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Bidirectional association between normative adjustment and bullying perpetration in adolescence: A prospective longitudinal study☆

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ABSTRACT

Normative adjustment stimulates the development of attitudes and behaviours that promote school climate. Previous research has shown that it is a relevant factor in preventing involvement in risk behaviours that affect the quality of peer relationships in classrooms and schools. Previous the development of behaviour adjusted to the norms which promotes interaction processes fostering a positive atmosphere in the classroom and in the school. The aim of this study is to analyse the prospective influence of normative adjustment on bullying perpetration over four time periods spaced six months apart (18 months). A total of 3017 adolescents between 11 and 16 years (49.5% girls; M_{ageT1} = 13.15, SD = 1.09) are involved in the present study. The Random Intercept Cross-Lagged Model results indicate an influential bidirectional association between normative adjustment and bullying perpetration over time. When the adolescents' normative adjustment increases, their involvement in bullying perpetration decreases six months later. On the other hand, when the adolescents' bullying perpetration increases over time, a decrease in normative adjustment is evident later. The unconditional univariate growth results report that normative adjustment increases, while bullying perpetration decreases. These findings are discussed in terms of the need to consider contextual factors and how they interact in our understanding and prevention of bullying in schools.

Asociación bidireccional entre el ajuste normativo y la agresión en acoso escolar en la adolescencia: un estudio longitudinal prospectivo

Palabras clave:
Acoso escolar
Normas
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Convivencia
Random Intercept Cross-Lagged

RESUMEN

El ajuste normativo estimula el desarrollo de actitudes y comportamientos que promueven la convivencia escolar. Estudios previos subrayan su relevancia para prevenir la implicación en comportamientos de riesgo que afectan a la calidad de las relaciones entre iguales en el aula y en el centro escolar. El objetivo del estudio es analizar la influencia prospectiva entre el ajuste normativo y la perpetración de acoso durante cuatro períodos de tiempo con un intervalo de seis meses (18 meses). Han participado un total de 3.017 adolescentes entre 11 y 16 años (49.5% niñas; M_{edad}T1 = 13.15, DT = 1.09). Los resultados del Modelo Random Intercept Cross-Lagged indican una asociación bidireccional entre el ajuste normativo y la perpetración del acoso a lo largo del tiempo. Cuando los adolescentes aumentan su ajuste normativo, disminuye su participación en la perpetración del acoso seis meses después. A su vez, cuando aumenta la implicación en agresión, se registra una disminución en su ajuste normativo a lo largo del tiempo. Los resultados de crecimiento univariado incondicional informan que el ajuste normativo aumenta mientras que la agresión en acoso escolar disminuye. Los hallazgos se discuten en términos de la necesidad de considerar la interacción longitudinal con factores contextuales para comprender y prevenir el acoso escolar en las escuelas.

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Introduction

Bullying is defined as aggressive behaviour intended to cause harm to the victim. This type of undesirable behaviour occurs against a background of a power imbalance, usually long-term, between bully and victim (Olweus, 1994). A substantial body of research has focused on the individual characteristics linked to bullying perpetration, but more studies are needed to understand students' behaviour in their own school context. The adherence to school norms based on the respect to others and the setting guides behaviours considered appropriate and desirable in schools and classrooms (Herrera-López et al., 2016). However, it is necessary to further investigate its bidirectional relationship with involvement in bullying perpetration. Recent research has shown that the lack of adjustment with school norms has been identified as a risk factor for involvement in bullying perpetration (Menesini & Salmivalli, 2017; Pouwels et al., 2018; Smith, 2016). Nevertheless, to understand the bidirectional association between the behaviour of schoolchildren who defiantly exhibit deviant behaviour towards the educational system of norms and peer aggression may help identify its relevance to understand bullying behaviour and guide prevention programs (Låftman et al., 2017; Teng et al., 2020).

