alegría maliciosa en situaciones de agresión online y offline. **Método:** La muestra estuvo formada por 3,183 estudiantes de educación primaria y secundaria (48.4% chicas; $M_{edad} = 12.76$; $DT = 1.52$). **Resultados:** Los datos confirmaron que el modelo bidimensional fue el que mejor ajuste obtuvo (χ^2 S-B = 81.800; CFI = .984; SRMR = .036; RMSEA = .049). Las puntuaciones de la escala demostraron ser invariantes independientemente del género y la edad y se obtuvieron evidencias de validez predictiva, al encontrar relación entre alegría maliciosa, agresión y ciberagresión. **Conclusiones:** Estos hallazgos confirman la validez de las puntuaciones del instrumento, que puede ser útil para medir esta emoción en el contexto educativo y orientar intervenciones psicoeducativas destinadas a mejorar la regulación de emociones morales y prevenir el acoso y ciberacoso.

Malicious joy, which is known internationally as *schadenfreude*, is defined as the pleasure that a person derives from witnessing the misfortunes suffered by others. Unlike sadism or other types of positive affect aggression (Quansah & Gagnon, 2023), *schadenfreude* is not the result of actively and directly causing another person misfortune or pain, but rather involves indirect enjoyment of other people's suffering, which leads to both physical and emotional distancing from the person who is experiencing adversity (Gromet et al., 2016). The study of *schadenfreude* has generated special interest due to its relationship with bullying behaviour (Oriol et al., 2023). Recent advances in neuroscience have shown that higher levels of *schadenfreude* are related to greater activation of the prefronto-striatal network, an area of the brain which plays a crucial role in the manifestation of antisocial behaviour (Jankowski & Takahashi, 2014).

The two-dimensionality of the construct has been evidenced through the different theoretical approaches (Wang et al., 2019). Firstly, Deservingness Theory (Feather, 1999) states that the perception of justice and deservingness plays a determining role in the cognitive-emotional chain that leads to pleasure in the misfortune of others (Brambilla & Riva, 2017; Greenier, 2021). When a person is perceived as being responsible for a negative action which brings them adverse consequences, their suffering is seen as deserved, which leads to a feeling of *schadenfreude* (Dasborough & Harvey, 2017).

Secondly, the Social Identity Theory (Tajfel, 1974) supports the idea that emotional reactions to the misfortunes of others are significantly influenced by the degree of social and affective identification maintained with them (Hoogland et al., 2015; Ouwkerk et al., 2018). In the case of someone who is disliked, incongruent responses tend to be made, displaying pleasure at their misfortunes and resentment of their achievements (Boecker et al., 2022). These reactions can be explained by different factors, including rivalry (Tyler et al., 2021), jealousy (Shamay-Tsoory et al., 2007), hate (Roseman & Steele, 2018), or other mechanisms of social comparison and interpersonal preference (Greenier, 2021; Hanif & Batool, 2021).

Although there has been growing scientific interest in the research into *schadenfreude* over recent decades, its approach and measurement have presented several challenges. First, the few studies conducted to date have measured this moral emotion in hypothetical situations using vignettes, which limits its measurement in real-life experiences (Leach et al., 2015; Peplak et al., 2020). In addition, no self-report measures have been found that fit the two-dimensional structure of the construct, which may considerably limit the precision with which the different motivations that cause *schadenfreude* can be analysed. This is the case with the *Schadenfreude Scale* (Hanif & Batool, 2021), which is based on empirical results rather than on theories, or the *Chronic Schadenfreude Scale* (Krizan & Johar, 2012), which includes in the description of its items emotions like envy or resentment, which are conceptually different constructs from *schadenfreude* and do not capture the component of pleasure which is characteristic of this emotion (Feather & Nairn, 2005). The *Schadenfreude Scale* devised by Crysel and Webster (2018) was designed precisely to overcome the limitations of the previous scales. In its design, a distinction was made between situations in which the pleasure taken from other people's failures involved minimal harm (benign) and those in which more significant harm was inflicted

(malignant). Although this scale brought advances in measuring the intensity of this moral emotion, it has been criticized for using items which are over-generalised and imprecise (Hudson & Uenal, 2024), thus restricting the possibility of exploring the behaviour specifically associated with it and the social circumstances that encourage its appearance.

