Psychometric Properties of the Styles of Bystander Defender Intervention Scale in Cyberbullying in Mexican Adolescents: Its Relationships With Moral Identity and Cyberbullying

Bystander Defender Intervention Scale in Cyberbullying

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Abstract

Researchers have a growing interest in measuring the role of bystanders in cyberbullying. Two independent studies with Mexican adolescents (Sample 1 and Sample 2; N1 = 612, N2 = 612) were used to analyze the psychometric properties of the Styles of Bystander Defender Intervention Scale (SBDI) in adolescents. In two samples, confirmatory factorial analyses revealed that a first-order two-dimensional factor structure comprising constructive and aggressive intervention factors was equivalent. The results demonstrated configural, metric, and scalar measurement invariance in the SBDI across gender and education level (secondary vs. high school). Latent mean comparisons indicate differences by gender and education level in the model dimensions. Finally, the results indicate that defenders' aggressive interventions are positively correlated with cyberbullying and negatively associated with moral identity. On the other hand, constructive interventions were negatively related to cyberbullying and positively related to moral identity. The findings suggest that the SBDI is a helpful measure of the styles of bystander defender intervention in cyberbullying events.

Keywords: cross-validation, cyberbullying, defender bystander, internal structure, cross-validation.

Propiedades psicométricas de los estilos de la escala de intervención defensiva en el Ciberbullying: sus relaciones con la identidad moral y el Cyberbullying

Resumen

El interés por la medición del papel del espectador defensor en el ciberacoso es creciente. El presente estudio analizó las propiedades psicométricas de la escala Estilos de Intervención Defensiva de los Espectadores (SBDI), con base en dos estudios independientes con adolescentes mexicanos (Muestra 1 y Muestra 2; N1 = 612, N2 = 612). Los análisis factoriales confirmatorios comprobaron que el modelo bifactorial compuesto por los factores de intervención constructiva y agresiva del espectador defensor se ajusta a los datos. Se confirmó la invariancia de medida por sexo y nivel educativo (secundaria vs. bachillerato) de la escala. El análisis de medias latentes mostró diferencias por sexo y nivel educativo en los factores. La intervención agresiva se asoció positivamente con el ciberacoso y negativamente con la identidad moral, mientras que la intervención constructiva lo hace de forma negativa con ambas variables. Los hallazgos sugieren que la SBDI es útil para medir los estilos de intervención del espectador defensor en eventos de ciberacoso.

Palabras clave: ciberacoso, espectadores defensores, estructura interna, invariancia de medida, validación cruzada.

Introduction

Adolescents frequently use digital devices and content (Organisation for Economic Co-operation and Development [OECD], 2019). Adolescents frequently use digital devices and content (OECD et al., 2020). Although differences in Internet access persist among Latin American countries, some studies have reported adolescents' frequent use of this resource for entertainment, socialization, and learning (OECD, 2020; Trucco & Palma, 2020). In Mexico, the National Institute of Statistics and Geography [INEGI], 2020) reports that 90% of adolescents between 12 and 17 years old are frequent internet consumers. Although Internet use has brought substantial benefits to adolescents' cognitive and social development (Ang, 2017; Skryabin et al., 2015), it has also had adverse effects, including online aggression (Chester et al., 2019; Rice et al., 2015).

Cyberbullying involves aggressive, repetitive, and intentional attacks through electronic devices against victims who cannot easily defend themselves (Hamm et al., 2015; Smith et al., 2008). Studies have revealed a substantial prevalence of cyberbullying in Latin American countries such as Ecuador (Calmaestra et al., 2020), Colombia and Uruguay (Yudes-Gómez et al., 2018), Argentina (Pengpid & Peltzer, 2022), and Brazil (Malta et al., 2022). In Mexico, empirical studies show that 20–30% of Mexican students have been victims of cyberbullying at some point in their schooling (INEGI, 2021; Madrid-López et al., 2020). Cyberbullying can have long-lasting adverse effects on youth mental health, including depression, anxiety, substance abuse, suicidal ideation, and attempts (Graham & Wood, 2017; Iranzo et al., 2019; Pengpid & Peltzert, 2022; Santos et al., 2022). Moreover, cyberbullying is strongly related to school absenteeism, low academic performance, and negative perceptions of school climate (Hinduja & Patchin, 2008; Ortega & González, 2016).

Throughout literature, cyberbullying is perceived as a social phenomenon that involves an aggressor, a victim, and a bystander. While the roles of aggressors and victims have been broadly explored, the role of bystanders is still understudied despite their potential to inhibit aggression and promote victims' well-being (Machackova & Pfetsch, 2016; Zych et al., 2019). Overall, scholars agree that bystanders should be behavior in cyberbullying events: passive, reinforcement of aggression, or defender of cyber victims (Mallmann et al., 2017; Olenik-Shemesh et al., 2017; Song & Oh, 2018). While passive and reinforcing bystanders have been shown to promote cyberbullying and its harmful effects on victims, defenders are expected to be potential shields that may not only hinder cyberaggression but also attenuate its negative effect on victims (DeSmet et al., 2019; Holfeld, 2014; Torgal et al., 2023).