Bullying perpetration and normative adjustment

Normative adjustment is defined as the set of attitudes and behaviours associated with compliance with social systems aimed at achieving coexistence in schools (Herrera-López et al., 2016). These social norms are linked to displaying values of respect and tolerance so that interpersonal relationships can flourish in schools (Longobardi et al., 2018). Previous studies have shown that adopting behaviour adjusted to the norms designed to foster interaction processes among individuals is positively related to high levels of support and social adaptation and low levels of bullying perpetration, improves the quality of relationships between peers, and creates a positive atmosphere in the classroom and the school (Dawes, 2017; Laninga-Wijnen et al., 2018; Mayeux & Kraft, 2018; Pozzoli et al., 2012).

Although it is assumed that normative adjustment acts as encouragement for positive social interactions in the classroom, its relationship with bullying perpetration in schools needs to be explored further. It has been shown that pupils who display less adjustment to school norms have a higher probability of being involved in bullying perpetration (Låftman et al., 2017; Longobardi et al., 2018; Müller et al., 2018; Wang et al., 2018). However, these are cross-sectional studies which limit the possibility of exploring causal relationships between the variables. The few longitudinal studies carried out take into account the perception of the school atmosphere as a factor linked to involvement in bullying perpetration (Romera, Luque-González et al., 2022; Teng et al., 2020), but not so much the behaviour and attitudes of schoolchildren towards the basic norms that guarantee a positive atmosphere in school, such as respect for others and for the school itself; nor do they take into account whether involvement in bullying perpetration could account for a greater degree of divergence with classroom and school rules.

In order to explore the possible reciprocal association between normative adjustment and bullying perpetration, we need to apply methodological approaches which take into account a between- and within-level approach. The between-person level records trait characteristics through the inter-subject effect, i.e., comparing schoolchildren with their peers. Meanwhile, the within-person level records state characteristics and approaches the link between normative adjustment and bullying perpetration from an intra-subject approach, i.e., analysing whether longitudinal changes in a variable in one particular individual lead to subsequent changes in another variable.

Uncontrolled discrimination between the between- and within-person level results in the absence of time-invariant individual differences being assumed. This fails to consider how the involvement of adolescents in bullying may tend to be a sporadic rather than a stable trait over time (Zych et al., 2020). Consequently, in the analysis of the mechanisms involved in bullying research, special consideration must be given to separating between- and within-person level effects to enable us to explore the prospective associations between the constructs when time-dependent characteristics such as state are considered (Romera et al., 2021).

The effects of sex and age should also be studied when considering the reciprocal association between normative adjustment and bullying perpetration, as clear differences have been identified between boys and girls. In general, indiscipline and lack of adjustment to norms tend to occur more frequently in boys than in girls, mainly in those educational contexts in which the social bonds are weaker (Jiménez & Estévez, 2017; Longobardi et al., 2018; Mucherah et al., 2018). In the case of bullying, significant differences have been identified as regards sex and age in adolescents. Indeed, previous results show that peer aggressive behaviour tends to decrease as adolescence progresses (Cho & Lee, 2020). On the other hand, although there is no consensus in studies on bullying about gender differences, cross-cultural studies indicate a general tendency for boys to be more frequent perpetrators of bullying (Smith et al., 2019). Despite gender differences in bullying perpetration, the moderating effect of gender has been recognised, with girls having a greater social influence on levels of aggressive behaviour (Busching & Krahé, 2015).

The longitudinal study of bullying and normative adjustment also demands a developmental approach to understand how both variables are connected over time. Through growth curve analysis previous studies have shown that bullying perpetration tends to decrease over adolescence (Cho & Lee, 2020), while the adjustment to normative behaviours in schools tend to increase (Ettekal & Shi, 2020). However, more studies are needed to understand the common trajectory of bullying perpetration and normative adjustment through parallel growth curve.