The few instruments designed for children and adolescents fail to report the validity and reliability of the instrument scores and display some major limitations. For instance, they evaluate pleasure derived from the suffering of others using a single statement (e.g., "I feel good when something bad happens to other people") or by rating their emotions with a single word, which makes it difficult to contextualize them and understand their meaning, as is the case with the *Envy and Schadenfreude Scale* (Sawada, 2008) or the *Post-Misfortune Schadenfreude Scale* (Van Dijk et al., 2008). Similarly, although it has been shown that *schadenfreude* manifests itself in interpersonal relationships from a very early age (Lange & Boecker, 2019) and that its appearance can lead to the development of immoral behaviour (Demeter et al., 2021), no scale has been found that measures this moral emotion in specific situations of online and offline aggression in the school context, which limits the possibility of exploring whether this emotion fosters aggressive behaviour, such as bullying and cyberbullying, among school pupils (Wang & Zhang, 2023). There is therefore a need for a scale with psychometric guarantees of validity and reliability which fits the two-dimensional definition of the construct more exactly, and which is easily accessible to the scientific community and professionals working in educational psychology (Álvarez-Marín et al., 2022). Adapting this scale to the school context is especially relevant to enable us to identify in future studies the risks associated with experiencing pleasure in episodes of violence between peers, such as bullying and cyberbullying, and to develop proposals for preventing them.

Bullying, which affects approximately 35% of young people (Modecki et al., 2014), is a type of immoral behaviour which seriously affects the health and well-being of children and adolescents, and is characterized by the continued, deliberate abuse of power in social relationships exercised by one or more aggressors against a victim or victims, with the intention of causing them harm (Volk et al., 2014). Although the relationship between *schadenfreude* and bullying has attracted little research to date (Li et al., 2019), studies such as those by Erzi (2020) or Cikara (2015) have shown that *schadenfreude* tends to be related to group aggression, manifested through subtle forms of group harassment towards the victim, such as spreading spiteful rumours in an attempt to damage their social status. This recognised relationship has led some studies to consider this moral emotion as a risk factor for peer aggression (Dasborough & Harvey, 2017).

With the recent advances in digital media, and children's and adolescents' extensive use of them for social interaction and communication, *schadenfreude* has also moved online (Barron et al., 2023). Thus, the already existing risks of this moral emotion in bullying have been added to those of cyberbullying, where schoolchildren, taking advantage of the favourable conditions that the Internet offers them (anonymity, unlimited audience and 24/7 immediacy, among others) (Peter & Petermann, 2018), engage in antisocial behaviour online to derive enjoyment from humiliating and intimidating others. This dynamics of abuse of power

exercised online has prevalence rates of around 15% (Modecki et al., 2014). However, to date, very few studies have explored the possible relationship between schadenfreude and certain aspects of cyberbullying behaviour (Brubaker et al., 2021).

The main purpose of this study was therefore to design and provide evidence of the validity of a scale to measure schadenfreude in specific situations of aggression and cyberbullying among schoolchildren. To achieve this, the following objectives were proposed: (1) to measure the underlying factorial structure of the *Schadenfreude in Bullying and Cyberbullying Scale* and examine the reliability of its scores; (2) to test the measurement invariance of the instrument by gender and age; (3) to obtain evidence about the incremental predictive validity of schadenfreude on aggression in bullying and cyberbullying. The hypotheses were: (H.1) the instrument will provide evidence of validity and reliability in which the proposed two-dimensional model, containing the factors of justice and aversion, is expected to be the structure that best fits the data; (H.2) the scores of the instrument are expected to be invariant regardless of gender and age; (H.3) evidence of incremental predictive validity will be obtained by finding a direct, significant relationship between schadenfreude and aggression in bullying and cyberbullying.

Method

Participants

The sample consisted of a total of 3,183 schoolchildren (48.4% girls) from primary and secondary schools, aged between 10 and 17 years ($M = 12.76$; $SD = 1.52$), from 27 state (85.19%) and private (14.81%) schools and colleges from Córdoba (Spain). Non-probabilistic incidental sampling was carried out due to the accessibility of the schools invited to participate (Singleton & Straits, 2004). 22.2% of the participants were from areas with a low socioeconomic level, 51.9% from areas with a medium level and 25.9% from areas with a high level. As regards the distribution of the population according to the size of the town/city, 37.03% lived in small towns (under 10,000 inhabitants), 18.53% in medium-sized towns and 44.44% in large towns/cities (over 100,000 inhabitants).