Bystander-defender behavior involves stopping cyber aggression or comforting cyber victims (Olenik-Shemesh et al., 2017; Sarmiento et al., 2019). Traditionally, bystander defenders' interventions have been conceptualized and measured as one-dimensional constructs (see Reijntjes et al., 2016; Salmivalli et al., 1996). However, current studies suggest that defender intervention is a multidimensional construct involving aggressive and constructive interventions to help victims (Bussey et al., 2020; García-Vargas et al., 2023; Moxey & Bussey, 2020). Defending constructive interventions include prosocial behaviors that may be oriented toward victims (by providing support and orientation) or toward the bully (by trying to stop aggressive behaviors and motivating the aggressor to apologize to the victim) (Cassidy et al., 2013; DeSmet et al., 2014). However, the intervention of aggressive bystander defenders implicates retaliation behavior against the bully (e.g., spreading rumors or posting images or videos denigrating the aggressor) (Bussey et al., 2020; Moxey & Bussey, 2020).

Despite being aimed at defending victims, bystander intervention effectively stops aggression only when it is constructive; otherwise, it contributes to increasing violence (Moxey & Bussey, 2020; Pronk et al., 2019). Nonetheless, adopting a

constructive or aggressive stance remains unpredictable, because it relies on individuals' psychological resources and moral development. In this regard, Bussey et al. (2020) reported that self-efficacy and low moral disengagement are positively related to constructive defender intervention and negatively related to aggressive intervention. A recent study (Valdés-Cuervo et al., 2021) shows that moral guilt and sympathy are negatively related to the aggressive defending intervention.

Measures of Bystander Defender Behavior in Cyberbullying

Salmivalli et al. (1996) define bystander defender intervention as a unidimensional construct that combines indicators of constructive and aggressive interventions. However, the current scales (DeSmet et al., 2016; Ferreira et al., 2020; Pozzoli & Gini, 2020; Sarmiento et al., 2019) exclude items aimed at assessing aggressive interventions. The Styles of Bystander Defender Intervention scale (SBDI; Moxey & Bussey, 2000) is the only scale found by the authors that measure bystander defender intervention as a multidimensional construct that comprises both constructive and aggressive interventions.

Moxey and Bussey (2020) used a sample of Australian high school students to report the validity of interpretation based on the SBDI. However, this measure presents at least five issues that must be addressed. First, no known study by the authors has compared the adjustment of the two-dimensional model proposed in the SBDI scale with the one-dimensional model, as traditionally proposed (see Salmivalli et al., 1996). Second, cross-validation was required to ensure the stability of the measurement model. Third, no study has examined the discriminant validity of each subscale, a condition needed to verify the construct's uniqueness (Shiu et al., 2011). Fourth, few studies have examined the measurement invariance of SBDI in critical variables such as gender and educational level. Fifth, the analysis of evidence based on relationships with other variables remains limited. Furthermore, no

studies have explored the validity and reliability of the scale score to measure constructs among Mexican adolescents.

Gender Differences in Bystander Defender Intervention

Although limited, previous findings of gender effects in bystander aggressive and constructive intervention indicate that constructive defending intervention was more frequent in females than males, whereas aggressive intervention was more prevalent in males (Bussey et al., 2020; Moxey & Bussey, 2020). Regarding the length of enrollment, whereas Moxey and Bussey (2020) found fewer constructive interventions for 9th-grade students than for 7th-grade students, Bussey et al. (2020) reported significant differences. Nonetheless, these studies did not examine the scale's measurement invariance by gender. It is essential to mention that measurement invariance ensures that differences between groups result from variances in the expression of the construct, rather than from measurement bias (Byrne, 2016; Van de Schoot et al., 2012). Therefore, it is necessary to establish measurement invariance for meaningful group comparisons.

Relationships With Related Constructs

Based on theoretical considerations, we expected that both types of bystander interventions would be differently associated with cyberaggression and moral identity. In line with previous literature (Chan & Wong, 2019; Marín-López et al., 2019), we posit that constructive bystander interventions are negatively associated with cyberbullying, and aggressive interventions are positively associated.

Constructive bystander interventions are associated with higher moral emotions and lower moral disengagement (Bussey et al., 2020; Moxey & Bussey, 2020; Valdés-Cuervo et al., 2021). We expected that moral identity, the importance of being a moral person based on the person's identity (Gibbs, 2014; Hardy & Carlo, 2011), would

encourage constructive interventions and hinder aggressive interventions.