The present study

The few longitudinal studies that analyse these associations over time deal with within- and between-person effects together, which may cause difficulties in the interpretation of the results (Berry & Willoughby, 2017). In this study, we followed statistical methods to differentiate these effects further so that the developmental processes occurring in adolescents may be interpreted more accurately. The objective of this study was to address the temporal associations between normative adjustment and bullying perpetration to identify the developmental process that increases the risk of individuals becoming involved in aggressive behaviour. Based on the above literature, after controlling the between-person variance, it was expected that normative adjustment would predict bullying perpetration (Hypothesis 1), while bullying perpetration would predict the subsequent normative adjustment (Hypothesis 2) at the within-person level. As found in previous studies, it was expected that these effects would be stronger for boys and early adolescents (Hypothesis 3). Based on the longitudinal trajectories, we predicted that normative adjustment would tend to increase over time (Hypothesis 4), while bullying perpetration would decrease (Hypothesis 5). After controlling the effects of gender and age, we also expected to find a negative common development between normative adjustment and bullying perpetration; in other words,

that an increase in normative adjustment over time would be associated with a decrease in bullying perpetration (Hypothesis 6).

Method

Participants

The sample consisted of a total of 3017 pupils (49.5% girls) from the four years of compulsory secondary education, attending thirteen different schools in the province of Córdoba (Spain) during the 2017/2018 and 2018/2019 academic years. The students' ages ranged from 11 to 16 years old (M_{T1} = 13.15, SD = 1.09). Schools were selected by incidental sampling, inviting the schools to participate. The 85.45% of the students belong to public schools, while 14.55% to private schools. The 21.5% of the students belong to environments with a low socioeconomic level, 54.8% to neighbourhoods with a medium socioeconomic level and 23.8% to environments with a high economic level. The distribution of the population according to the town population size was: 19.1% belong to small towns (less than 10,000 inhabitants), 33% to medium-sized towns, and the rest, 47.9%, to large towns (more than 100,000 inhabitants).

Instruments

Normative adjustment was measured using the scale with this name in the *Adolescent Multidimensional Social Competence Questionnaire* (AMSC-Q) (Gómez-Ortiz et al., 2017), which consists of 5 Likert-type items 1–7 (1 = completely false, 7 = completely true). This scale measures the students' level of compliance with classroom norms, the respect for the opinions of their peers and care for the school's material and facilities. One item, for instance, reads: "I respect the opinion of others even if I do not share it". This *normative adjustment* subscale has been previously validated with Spanish adolescents as a unidimensional structure (Herrera-López et al., 2016).

To measure the pupils' bullying perpetration, we used the *aggression* scale of the *European Bullying Intervention Project Questionnaire* (EBIPQ) (Ortega-Ruiz et al., 2016) (ω_{T1} = .77). The EBIPQ measures the involvement of schoolchildren in victimization and aggression bullying behaviours, associated with actions such as hitting, name-calling, threatening, spreading rumours, or excluding during the last three months. Students were previously informed that bullying refers to harmful behaviours that occur repeatedly, intentionally and with an imbalance of power. The *aggression* scale is made up of 7 Likert-type items 0–4 (0 = no, 4 = yes, more than once a week). An example item of the *aggression* scale is: "I have insulted a fellow pupil". This *bullying perpetration* subscale has been previously validated with Spanish adolescents as a unidimensional structure (Romera et al., 2021).

Procedure

A four-time longitudinal research design was used, with time periods spaced six months apart. Permission was granted by the schools and the families of the pupils who took part, and the study was approved by the Ethics Committee from the institution where the authors work. Data collection was carried out by the pupils filling in a questionnaire in normal classroom time, supervised by one of the research team. The students were fully informed of the voluntary, confidential, and anonymous nature of the questionnaire and that they could opt out of the study at any time. The time spent completing the questionnaire did not exceed 40 minutes, in all cases.

Data analysis

In the preliminary analyses, internal consistency and psychometric properties of both scales were explored. Internal consistency was measured through Cronbach's alpha, McDonald's omega, composite reliability whose appropriate values are indicated by indices above .70 (Bacon et al., 1995). In addition, the average variance extracted was also reported with the recommendation that it should exceed a value of 50% (Hair et al., 2006). The psychometric properties of the scales were also explored. Model fit was estimated using the indices: comparative fit index (CFI > .90), the Tucker–Lewis index (TLI > .90), the root mean square error of approximation (RMSEA < .08) and the standardized root mean square residual (SRMR < .08) (Chen, 2007). The association between the variables was also subjected to a correlation analysis and the differences in the variables based on gender and age were tested through latent mean differences from scalar invariance. Cohen's d was calculated to explore the effect size of the differences. As recommended as a previous step to the longitudinal analyses, the independent invariance of the instruments over time was explored through a confirmatory factor analysis (CFA) using a sequence of hierarchical steps (Little, 2013).