Instruments

The Schadenfreude in Bullying and Cyberbullying Scale (SBCS). This scale was specifically designed as one of the objectives of this study. It consists of nine Likert-type items with five response options (from 1 = *totally disagree* to 5 = *totally agree*). The validity and internal consistency indices of the instrument scores are presented in the 'Results' section.

The European Bullying Intervention Project Questionnaire (EBIPQ; Ortega-Ruiz et al., 2016). This instrument is made up of 14 items aimed at measuring victimization and aggression in bullying. For this study, only the seven items referring to aggression were used (e.g., "I have hit or pushed a classmate"). The response for each item was assessed on a Likert-type scale with five response options (from 0 = *never* to 4 = *more than once a week*). Optimal fit indices were obtained, χ^2 S-B = 204.526; $df = 14$; $p < .001$; NNFI = .98; CFI = .99; SRMR = .06; RMSEA = .074 (90% CI = [.065, .083] and reliability ($\alpha = .84$; $\omega_h = .85$), in the sample used in the present study.

The European Cyberbullying Intervention Project Questionnaire (ECIPQ; Del Rey et al., 2015). This questionnaire consists of a total of 22 items aimed at measuring cybervictimization and cyberaggression. For this study, only the 11 cyberaggression items were used (e.g.: "I have created a fake account to pretend to be someone else on the Internet"). Responses were given on a five-point Likert-type scale (from 0 = *never*, to 4 = *more than once a week*). Reliability indices ($\alpha = .90$; $\omega_h = .90$) and fit indices were optimal (χ^2 S-B = 417.069; $df = 44$; $p < .001$; NNFI = .98; CFI = .98; SRMR = .05; RMSEA = .058 (90% CI = [.053, .064]).

Procedure

The SBCS was developed in accordance with the international guidelines established in the *Standards for Educational and Psychological Testing* (American Educational Research Association [AERA], American Psychological Association [APA], & National Council on Measurement in Education [NCME], 2014) for the construction and validation of tests, and following the steps proposed by Muñiz and Fonseca-Pedrero (2019). Firstly, a theoretical review of the scientific literature was carried out to obtain a solid conceptual definition of the construct, and the purpose of the scale was defined. The format of the items and the response options were also established, following the recommendations given by Haladyna et al. (2002) and Moreno et al. (2015).

The first version of the questionnaire was then generated, using a representative set of 11 items. To ensure the content validity of the instrument items, discussions were held in four focus groups with an independent sample of 60 pupils (58.3% girls) aged between 11 and 16 years ($M = 13.48$; $SD = 1.24$) from two schools located in Córdoba (Spain). Prior consent was given by the participants to record, transcribe and code the sessions, which lasted between 40 and 50 minutes. Next, the content was re-evaluated by a group of four expert judges in the field, with the aim of avoiding bias in the evaluation of the items and ensuring that only parsimonious, functional and internally consistent elements were included. As a result, two conceptually imprecise elements were omitted, and the scale was reduced to a final set of nine items.

The test was then applied to the study sample, followed by an analysis of the psychometric properties of the scores obtained. The study was approved by the Bioethics and Biosafety Committee of the University of Córdoba (Spain) and complied with the basic principles of the Declaration of Helsinki, as well as with data protection standards. The parents were informed of the voluntary, anonymous and confidential nature of the study, and their signed authorization was obtained, together with written consent from the participants themselves. The 3% of the parents or legal representatives did not agree to their children participating in the study. The self-reports were administered individually during school hours in a separate school classroom, and the procedure was supervised by at least one previously trained researcher, who followed a standardized protocol to ensure uniformity when the questionnaire was administered. Clear instructions were provided before starting, and any questions which arose during the process were answered. The teacher who usually taught in that classroom was absent during the process, which lasted between 15 and 20 minutes. To verify the stability of the instrument over time, the questionnaires were administered again one year later to a total of 1,712 pupils, which represented 53.8% of the original

sample. A control code was assigned to enable researchers to identify during this follow-up stage the pupils who had previously completed the questionnaires.

Data Analysis

The sample size was estimated following the criterion of having a minimum of 10 participants for each item of the scale (Boateng et al., 2018). In addition, in line with the recommendations given by Lorenzo-Seva (2022), the total sample was divided randomly into two subsamples with a proportional number of boys and girls. Exploratory Factor Analysis (EFA) was performed with 1,592 participants (48.3% girls, $n = 794$), and Confirmatory Factor Analysis (CFA) was tested with 1,591 pupils (48.5% girls, $n = 780$), using the cross-validation procedure. All the participants in the study were included in the analyses. To deal with missing data, Full Information Maximum Likelihood (FIML) estimation was used, as the data were missing at random (MAR; $\chi^2/df = 1.48$) (Bollen, 1989).