The Present Study

The present study proposed examined the validity of the interpretation of scores of Styles of Bystander Intervention in Cyberbullying (SBDI) to describe the frequency of constructive and aggressive styles of intervention in cyberbullying events in Mexican adolescents. The study assumed that validity is a unitary concept, so various sources of evidence should be integrated into the judgment of the validity of the interpretation (American Educational Research Association et al., 2014; Zumbo et al., 2014). To examine evidence based on internal structure: (1) calculate several confirmatory factorial analyses (CFA) to compare the goodness of fit of the one-dimensional and two-dimensional measurement models of bystander defender intervention (see Figure 1). (2) Verify whether the differences between the factors are empirically grounded. (3) Cross-validation was performed to examine the stability of the internal structure in an independent sample. (4) Use robust measures to ensure scale reliability (McDonald's Omega and variance extracted). (5) Explore scale measurement invariance by gender and educational level (secondary vs. high school). (6) Comparison of latent means by gender and educational level. Additionally, (7) we examined evidence validity based on the scale dimensions' relations with external variables such as cyber aggression and moral identity.

Figure 1. Factor Model of Styles of Bystander Defender Intervention in Cyberbullying
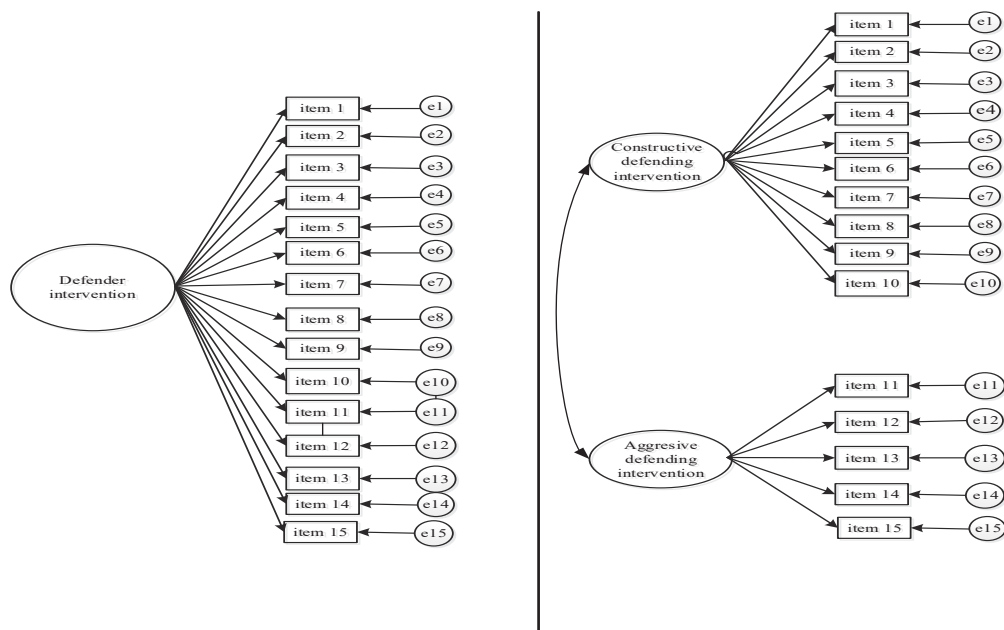
Method

We used a non-probabilistic sample of Mexican adolescents. The sample came from urban secondary schools (N = 68) and high schools (N = 68) in Sinaloa (Sample 1) and Sonora (Sample 2), Mexico. These schools are located in the middle and low-class areas of these cities. In both samples, nine participants were recruited from each school (three from each grade). We ensured that the ratio of male to female students was similar to that in the schools. Sample 1 (calibration sample) included 612 (nine from each school) adolescents (42.3% males and 57.7% females), with 306 (50%) secondary students aged from 12 to 15 years old (M years = 13.2, SD = 1.04), and 306 high school students (50%) aged from 15 to 19 years old (M years = 16.2, SD = 1.01). Sample 2 (cross-validation sample) contained 612 (nine from each school) adolescents (43% male and 57% female), with 306 (50%) secondary students aged from 12 to 15 years old (M years = 12.9, SD = 1.24), and 306 (50%) high schools students aged from 15 to 19 years old (M years = 15.8, SD = 1.11).

Measures

Styles of Bystander Intervention in Cyberbullying Incidents

The Styles of Bystander Defender Intervention Scale (SBDI; Moxey & Bussey, 2020) was used. The scale includes 15 items grouped into two dimensions: constructive defending intervention (10 items, e.g., encouraging the child to report being picked on) and aggressive defending intervention (5 items, e.g., sharing humiliating images or videos of the bully). Likert scale response with five points (0 = never to 4 = always) was used to answer questions such as, "During the last term, how often did YOU respond to defend a cyber-victimized kid?"

A back-translation procedure was adopted to translate the items from English to Spanish. Three professional bicultural bilingual translators participated in the scale translation. One translator, whose mother language was Spanish, translated the English version of the scale into Spanish. A second translator, whose mother language was English, translated the Spanish version back to English. A third translator certified the equivalence of these versions.

Cyberbullying

The Adolescent Cyber-Aggressor Scale (CYB-AGS; Buelga et al., 2020) was used. This scale comprises 18 items to measure the frequency of harassment and intimidation suffered by classmates using the Internet and social media (e.g., average variance extracted AVE = .58, *McDonald's Omega* W = .83). The scale uses a Likert response format (0 = *never* to 4 = *always*). The CFA evidence the model fit to the data (SBX^2 = 163.43, df = 132, p = .033; SRMR = .04; CFI = .98; TLI = .97; RMSEA = .05, 90% CI [.03, .06]).