A Random Intercept Cross-Panel Model (RI-CLPM; Hamaker et al., 2015) was conducted to explore the reciprocal contribution between *normative adjustment* and *bullying perpetration* at the between- and within-person levels. In contrast to the traditional cross-lagged panel model (CLPM), RI-CLPM is sensitive to the differences of within- and between-person variance by splitting into a random intercept (Berry & Willoughby, 2017). The random intercept captures stable between-individual differences in *normative adjustment* and *bullying perpetration* across all time points, while in the within-person level, the residuals at each measurement capture the intraindividual deviations from a person's stable level within each time point. Regarding the between-person effect, RI-CLPM provides two random intercept factors by fixing the loading factor to 1.0. The within-person effect contains autoregressive and cross-lagged parameters, as well as covariances between the outcomes at the same time. The autoregressive parameters indicate the temporal stability of the variable. Cross-lagged effects estimate the bidirectional influence of *normative adjustment* and *bullying perpetration* in a subsequent measurement with the aim of analysing the causal effect of one variable on another. Finally, variables are associated in each time to reflect within-person change covariances between the variables. Due to the segregation of the within-and between-person, the cross-lagged and autoregressive effects in the RI-CLPM are entirely located at the within-person level. We compare a series of models through which the same parameters are constrained to be equal across time based on the principle of parsimony. Provided that the simplified model remains conceptually consistent, the simplified model is generally considered best as the greater degrees of freedom increase the likelihood of its rejection (Kline, 2015). Thus, when performing these model comparisons, the aim is to analyse whether a simplified model rather than the more complex model can be selected and whether there are any significant differences between the two model fits. Model building involved four steps. First, we estimated the RI-CLPM by freely estimating all the effects. Second, the autoregressive parameters within the person were constrained to be equal over time. Third, we constrained the within-person cross-lagged paths. Fourth, the covariances between the residuals of the within-person centred variables at the same time from second to fourth times were constrained to be equal over time. Finally, to test for age and gender differences, we performed multiple group analyses by constraining the coefficients to be equal across gender (boys versus girls) and age (early versus middle adolescence). The post hoc Wald χ^2

test (Chou & Bentler, 1990) was used to determine if there would be a significant differences across the groups in the RI-CLPM.

The Growth Curve Model (Preacher et al., 2008) was performed to explore the developmental changes of *normative adjustment* and *bullying perpetration*. The mean and variance of the intercept and slope was considered, as well as the covariance between the intercept and slope. The intercept shows the initial level of a variable, while the slope refers to the global magnitude of change (positive or negative) during the time covered by the study (18 months in our study). The variance of both parameters reflects inter-individual differences. The linear slope factors were quantified as 0, 0.5, 1.0, and 1.5 to provide the evenly spaced six-month measurement intervals. The growth curve analyses involved two steps. First, we conducted a univariate growth curve to explore the changes in each variable separately, to test whether the pattern of the hypothetical trajectory fits the data. For each outcome, we analysed the changes of the variable over time and its relationship to the initial levels (e.g., covariance between the intercept and slope of *bullying perpetration*). In the second step, we performed a parallel growth curve to capture the co-development of changes in the target outcomes with gender and age as covariates (e.g., the covariance between the slopes of *normative adjustment* and *bullying perpetration*), and because the initial values of one variable are associated with hypothetical changes in the other (e.g., covariance between the intercept of *normative adjustment* and the slope of *bullying perpetration*). Gender and age were introduced to control for the effect on intercept and slope of each variable. Parallel growth modelling supports the concurrent estimation of growth rate parameters among a group of variables.