Following the guidelines for factor analysis of test items (Ferrando et al., 2022), the factor structure of the scale was measured in several steps. First, the Kaiser-Meyer-Olkin (KMO) measurement for sampling adequacy ($p \geq .60$) and Bartlett's test of sphericity ($p \leq .001$) (Watson, 2017) were checked, to assess the factorability of the data and confirm the relevance of performing an EFA. The number of factors to be retained was decided following the recommendations of the Hull method (Lorenzo-Seva et al., 2011), Horn's parallel analysis (1965), and the Kaiser-Guttman criterion (eigenvalue rule > 1) (Kaiser, 1960). Since the scale uses a Likert-type response, the EFA was performed using a polychoric correlation matrix using the *psych* package and the WLSMV estimator in the RStudio statistical software (Version 2022.07.02). Factor loadings lower than .40 (Worthington & Whittaker, 2006) and items with cross-loadings higher than .30 on more than one factor (Mahalik et al., 2003) were considered as exclusion criteria. In addition, to check the psychometric properties of the instrument scores, analyses based on Item Response Theory (IRT) were performed, using a three-parameter model (3PL), and adjusted to polytomous scales (Muraki, 1990). Unlike other models such as the 1PL, the 2PL or the Samejima graded model, the 3PL allowed us to evaluate not only the difficulty or the discrimination capacity of the items, but also the probability of random responses, which made it the most suitable model given the multiple-choice format of the SBCS (Chiesi et al., 2012).

Secondly, a CFA was carried out to evaluate and confirm the goodness of fit of both the first-order factorial model initially proposed from the EFA and the second-order model, where the previously identified factors were integrated under the global construct of schadenfreude. Analyses were then performed using the *lavaan* package in RStudio (Rosseel, 2012), and the robust maximum likelihood (MLR) estimator was employed to address the categorical and non-normally distributed nature of the data. The following indicators were included: Satorra-Bentler Chi-Square (χ^2 S-B), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). Values over .90 and .95 for the CFI and TLI and below .08 and .06 for the RMSEA and SRMR represented an acceptable and good fit, respectively (Chen, 2007; Hu

& Bentler, 1999). To estimate the reliability of the instrument scores, the composite reliability (CR) and average variance extracted (AVE) indices were also calculated, as well as Cronbach's alpha (α) and the McDonald's total (ω_t) and hierarchical (ω_h) omega coefficients. The cut-off points used for these indices were .60 for CR, Cronbach's alpha and omega coefficients, and .50 for AVE (Hair et al., 2010). In addition, the test-retest reliability was analysed to assess the reliability and temporal stability of the test scores using Spearman's correlation coefficient.

Third, the measurement invariance by gender and age was analysed, to test whether the instrument scores remained invariant, and were therefore replicable and generalizable in both subgroups. A series of increasingly restrictive nested models were implemented and compared: (a) Configural, in a baseline model without any restrictions, in which the factor loadings and intercepts were freely estimated; (b) Metric (weak), aimed at assessing whether the factor loadings were the same in both groups; and (c) Scalar (strong), which examined whether the item intercepts and the loadings were equal for both gender and age. It was verified that no more than two criteria were violated: $\Delta CFI < .01$, $\Delta RMSEA < .015$ y $\Delta \chi^2 > .05$.

As a final step, incremental predictive validity was analysed using a longitudinal study of the relationship between schadenfreude, on the one hand, and bullying and cyberbullying, on the other, after evaluating the differences by gender (boys and girls) and age (10 to 13 years and 14 to 17 years) using Student's *t* test and the effect size through Cohen's *d*. A series of longitudinal linear regression models were performed in which age and gender were included as covariates. In addition, the assumptions of linearity, homoscedasticity, independence of residuals and non-collinearity were checked. The level of statistical significance adopted was $p < .05$.

Results

Exploratory Factor Analysis (EFA)

The relevance of performing an EFA to check the factorability of the correlation matrix and determine the model that best fits the data was confirmed using the Kaiser-Meyer-Olkin (KMO) measurement of sampling adequacy, with a value of .85, and a statistically significant Bartlett test of sphericity [$\chi^2 (36, n = 1592) = 7147.919; p < .001$]. All the tests pointed to using a model made up of two dimensions, in which the eigenvalues were greater than one (3.59 and 2.67, respectively). The third factor showed a significant drop in the eigenvalue to a value below one (0.54). The two-factor model accounted for 71.18% of the total variance, with the factors of justice and aversion accounting for 41.39% and 29.79% of the variance, respectively. Table 1 shows the factor loadings of the items for each of the two factors.