Moral Identity

The Moral Identity Scale (MIE; Aquino & Reed, 2002) was used to measure the construct. A back-translation procedure was used to translate the scale from English to Spanish. The scale comprises two dimensions: (1) internalization, with four items to assess the level of importance that individuals assign to moral traits (e.g., I feel good to be a person who holds features such as compassion, kind, fairness, generosity, and honesty; VME = .62, W = .74), and (2) symbolization, with five items to assess the level of moral traits reflected in individuals' behavior (e.g., the things I do during my free time portrays me as a person that holds: compassion, kindness, fairness, generosity, and honesty; VME = .51; W = .88). The items were rated on a Likert scale (0 = *strongly disagree* to 4 = *strongly agree*). The results of the CFA supported the model's goodness of fit (SBX^2 = 38.20, df = 20, p = .008; SRMR = .019; TLI = .99; CFI = .99; RMSEA = .02, 90% CI [.01, .04]).

Procedure

The Ethical Commission of the Institute Technologic of Sonora approved the study. Secondary

and high schools were invited to participate in the study. Schools that agreed to participate in this study were also included. Data were collected in the classroom during school hours. Parents were then asked for permission from their children to respond to the questionnaires. Only 4% of the parents rejected authorization for their children to participate. Next, the students were informed about the study's objective and that their participation would be voluntary. Finally, the participating students and parents were informed about the confidentiality of the participants.

Data analysis

The dataset contains no missing data. Means, standard deviation, symmetry, and kurtosis were calculated. We assumed that skewness and kurtosis values between -2 and 2 indicated univariate normality (George & Mallery, 2001).

Analysis of Evidence Based on Internal Structure

The goodness of fit of the one-dimensional (Model 1) and two-dimensional (Model 2) measurement models was compared (see Figure 1). The CFA uses the Diagonal Weighted Least Squares Robust (DWLS) estimation method with robust X^2 (SBX^2) correction using the LISREL 12 software. The goodness of fit of the one-dimensional (Model 1) and two-dimensional (Model 2) measurement models was compared (see Figure 1). Because the SBX^2 statistic is sensitive to large sample sizes (Byrne, 2016; Powel & Schafer, 2001), we additionally used fit indices, such as the standardized root mean square (SRMR), comparative fit index (CFI), Tucker Lewis index (TLI), and root mean square error of approximation (RMSEA). The structural equation literature (SEM) suggests that the values of SRMR and RMSEA ≤ .08 and CFI and TLI are ≥ .95 indicating a good model fit (Brown, 2015; Byrne, 2016). The goodness of fit of the model was compared using differences in SBX^2 (ΔSBX^2), Akaike Information Criterion (ΔAIC), and Bayesian Information Criterion (ΔBIC). When the difference in ΔSBX^2 was

significant, a model with greater SBX^2 had a worse fit (Brown, 2015; Byrne, 2016). Furthermore, differences in AIC and BIC > 10 indicate distinctions in the model's fit, and a model with greater AIC and BIC has poor fit (Byrne, 2016; Vrieze, 2012).

We confirmed that the distinctions between the scale dimensions were empirically supported. Based on the guidelines proposed in the literature, we expected that the square of the correlation (R^2) between the SBDI factors would be less than the AVE of each factor (Hair et al., 2010).

Cross-Validation Analysis

Structural cross-validation examines the replicability of the measurement model in an independent sample (Byrne, 2016). Multigroup analysis was used to assess the replicability of the factor structure in an independent sample (sample 2). Configural, metric, and scalar invariances were also examined. Measurement invariance was supported when ΔSBX^2 was not significant ($p > .001$), $\Delta CFI \leq .01$, and $\Delta RMSEA \leq .015$.

Reliability Analysis

The scale's reliability was tested using McDonald Omega (W) and the average variance extracted (AVE). The results of $\omega > .70$ and AVE > .50 suggest adequate reliability of the scale scores (Dunn et al., 2014; Hair et al., 2017).

Measurement Invariance Analysis by Gender and Educational Level

Using a multigroup procedure, we tested configural (constrained the number of factors and factor-loading structure to be the same across groups), metric (fixed factor loadings across groups), scalar invariance (constrained intercept across groups), and residual invariance (constrained item residuals variance across groups). The nested factor model was used to examine measurement invariance in the groups by gender and educational level. The difference in SBX^2 (ΔSBX^2) was not statistically significant ($p > .001$), suggesting that the constraints imposed were equal between the groups (Brown,

2015; Byrne, 2016). We also used the differences in CFI and RMSEA to assess the invariance. The structural modeling literature proposed that differences in CFI (ΔCFI) less than .01 and differences in RMSEA (ΔRMSEA) less than .015 confirmed model invariance (Sass & Schmitt, 2013). When the results were contradictory, we assumed that the differences in CFI and RMSEA were due to the large sample size.