The analyses were performed using the *Lavaan* R package (Rosseel, 2012). Robust standard errors with maximum likelihood (MLR) were addressed to account for data non-normality. Model fit was evaluated according to the standard fit indices comparative fit index (CFI), the Tucker–Lewis index (TLI), the root mean square error of approximation (RMSEA) and the standardized root mean square residual (SRMR). Values above .90 in CFI and TLI were considered an acceptable fit and above .95 a good fit. Values below .08 were considered acceptable in RMSEA and SRMR, while values below .05 indicated a good fit. Differences of < .01 ΔCFI and < .015 ΔRMSEA were considered as references to determine the difference between the models explored (Chen, 2007). The low levels of normed χ^2 (χ^2/df = 1.59) in Little's MCAR test indicate that this missing data was random (MAR) (Bollen, 1989). The method used to deal with the missing data was full information maximum likelihood (FIML), using the valid data without removing any individual, instead of imputing data (Enders, 2010).

Results

Preliminary results

The *bullying perpetration* subscale had good internal consistency through Cronbach's alpha (α_{T1} = .82, α_{T2} = .80, α_{T3} = .82, and α_{T4} = .78), McDonald's omega (ω_{T1} = .83, ω_{T2} = .83, ω_{T3} = .83, and ω_{T4} = .82), composite reliability (CR_{T1} = .95, CR_{T2} = .94, CR_{T3} = .95, and CR_{T4} = .95) and average variance extracted (AVE_{T1} = 64.95%, AVE_{T2} = 60.67%, AVE_{T3} = 66.64%, and AVE_{T4} = 64.47%). The *bullying perpetration* subscale also showed good psychometric properties through CFA: T1, $\chi^2(14) = 301.790$, $p < .001$, CFI = .984, TLI = .976, RMSEA = .076, [90% CI .068-083], and SRMR = .071; T2, $\chi^2(14) = 274.239$, $p < .001$, CFI = .983, TLI = .975, RMSEA = .076, [90% CI .068-084], and SRMR = .074; T3, $\chi^2(14) = 260.526$, $p < .001$, CFI = .986, TLI = .979, RMSEA = .074, [90% CI .067-082], and SRMR = .075; T4, $\chi^2(14) = 235.495$, $p < .001$, CFI = .984, TLI = .976, RMSEA = .072, [90% CI .064-080], and SRMR = .080).

The *normative adjustment* subscale had good internal consistency through Cronbach's alpha (α_{T1} = .81, α_{T2} = .84, α_{T3} = .83, and α_{T4} = .85), McDonald's omega (ω_{T1} = .82, ω_{T2} = .85, ω_{T3} = .85, and ω_{T4} = .86), composite reliability (CR_{T1} = .93, CR_{T2} = .92, CR_{T3} = .93, and CR_{T4} = .93) and average variance extracted (AVE_{T1} = 53.47%, AVE_{T2} = 58.61%, AVE_{T3} = 59.62%, and AVE_{T4} = 61.06%). The *normative adjustment* subscale also showed good psychometric properties through confirmatory factor analysis (CFA): T1, $\chi^2(5) = 51.000$, $p < .001$, CFI = .997, TLI = .995, RMSEA = .049, [90% CI .037-062], and SRMR = .026; T2, $\chi^2(5) = 75.635$, $p < .001$, CFI = .998, TLI = .995, RMSEA = .058, [90% CI .047-070], and SRMR = .027; T3, $\chi^2(5) = 99.255$, $p < .001$, CFI = .997, TLI = .994, RMSEA = .066, [90% CI .055-077], and SRMR = .029; T4, $\chi^2(5) = 98.213$, $p < .001$, CFI = .997, TLI = .995, RMSEA = .066, [90% CI .055-078], and SRMR = .028).

The descriptive statistics of the study variables are shown in Table 1. After successfully achieving scalar invariance between boys and girls, and early and middle adolescents (see Tables S1 and S2 in supplementary material), gender and age differences were analysed with latent mean difference (from scalar invariance). In terms of gender, boys showed greater involvement in bullying (from T1 to T3), with a low effect size. Girls showed higher levels of *normative adjustment*, with a moderate effect. Two groups were established to explore differences based on age, early adolescents (from 11 to 13 years) and middle adolescents (from 14 to 16 years). Low effect size was found by rating middle adolescents with greater *bullying perpetration* (from T1 to T3). Early adolescents reported more *normative adjustment* with a low effect size.