The inter-item polychoric correlations ranged from $r = -.01$ to $r = .70$, which indicates that the items measured related but clearly differentiated aspects. In addition, the 3PL analysis, based on Item Response Theory (IRT), revealed discrimination indices over 1, which are considered good values; the degree of difficulty of the items varied between -1.73 and 1.20, which is an acceptable value, being within the range of -3 and 3; and the error probability values were low, indicating good item quality (see Table 2).

Table 1

Factor Loadings for the Factor Structure of the SBCS Items in the EFA

Items	Factor 1	Factor 2
SBCS1. Me satisface que un compañero/a que ha tratado mal a los demás sea castigado/a [I'm pleased when a classmate who has treated others badly is punished]	.818	.022
SBCS2. Me agrada que alguien que ha traicionado a otro/a compañero/a para conseguir lo que quiere sea descubierto/a [I'm pleased when someone who has betrayed another classmate to get what he/she wants is found out]	.800	.048
SBCS3. Me hace sentir bien ver que alguien que ha hecho daño a otros/as reciba su merecido [It makes me feel good to see someone who has hurt others get what they deserve]	.875	.047
SBCS4. Siento alegría cuando alguien que amenaza a otros/as por las redes sociales es expulsado del centro [I'm happy when someone who threatens others on social media is expelled from school]	.754	.057
SBCS5. Disfruto cuando un compañero/a que no aguanto está solo/a en el recreo [I enjoy it when a classmate I can't stand is left alone during the break]	.103	.795
SBCS6. Me resulta divertido cuando se critica a alguien que me cae mal [I find it amusing when someone I don't like is criticized]	.140	.825
SBCS7. Me satisface ver que alguien que no me cae bien es acosado/a por Internet [I'm pleased when someone I don't like is harassed online]	-.049	.903
SBCS8. Me alegra ver que alguien que no soporto es humillado/a delante de los demás [I'm happy to see someone I can't stand humiliated in front of others]	.034	.896
SBCS9. Me gusta cuando se hacen pasar por alguien que me cae mal para dañar su reputación por Internet [I like it when people pretend to be someone I don't like to damage their reputation online]	-.060	.887

Note. Factor loading values $p \geq .40$ are shown in bold.

Table 2

Means, Standard Deviations, Skewness, Kurtosis, and 3PL Analysis (Item Response Theory; IRT)

Ítems	SBCS-1	SBCS-2	SBCS-3	SBCS-4	SBCS-5	SBCS-6	SBCS-7	SBCS-8	SBCS-9
SBCS-1	-								
SBCS-2	.61**	-							
SBCS-3	.62**	.61**	-						
SBCS-4	.53**	.49**	.63**	-					
SBCS-5	.12**	.10**	.10**	.08**	-				
SBCS-6	.09**	.13**	.14**	.13**	.60**	-			
SBCS-7	-.01	.03	.01	.04	.54**	.60**	-		
SBCS-8	.05	.05	.06*	.07*	.64**	.66**	.67**	-	
SBCS-9	.01	.03	.01	.03	.58**	.56**	.70**	.66	-
<i>M (SD)</i>	3.71(1.30)	3.65(1.36)	3.69(1.29)	3.50(1.34)	1.78(1.13)	1.83(1.15)	1.48(0.97)	1.66(1.08)	1.50(0.96)
<i>K</i>	-0.66	-0.78	-0.69	-0.95	1.31	0.88	4.08	2.06	4.22
<i>S</i>	-0.72	-0.66	-0.67	-0.49	1.46	1.31	2.16	1.69	2.15
<i>a</i>	1.01	1.05	1.20	1.10	2.85	2.71	3.99	4.07	3.38
<i>b</i>	-1.73	-1.51	-1.49	-1.29	0.93	0.87	1.18	0.98	1.20
<i>c</i>	.00	.02	.01	.00	.04	.03	.00	.00	.04

Note. K = Kurtosis; S = Skewness; a = Discrimination; b = Difficulty; c = Error Probability; * $p < .05$, ** $p < .01$

Confirmatory Factor Analysis (CFA)