Latent Means Differences

Latent means by gender and education level were compared. The reference groups (girls and high school students) were fixed at zero, while the factor means of the other groups were estimated freely. A z-statistic was used to examine the differences between latent means (Brown, 2015; Byrne, 2016).

Analysis of Evidence Based on the Scale Relations With External Variables

Correlations between the SBDI with external variables were calculated to examine concurrent validity. Then, the correlation between SBDI and cybervictimization was calculated. The effect size was assessed based on guidelines from the literature (see Funder & Ozer, 2019). An effect size *r* of .10 is small, .20 indicates a medium effect, and .30 suggests a large effect.

Results

Descriptive Analysis

Table 1 provides the descriptive statistics of the items. For ten items, the means center in the "sometimes" category, with the remaining five in the "never" category. The results of skew and kurtosis indicated a normal univariate for 11 items. However, statistics indicate departures of univariate normality for items 11, 12, 13, and 14. These results indicate that adolescents rarely intervened in defending themselves against cyberbullying victims.

Table 1 *Descriptive Statistics of the SBDI Items of Calibration (Sample 1) and Cross-Calibration Sample (Sample 2)*

Item	Sample 1				Sample 2			
	M	*SD*	Skew	Kurtosis	*M*	*SD*	Skew	Kurtosis
Item 1	2.78	1.33	-0.83	-0.47	2.84	1.32	-0.96	-0.28
Item 2	2.83	1.25	-0.87	-0.19	2.86	1.23	-0.82	-0.35
Item 3	1.91	1.28	-0.96	-0.15	2.02	1.54	0.15	-1.45
Item 4	1.95	1.52	-0.48	-1.43	2.21	1.38	-0.41	-1.01
Item 5	2.62	1.33	-0.59	-0.78	2.42	1.43	-0.44	-1.11
Item 6	2.43	1.36	-0.41	-0.99	2.23	1.39	-0.39	-1.06
Item 7	2.48	1.41	-0.50	-1.03	2.16	1.44	-0.14	-1.29
Item 8	2.45	1.38	-0.44	1.02	2.12	1.23	-0.87	-0.92
Item 9	2.18	1.42	-0.17	-1.24	2.28	1.41	-0.67	-0.88
Item 10	2.32	1.45	-0.31	-1.22	2.13	1.21	-0.45	-1.12
Item 11	0.46	0.87	2.06	3.93	0.51	0.63	1.93	3.16
Item 12	0.38	0.52	3.01	6.28	0.31	0.46	1.80	6.81
Item 13	0.39	0.72	2.36	5.46	0.44	0.68	1.91	4.43
Item 14	0.50	1.13	2.01	3.46	0.53	0.78	1.92	3.01
Item 15	0.83	1.13	1.27	0.74	0.85	1.16	1.23	0.58

Assessing One-Dimensional and Two-Dimensional Measurements Models

The goodness-of-fit statistics for the one-dimensional (Model 1) and two-dimensional (Model 2) measurement models in Sample 1 (calibration sample) were assessed. Confirmatory factor analyses showed that Model 1 did not have a reasonable adjustment to the data ($\text{SBX}^2 = 680.14$, $df = 76$, $p < .001$; SRMR = .12; CFI = .88; TLI = .77; RMSEA = .13, 90% CI [.12, .14]), whereas Model 2 had an acceptable goodness of fit ($\text{SBX2} = 105.61$, $df = 78$, $p = .014$; SRMR = .04; CFI = .98; TLI = .97; RMSEA = .04, 90% CI [.03, .05]). The fit of Model 2 showed better adjustment than Model 1 ($\Delta\text{SBX}^2 = 384.53$, $df = 2$, $p < .001$; ΔAIC = 515.73; ΔBIC = 515.62; see Table 2).

Table 2 *Goodness-of-fit Statistics of the One-Dimensional and Two-Dimensional Measurement Models (N = 612)*

Model	SBX^2	df	p	AIC	BIC	Comparison	ΔSBX^2	ΔAIC	ΔBIC
One-dimensional	490.14	76	< .001	767.42	892.54	1 vs. 2	384.53	515.73	521.62
Two-dimensional	105.61	78	.014	251.69	370.92				

In Model 2, the factor loadings were from .54 to .88 ($p < .001$); the constructive defending and aggressive defending intervention factors were positively correlated with each other (see Figure 2). The remaining analyses were based on model 2. These results indicate that bystander defender intervention is a two-dimensional model.