Stability correlations also show how *normative adjustment* (r = .57 – .71) and *bullying perpetration* remain stable over time (r = .29 – .35). The results obtained show a moderate negative relationship between *bullying perpetration* and *normative adjustment* (r = -29 – -.39 within time; r = -.24 – -.36 across time). The correlation analysis highlighted the presence of high values in the two study variables over time (see Table 2) thus determining their temporal consistency.

Measurement invariance

The measurement invariance of each construct was estimated over time using CFA, including covariances between the latent indicators of each time period (Little, 2013). A series of restrictive steps were applied to obtain the measurement invariance of the constructs over time (see Table 3). The CFA was developed by loading all the items of the same scale into an indicator, as done in previous studies with *normative adjustment* (Gómez-Ortiz et al., 2017) and *bullying perpetration* (Ortega-Ruiz et al., 2016). The model fits are shown in Table 3. First, the configural model was estimated without restrictions, where factor loadings and intercepts were freely estimated for both *normative adjustment* and *bullying perpetration*. The results of configural invariance show an excellent model fit. Second, the metric model estimated after constraint that the factor loading was equivalent across time. Such constraints did not significantly change the model fit in any construct in comparison with configural invariance as ΔCFI and ΔRMSEA was lower than < .01 and < .015 respectively. Finally, the intercepts were constrained in the scalar model. The model fit indicates that there are no significant differences between the metric and scalar invariance.

Random intercept cross-lagged model

A series of sequential models were performed with the aim of obtaining the most parsimonious model fit when interpreting the results (see Table 3). Model 1 represents the free estimation of all parameters. The model fit indicates a good fit. The first constraint was applied to the autoregressive paths in model 2, which showed no significant differences with respect to the unconstrained model.

Table 1
Descriptive statistics and latent mean differences across gender and age

	Total sample			Gender differences[a]				Age differences[b]			
				Boys	Girls			Early adolescents	Middle adolescents		
	S	*K*	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*z*	*d*	*M* (*SD*)	*M* (*SD*)	*z*	*d*
Normative adjustment T1	−1.15	1.38	5.79 (1.07)	5.54 (1.13)	6.04 (.94)	8.09***	0.49	5.92 (1.02)	5.59 (1.11)	−6.39***	0.38
Normative adjustment T2	−1.03	0.96	5.81 (1.02)	5.59 (1.06)	6.00 (.93)	8.08***	0.46	5.91 (1.02)	5.65 (.98)	−5.88***	0.33
Normative adjustment T3	−1.14	1.20	5.94 (.99)	5.73 (1.07)	6.12 (.89)	7.74***	0.48	6.05 (.97)	5.75 (1.01)	−6.66***	0.38
Normative adjustment T4	−1.17	1.55	5.88 (1.01)	5.67 (1.08)	6.02 (.91)	7.52***	0.45	5.95 (.99)	5.76 (1.06)	−4.05***	0.23
Bullying perpetration T1	3.45	16.52	0.26 (.44)	0.33 (.53)	0.19 (.32)	−4.11***	0.38	0.23 (.30)	0.31 (.46)	4.11***	0.38
Bullying perpetration T2	3.33	15.96	0.28 (.45)	0.34 (.45)	0.23 (.37)	−2.98**	0.24	0.26 (.39)	0.32 (.45)	2.98**	0.24
Bullying perpetration T3	3.56	16.67	0.20 (.38)	0.26 (.45)	0.15 (.29)	−2.32*	0.23	0.19 (.36)	0.22 (.36)	2.32*	0.23
Bullying perpetration T4	3.48	19.27	0.22 (.36)	0.25 (.41)	0.17 (.30)	−0.69	0.07	0.20 (.28)	0.23 (.38)	0.69	0.07