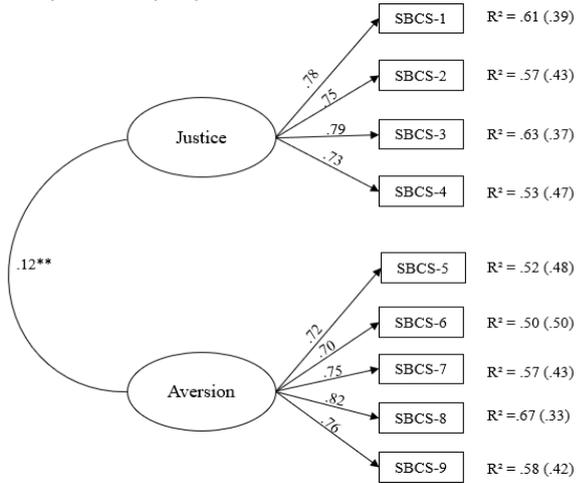
The CFA for the two-dimensional structure of the SBCS scores showed excellent fit indices: χ^2 S-B = 81.800; df = 26; $p < .001$; CFI = .984; TLI = .978; SRMR = .036; RMSEA = .049 (90% CI = [.037, .061]). All the items showed statistically significant standardized factor loadings over .70 and low measurement errors, as well as low but significant covariance between factors. These results provided evidence of validity for a first-order model composed of two interrelated, but non-overlapping dimensions (see Figure 1). Next, a second-order model was tested to find whether the general factor of schadenfreude underlies the first-order factors of justice and aversion. Similarly, optimal fit indices were obtained: χ^2 S-B = 75.507; df = 24; $p < .001$; CFI = .984; TLI = .976; SRMR = .036;

RMSEA = .051 (90% CI = [.038, .064]). These results demonstrated that this model effectively integrates both specific dimensions into a global construct of schadenfreude, which underlines the ability of the scale to assess this moral emotion as a whole.

The test scores obtained excellent reliability and validity indices. For the full scale, values of $\alpha = .79$, $\omega_t = .75$ and $\omega_h = .70$ were obtained, while for the dimension of justice, the indices were $\alpha = .85$, $\omega_t = .84$ and $\omega_h = .84$, with $\alpha = .87$, $\omega_t = .87$ y $\omega_h = .86$ for the dimension of aversion. The composite reliability (CR) produced values of .85 and .88 for both dimensions, while the average variance extracted (AVE) scores were .58 and .55, respectively. Finally, test-retest reliability analyses confirmed adequate stability and reproducibility of the instrument scores in two separate measurements over time, yielding significant, positive Spearman correlation coefficients for both dimensions of the instrument ($\rho_{\text{justice}} = .38$, $p < .01$; $\rho_{\text{aversion}} = .43$, $p < .01$).

Figure 1

Confirmatory Factor Analysis of the SBCS Bidimensional Model



Note. Residual errors are shown in brackets

Measurement Invariance of the SBCS by Gender and Age

The results of the multigroup analysis showed that the unrestricted configural invariance model had a good baseline fit for gender and age. Likewise, the model did not show any significant changes in fit after testing metric invariance and scalar invariance with factor loadings and intercepts reduced so as to be equal in both cases. These results verified the replicability of the instrument scores by gender (boys and girls) and age groups (10 to 13 years and 14 to 17) (see Table 3).

Table 3

Analysis of Factorial Invariance of SBCS Instrument by Gender and Age

Model	Model fit					Model comparison		
	χ^2 -B (df)	CFI	TLI	RMSEA [90% CI]	SRMR	$\Delta\chi^2$ -S-B (df)	Δ CFI	Δ RMSEA
Gender (Boys vs Girls)								
Configural	198.928 (52) ***	.979	.970	.057 [.049, .066]	.032	—	—	—
Metric	205.452 (59) ***	.978	.973	.055 [.047, .063]	.036	10.243(7)	-0.001	-0.002
Scalar	234.036 (66) ***	.975	.973	.055 [.047, .062]	.038	30.171(7)***	-0.003	.000
Age (10-13 vs 14-17)								
Configural	178.206(52) ***	.982	.975	.053 [.045, .062]	.031	—	—	—
Metric	195.917(59) ***	.981	.976	.052 [.044, .060]	.035	18.077(7) *	-0.001	-0.001
Scalar	221.953(66) ***	.979	.977	.052 [.044, .059]	.037	27.086(7) ***	-0.002	.000

Note. CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval; SRMR = Standardized Root Mean Square Residual. *** $p < .001$; * $p < .05$.