Figure 2 *Results of the Two-Dimensional Model of Styles of Bystander Defender Intervention*
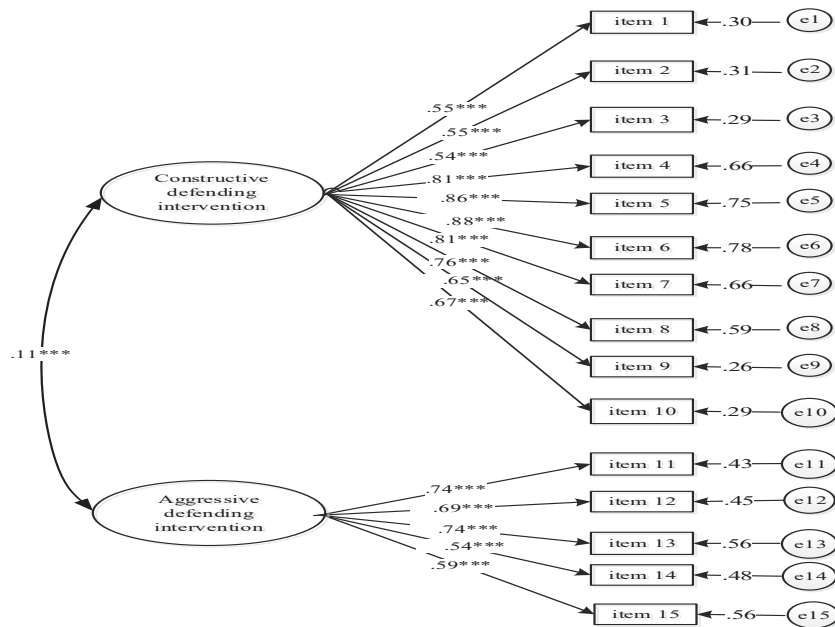
Note. Standardized factor loadings are also reported.

The square of the correlation between the SBDI factors in both samples was less than the AVE of each factor (Sample 1 AVE = .52, R^2 = .01; Sample 2 AVE = .53, R^2 = .02). We concluded that these scores confirm the uniqueness of each SBDI dimension.

Factorial Structure Cross-Validation

A multigroup procedure was used to assess the stability of the two-dimensional measurement model in an independent sample of adolescents. The configural model (SBX^2 = 192.65, df = 152, p = .014; SRMR = .04; CFI = .97; TLI = .96; RMSEA

= .04, 90% CI [.03, .07]) had an adequate fit for the data. Furthermore, the results confirmed the metric and scalar invariance of the model (see Table 3). Additionally, the reliability for each factor in both samples was acceptable: constructive defending (Sample 1, ω = .77 and AVE = .52; Sample 2 ω = .79 and AVE = .53), and aggressive defending (Sample 1, ω = .81 and AVE = .55; Sample 2 ω = .78; AVE = .51). Overall, these results confirmed that Sample 1 factor structures were replicated in Sample 2, which confirms the stability of the two-dimensional first-order structure.

Table 3 *Results of Comparisons Between Sample 1 (N = 612) and Sample 2 (N = 612)*

Model	SBX^2	df	ΔSBX^2	Δdf	p	ΔCFI	ΔRMSEA
Configurational	192.65	152					
Metric	203.05	165	12.4	13	.495	.001	.001
Scalar	211.34	168	18.69	16	.285	.001	.002

Assessing Measurement Invariance by Gender

The configural model had a goodness-of-fit on both samples (Sample 1 SBX^2 = 205.45, df = 152, p = .002; SRMR = .051; CFI = .98; RMSEA = .03, 90% CI [.02, .03]; Sample 2 SBX^2 = 196.25, df = 152, p < .001; SRMR = .06; CFI = .98; RMSEA = .03, 90% CI [.02, .04]). When factor loadings were fixed to be equal across genders (metric invariance), the difference in the configural model was not statistically significant in either sample, and changes in the CFI and RMSEA were small (ΔCFI < .01, and ΔRMSEA < .015). When intercepts of the observed variables were forced to be equal by gender, the differences were not statistically significant, and differences in CFI and RMSEA were small (ΔCFI < .01, and ΔRMSEA < .015), which supports scalar invariance in Samples 1 and 2. Finally, the results support residual invariance (see Table 4).

Assessing Measurement Invariance by Educational Level

The fit indices indicated that the configural model fit the data by educational level in both samples (Sample 1: SBX^2 = 205.67, df = 152, p = .002; SRMR = .04; CFI = .97; TLI = .96; RMSEA= .04, 90% CI [.03, .06]; Sample 2 SBX^2 = 194.38, df = 152, p = .011; SRMR = .05; CFI = .96; TLI = .95; RMSEA= .05, 90% CI [.03, .07]). The factor loadings were constrained to be equal between secondary and high school students (metric invariance), the comparison with the configural model was not statistically significant in either sample, and the changes in CFI and RMSEA were not significant (ΔCFI < .01, ΔRMSEA < .015). We then added constraints on the intercepts of the model (scalar invariance). These results show that the difference in SBX^2 between models was not significant, and the changes in CFI and RMSEA were smaller than those suggested in the literature (ΔCFI = .003, ΔRMSEA = .002). Also, the results confirmed residual invariance by educational level (secondary school vs. high school) (see Table 4).