[a] For boys the latent means variables were fixed at 0 and freely estimated for girls.
[b] For middle adolescents the latent means variables were fixed at 0 and freely estimated for early adolescents. *S* = Skewness; *K* = Kurtosis.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 2
Correlations for normative adjustment and bullying perpetration across four times

	1	2	3	4	5	6	7
1. Normative adjustment T1	–						
2. Normative adjustment T2	0.69***	–					
3. Normative adjustment T3	0.61***	0.71***	–				
4. Normative adjustment T4	0.57***	0.66***	0.65***	–			
5. Bullying perpetration T1	−0.35***	−0.36***	−0.32***	−0.24***	–		
6. Bullying perpetration T2	−0.32***	−0.39***	−0.31***	−0.30***	0.32***	–	
7. Bullying perpetration T3	−0.24***	−0.36***	−0.35***	−0.27***	0.35***	0.34***	–
8. Bullying perpetration T4	−0.23***	−0.29***	−0.29***	−0.28***	0.29***	0.29***	0.34***

*** $p < .001$.

Table 3
Goodness-of-fit indices of the measurement invariance, random intercept cross-lagged panel model and growth curve model

	Model fit						Model comparison		
	$\chi^2_{S\text{-}B}$	*df*	CFI	TLI	RMSEA	SRMR	$\Delta\chi^2_{S\text{-}B}$ (*df*)	ΔCFI	ΔRMSEA
Measurement Invariance									
Normative adjustment									
Configural	2792.245***	147	0.987	0.985	0.081 [0.078, 0.084]	0.058	–	–	–
Metric	2307.593***	159	0.986	0.984	0.080 [0.077, 0.082]	0.060	35.506 (12)***	0.001	0.001
Scalar	2481.751***	171	0.986	0.985	0.077 [0.074, 0.079]	0.060	0.46 (12)	0.000	0.003
Bullying perpetration									
Configural	2074.931***	319	0.974	0.969	0.049 [0.047, 0.051]	0.083	–	–	–
Metric	1867.141***	337	0.974	0.971	0.048 [0.046, 0.050]	0.084	16.619 (18)	0.000	0.001
Scalar	1966.869***	355	0.974	0.973	0.047 [0.045, 0.049]	0.084	0.84 (18)	0.000	0.000
Random Intercept Cross-Lagged Model									
Model 1	143.293***	19	0.955	0.933	0.073 [.062, .085]	0.070	–	–	–
Model 2	142.594***	23	0.952	0.942	0.068 [.058, .069]	0.067	0.699 (4)	0.003	0.005
Model 3	145.064***	27	0.954	0.952	0.062 [.052, .072]	0.070	2.47 (4)	0.002	0.006
Model 4	148.159***	29	0.953	0.954	0.061 [.051, .070]	0.073	3.095 (2)	0.001	0.001
Growth Curve Model									
Unconditional normative adjustment	54.019***	5	0.983	0.979	0.070 [0.054, 0.088]	0.039	–	–	–
Unconditional bullying perpetration	23.681***	5	0.968	0.962	0.057 [0.036, 0.080]	0.034	–	–	–
Parallel growth curve	129.110***	30	0.974	0.961	0.046 [0.038, 0.054]	0.035	–	–	–

Note. χ^2 = Robust chi-square test of exact fit; *df* = Degrees of freedom; CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; Δ = Change in fit indices.
*** $p < .001$.

In model 3 the cross-lagged effects were constrained, showing no significant differences compared to model 2. Finally, in model 4, the covariances between the residuals in the same time period were constrained. Considering that model 4 presented no significant differences to model 3, it was adopted as the most parsimonious model, as a reference to explore the associations between *normative adjustment* and *bullying perpetration*.