Table 4

Means, Standard Deviations and Differences by Gender and Age for Study Variables

	Total		Boys		Girls		<i>t'</i>	<i>d</i>	10-13 years		14-17 years		<i>r</i> ²	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Time 1														
Justice	3.68	1.09	3.68	1.10	3.69	1.08	-0.07	.00	3.76	1.06	3.51	1.15	5.20***	.23
Aversion	1.65	0.85	1.82	0.95	1.45	0.68	11.11***	.45	1.66	0.86	1.60	0.80	1.56	.07
Bullying	0.37	0.55	0.46	0.61	0.27	0.43	8.90***	.36	0.39	0.54	0.34	0.54	2.21*	.09
Cyberbullying	0.16	0.40	0.20	0.47	0.11	0.29	6.10***	.24	0.14	0.38	0.18	0.44	-2.37*	.10
Time 2														
Justice	3.56	1.14	3.54	1.17	3.56	1.12	-0.52	.02	3.64	1.11	3.44	1.16	4.74***	.18
Aversion	1.66	0.88	1.82	0.96	1.48	0.72	10.67***	.40	1.66	0.87	1.64	0.88	0.71	.03
Bullying	0.35	0.55	0.42	0.62	0.25	0.42	8.83***	.33	0.36	0.54	0.31	0.55	2.67**	.10
Cyberbullying	0.18	0.46	0.21	0.53	0.12	0.33	5.90***	.22	0.14	0.38	0.20	0.51	-3.66***	.14

Note. ¹ 1 = Boys, 2 = Girls; ² 1 = 10-13 Group, 2 = 14-17 Group; * $p < .05$; ** $p < .01$; *** $p < .001$.

Relationship Between Schadenfreude and (Cyber)Bullying

After confirming the two-factor structure of the SBCS, the data from subsamples 1 and 2 ($N = 3183$) were combined to explore the longitudinal relationship between schadenfreude and aggression in bullying and cyberbullying (see Table 4). Student's t-test showed the existence of gender differences both at Time 1 and Time 2, with boys reporting significantly higher levels of bullying and cyberbullying in bullying and schadenfreude due to aversion than girls. However, the effect size (Cohen's *d*) was low in all cases. As regards age, it was found that at both measurement times, students aged 10-13 years reported higher levels of schadenfreude through justice and of aggression than students aged 14-17 years, who scored significantly higher on cyberbullying aggression. Again, the effect size was low for all the variables.

With the multiple linear regression models, schadenfreude due to aversion directly and significantly predicted involvement in bullying and cyberbullying aggression at both Time 1 and Time 2. Schadenfreude due to justice inversely predicted cyberbullying aggression at both measurement times, but no significant relationship was found with bullying aggression. There was no evidence of multicollinearity for any of the bullying predictors: Justice ($T = .97$, $VIF = 1.03$) and Aversion ($T = .94$, $VIF = 1.06$) or cyberbullying predictors: Justice ($T = .97$, $VIF = 1.03$) and Aversion ($T = .95$, $VIF = 1.06$). The Durbin-Watson statistics were 1.957 (bullying) and 1.910 (cyberbullying), thus corroborating the absence of autocorrelations between the residuals of the linear regression model and the independent variables (see Table 5).

Discussion

After several decades of research into bullying and cyberbullying, we now know that the emotions arising from an individual’s self-assessment of certain moral events that happen to other people are key to understanding the different behaviour exhibited by boys and girls in online and offline bullying situations (Oriol et al., 2023). Since no instruments aimed at measuring emotions such as *schadenfreude* in this context have been designed to date, the main objective of this study was to design and provide evidence of the validity of a scale to assess this moral emotion in situations of aggression and cyberbullying among primary and secondary school children.

As was expected in the first hypothesis, the results obtained confirmed that the two-dimensional structure, containing the factors of justice and aversion, was the model that best fit the data. Unlike the previously existing scales, which measure *schadenfreude* in general situations without considering the slight changes of angle which occur in specific contexts such as bullying and cyberbullying, and which are based more on empirical results than on solid theoretical foundations, one of the main advantages of this new instrument is that it is supported by a factorial structure based on the Deservingness Theory (Feather, 1999) and the Social Identity Theory (Tajfel, 1974). In addition, this scale has been specifically designed to measure *schadenfreude* in the context of interpersonal relationships established between peers in the school environment, where perceptions of justice and aversion can influence in different ways the emergence and development of immoral behaviour (Wang et al., 2019).