Table 4 *Summary of Fit Statistics for Testing Measurement Invariance by Gender and Education Level in Styles of Bystander Defender Intervention Scale in Cyberbullying*

Invariance	SBX^2	df	ΔSBX^2	Δdf	p	ΔCFI	ΔRMSEA
Gender							
Sample 1							
Configural	205.45	152					
Metric	225.89	165	20.44	13	.085	.004	.001
Scalar	234.23	168	28.78	16	.025	.007	.004
Residual	264.56	188	30.33	20	.064	.008	.003
Sample 2							
Configural	196.25	152					
Metric	213.33	165	17.08	13	.196	.003	.002
Scalar	221.43	168	25.18	16	.07	.005	.005
Residual	251.12	188	29.69	20	.075	.008	.009
Educational level (secondary vs. high school)							
Sample 1							
Configural	205.67	152					
Metric	230.22	165	24.55	13	.026	.002	.001
Scalar	236.11	168	30.44	16	.016	.003	.002
Residual	270.65	188	34.54	20	.023	.008	.007
Sample 2							
Configural	194.38	152					
Metric	208.18	165	13.8	13	.388	.003	.003
Scalar	216.23	168	21.85	16	.148	.006	.006
Residual	242.15	188	25.92	20	.168	.008	.009

Latent Means Differences

Females were chosen as a reference group to compare factors by gender. Then, the male means informed the difference in constructs across the groups. The results show a statistically significant difference in gender in the model dimensions. Notably, girls had higher levels of constructive defense and lower levels of aggressive defense than did boys.

Concerning possible differences by educational level, the high school group was chosen as the reference and the secondary students' group was informed of the difference in factor means. The test results revealed a statistically significant difference that was unique to the aggressive defense dimension. High school students had higher levels of aggressive intervention than secondary school students when they observed cyberbullying incidents (see Table 5).

Relations With External Variables

As expected, constructive defending had a negative relationship with cyberbullying and a positive relationship with moral identity (see Table 6). Furthermore, as expected, aggressive defending interventions were positively correlated with cyberbullying and negatively correlated with moral identity. The effect size of the correlation ranged between low and medium, suggesting explicative and practical consequences (Funder & Ozer, 2019). Overall, these correlations confirmed the concurrent validity of the SBDI.

Table 5 *Latent Means Differences by Gender and Educational level on SBDI*

Variable	Factor	M_{dif}	z	p	Cohen's d
Gender	Constructive	0.24 *0.19*	-2.58 *-2.19*	.010 *.028*	0.11 *0.08*
	Aggressive	0.27 *0.32*	6.30 *5.08*	< .001 < .001	0.18 *0.20*
Educational level	Constructive	0.07 0.11	0.25 *-0.89*	.802 *.373*	0.03 *0.05*
	Aggressive	0.14 *0.20*	-3.12 *-2.13*	.002 *.017*	0.09 *0.07*

Note. Values in regular font are from Sample 1; those in italics are from Sample *2.*

Table 6 *Correlations Between SBDI Subscales, Cyberbullying, and Moral Identity*

	1	2	3	4
1. Defender constructive intervention	_	.13	-.19**	.20**
2. Defender aggressive intervention	.11	_	.22**	-.17**
3. Cyberbullying	-.17**	.24**	_	.27**
4. Moral identity	.18**	-.15**	.29**	_

Note. Sample 1 values are below the diagonal, and sample 2 values are above the diagonal.

**p < .01.

Discussion

Prior studies have investigated bystander-defender intervention in cyberbullying events; most conceptualized bystander-defender intervention in cyberbullying as prosocial. However, this study confirms that defender intervention should be aggressive or constructive. Thus, unlike other scales, the Styles of the Bystander Defender Intervention (SBDI) considers two possible stances for defenders: constructive and aggressive. Given its relevance to advancing the current understanding of multidimensional defenders' interventions in cyberbullying, this study sought to examine the psychometric properties of the SBDI in a Mexican sample. Our findings confirm what other studies report, bystander defender intervention is a multidimensional construct that comprises aggressive and constructive intervention. Furthermore, the results indicate that the scale may be suitable (valid and reliable) for use in Mexican populations, facilitating research on variables associated with constructive interventions in cyberbullying.

Bystander Defender Intervention as a Multidimensional Construct

Findings support the multidimensional conceptualization of the bystander defender intervention proposed by the SBDI. Discriminant validity was confirmed, suggesting that constructive and aggressive factors measure a unique construct. Our results align with those of previous research (Bussey et al., 2020; Lou & Bussey, 2019; Moxey & Bussey, 2020) that distinguishes constructive and aggressive interventions for cyberbullying bystanders. Further studies are needed to explore the roots and effects of different bystander intervention styles on cyberbullying. Similarly, it is necessary to explain the effects of bystander interventions (constructive and aggressive) on the prevalence and prevention of cyberbullying.

Measurement Invariance by Gender and Educational Level

The results provide empirical evidence supporting the measurement invariance of the SBDI scale by gender and education level (secondary and high school). In other words, the SBDI

measures the same metrics between the groups. Once measurement invariance was confirmed, mean latent differences were examined in these groups. Consistent with other studies regarding gender differences (Bussey et al., 2020; Moxey & Bussey, 2020), these results confirm the statistical differences in both model dimensions. Girls have higher levels of constructive and lower levels of aggressive intervention in cyberbullying.