As for the second hypothesis, the multigroup analysis showed that the scores produced by the instrument remain invariant in the subgroups of boys and girls, as well as that of preadolescents and adolescents. This suggests that both genders and age groups understand the construct in the same way and implies that the differences observed are not due to variations in how they interpret

the items, but rather to real differences in their levels of *schadenfreude* (Steyn & De Bruin, 2020). This point is particularly relevant given that some previous works have suggested there may be differences in the cognitive interpretation of moral emotions between boys and girls, as well as between preadolescents and adolescents, due to processes and cultural norms of socialization transmitted from childhood, and to biological predispositions (Chaplin & Aldao, 2013; Vera-Estay et al., 2015).

Finally, as regards the third hypothesis, the instrument showed evidence of predictive validity. Specifically, this study provides information on how *schadenfreude* due to aversion can increase the risk of participating in online and offline bullying. However, when this moral emotion arises from evaluations of justice, the probability of engaging in online bullying was seen to decrease, which could indicate that, although schoolchildren can experience *schadenfreude* at the misfortunes of others, the dimension of justice associated with this emotion could be mediated by the existence of a certain moral criterion or judgment which prevents them from participating in online bullying (Romera et al., 2019). These results reinforce our understanding of how *schadenfreude* is related to involvement in violent behaviour in the context of bullying and cyberbullying.

This work has certain limitations which must be taken into account. Firstly, the study was conducted using self-reports, which, despite being the most widely used instruments in this field, can be influenced by response bias or social desirability, even when anonymity is ensured. Moreover, the use of non-probabilistic sampling limited the selection of the sample to schoolchildren from a single geographical region of Spain, which affects the generalizability of the results and the cross-cultural robustness of the measurements. It would therefore be advisable to conduct future cross-cultural comparative studies using stratified random sampling, and to assess other variables that may influence the activation of *schadenfreude*, such as empathy, a previous history of emotional problems, self-esteem or emotional regulation, among others.

Table 5
Multivariate General Linear Model for the Predictor Variables of Bullying and Cyberbullying

	Time 1				Time 2			
	R ²	F	β	t	R ²	F	β	t
Bullying								
Model 1	.034	40.34***			.019	26.94***		
Gender			-.18	-8.63***			-.13	-7.06***
Age			-.05	-2.39*			-.04	-2.17*
Model 2	.173	119.57***			.170	140.00***		
Gender			-.10	-4.88***			-.07	-3.69***
Age			-.04	-2.06*			-.03	-1.89
Justice			-.01	-0.66			-.01	-0.80
Aversion			.38	19.55***			.40	22.08***
Cyberbullying								
Model 1	.017	19.62***			.014	20.33***		
Gender			-.12	-5.70***			-.09	-4.62***
Age			.06	2.69**			.08	4.76***
Model 2	.098	62.58***			.146	119.21***		
Gender			-.06	-2.89**			-.03	-1.42
Age			.06	2.99**			.08	4.76***
Justice			-.06	-3.08**			-.08	-4.33***
Aversion			.29	14.32***			.37	20.72***

Note. * *p* < .05; ** *p* < .01; *** *p* < .001.

This study provides a theoretically sound, psychometrically valid, and gender- and age-invariant measurement scale that may be especially useful for assessing schadenfreude as a risk factor which makes adolescents more likely to engage in specific bullying and cyberbullying situations. Understanding these types of moral emotions is key in order to identify the negative repercussions they can have both on the moral development of those who experience them, and on their ability to make decisions, which should be based on the ethics of care. This will have a positive impact on the design of prevention and intervention programs aimed at developing strategies that promote the management of social, emotional, and moral competence, which are vital ingredients for online and offline coexistence, helping them to become ecosystems of solidarity and pro-sociality that foster the establishment of positive, beneficial interpersonal relationships.

Author Contributions

Antonio Cabrera-Vázquez: Conceptualization; Formal analysis; Methodology; Visualization; Writing and editing. **Daniel Falla:** Conceptualization; Supervision; Review and editing. **Rosario Ortega-Ruiz:** Supervision; Review and editing. **Eva M. Romera:** Conceptualization; Supervision; Funding acquisition; Data curation; Project administration; Review and editing.

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Declaration of Interests

The authors declare that there is no conflict of interest.

Data Availability Statement

The datasets produced and/or analysed during the study are not available publicly but can be requested from the corresponding author.

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