Statistically significant differences in aggressive interventions were also found among the education level groups. High school students had higher levels of aggressive intervention in cyberbullying incidents than secondary school students. Further research is needed to test the roots of these differences by analyzing contextual, family, and personal factors as input variables leading to constructive or aggressive defender interventions.

Relations With External Variables

The expected correlation between the SBDI and cyberbullying and moral identity was found, confirming concurrent validity. These results are in line with those of previous studies (see Moxey & Bussey, 2020). Although further studies are needed, we suggest that the violence escalation cycle framework (Anderson & Carnagey, 2004) helps to explain the effect of aggressive interventions in maintaining cyberbullying.

On the other hand, the results are consistent with past research (see Bussey et al., 2020; Valdés-Cuervo et al., 2021), showing that aggressive intervention by bystanders is negatively associated with moral identity, whereas constructive intervention is positively related. Although additional research is needed to understand these relationships, we posit that moral identity is a potential buffer for adolescent aggression (see Colasante et al., 2015).

Theoretical and Practical Implications

This research improves our knowledge of the role of bystanders in cyberbullying. Identifying specific roles and associated factors has contributed to the development of effective targeted bystander cyberbullying interventions. The intervention of defender bystanders is crucial for education, evaluation, and research purposes. The distinction between aggressive and constructive bystander defender interventions facilitates the study of psychosocial factors associated with these behaviors and the development of targeted and helpful anti-cyberbullying programs. Furthermore, an intervention that promotes bystander defender intervention could teach students how to intervene constructively in cyberbullying events. Although further studies are necessary, the findings suggest that strategies to encourage cyber bystanders' defensive interventions must be accompanied by interventions that encourage students' moral development.

The measurement invariance of the SBDI facilitates a meaningful comparison of defender interventions by gender and educational level (secondary vs. high school). Then, practitioners can identify the differences in factors associated with types of defender intervention in both gender and educational level (secondary and high school). In addition, they can evaluate whether programs to promote bystander construction and hinder aggressive defending interventions have different results according to gender and education level.

Limitations

This study has several limitations. First, the results were based on self-reported measures, which may have inherent response biases. Therefore, further studies should include different informants (e.g., peers and teachers) and measurement strategies (e.g., interviews) to provide a more robust scale to measure the styles of bystander defender interventions in cyberbullying events. Second, the findings are based on a non-probabilistic sample from a specific region of Mexico. It is desirable to use random and cross-national samples from diverse cultures (e.g., indigenous students) to examine the psychometric properties of the SBDI.

Third, given the cross-sectional design of this study, it remains challenging to assess whether aggressive or constructive intervention exists. Therefore, further studies should examine the prevalence of the bystander defender type (constructive or aggressive) in cyberbullying events over time. Finally, we need to examine the validity equivalence of the English and Spanish versions of the scale. Further research should examine the validity of the interpretation of this two-scale version.

Future Research

Future studies must further examine the precursors and consequences for victims of both styles of bystander–defender intervention in cyberbullying. Additionally, differences in gender and education levels in defender intervention styles should be studied. Finally, additional studies exploring the consequences of aggressive and constructive interventions in prevention programs are required.

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Appendix

Styles of *Bystander Defender Intervention Scale*

Constructive intervention

By telling the cyber-aggressor, you think that what the cyberbullying did is not OK.
> Le digo al ciber agresor que el ciberbullying no está bien.

By comforting the cyber victim and telling them that it is not their fault that they were picked on.
> Consuelo a la ciber víctimas y les digo que no es su culpa que la hayan molestado.

By encouraging the cyber-victim to report being picked on.
> Animo a la ciber víctima a denunciar que la están molestando.

By telling the cyber-aggressor to stop picking on the other students.
> Le digo al ciber agresor que deje de molestar a otros estudiantes.

By telling the cyber-aggressor that picking on the other students was mean and wrong.
> Le digo al agresor ciber agresor que molestar a los otros estudiantes es malo e incorrecto.

By telling the cyber-aggressor that picking on the other students is hurtful to them.
> Le comento al ciber agresor que acosar a otros estudiantes es dañino para él mismo.

By telling the cyber-victim to ignore the mean things that were said.
> Le digo a las ciber víctimas que ignoren las cosas malas que le dicen.

By encouraging the cyber-aggressor to say sorry to the student they picked on.
> Estímulo al ciber agresor a pedir disculpas al estudiante que molesto.

By giving the cyber-victim advice about coping with cyberbullying.
> Aconsejo a la ciber víctima como manejar la situación de ciberacoso.

By telling the cyber-aggressor to back-off.
> Le digo al ciber agresor que se detenga.

Aggressive Intervention

By writing embarrassing jokes or comments about cyber-aggressor.
> Publico chistes o comentarios vergonzosos sobre el ciber agresor

By sharing humiliating images or videos of the cyber-aggressor.
> Comparto imágenes o videos humillantes del ciber agresor.

By spreading rumors or gossip about cyberbully.
> Difundo rumores o chismes del ciber acosador.

By making threats to the cyber-aggressor.
> Amenazo al ciber aggressor.

By saying mean things about the cyber-aggressor.
> Publico cosas malas del ciber agresor.