The results of the random intercept cross-lagged model are reported in Figure 1. At the between-person level, the covariance among the intercepts was significant and negative, indicating that adolescents with greater involvement in *bullying perpetration* across the four times reported less *normative adjustment* compared to other adolescents. The significant negative covariances between construct residues at the within-person level indicate that when

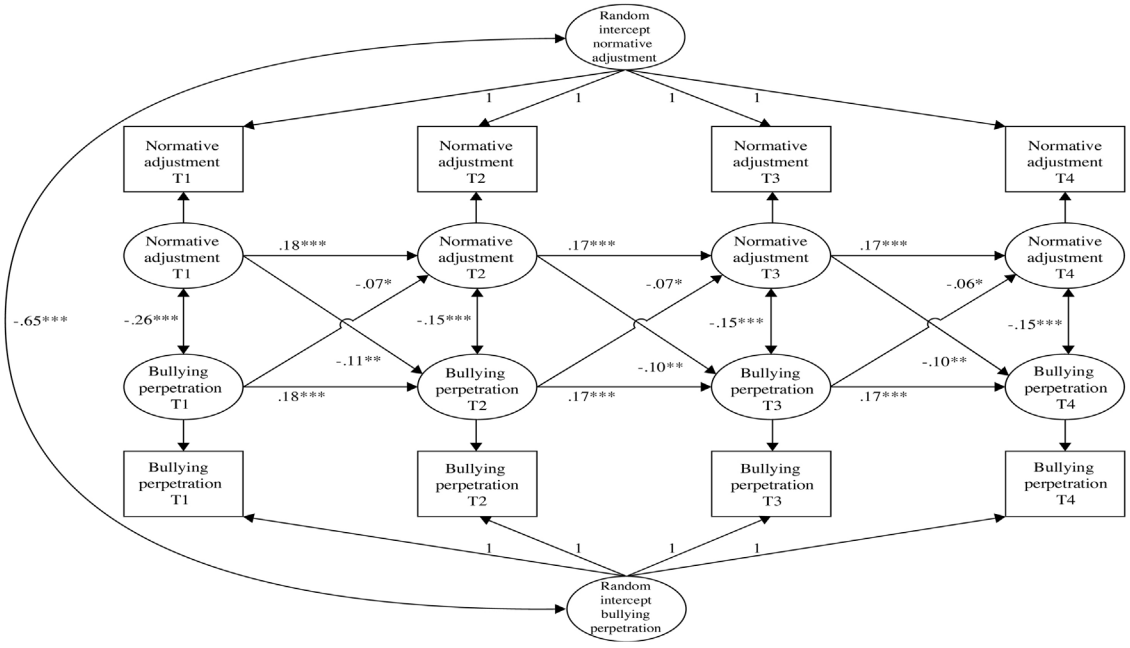

Figure 1. Results of random intercept cross-lagged model.
Note. Standardized coefficients based on constrained unstandardized coefficients are shown.
* $p < .05$. ** $p < .01$. *** $p < .001$.

adolescents reported a high degree of *bullying perpetration*, they also consistently revealed lower than average levels of *normative adjustment*. With respect to cross-lagged effects, when adolescents showed an increase in *normative adjustment*, this subsequently predicted a decrease in *bullying perpetration* compared to their own levels six months later. Likewise, changes in *bullying perpetration* predicted later inverse changes in *normative adjustment*. The results of the Wald tests indicated that there were no differences in gender, Wald $\chi^2(5) = 4.87$, $p = .43$ or age, Wald $\chi^2(5) = 1.36$, $p = .93$ in the reciprocal association between *normative adjustment* and *bullying perpetration*.

Growth curve model

A series of growth curve analyses were performed to examine the longitudinal trajectories of *normative adjustment* and *bullying perpetration*. First, we performed unconditional univariate growth curves for each variable. The model fit for each model indicated a good fit of the data (see Table 3). The significant and positive, $\beta = .18$, $t = 4.25$, $p < .001$, and negative, $\beta = -.18$, $t = -5.18$, $p < .001$, slopes suggest that *normative adjustment* and *bullying perpetration* tended to increase and decrease respectively during the study period. The variances of the slopes ($M = .10$, $SE = .03$, $t = 3.73$, $p < .001$, and $M = .04$, $SE = .01$, $t = 4.27$, $p < .001$, respectively) support the idea that these changes did not occur equally for all adolescents in *normative adjustment* and *bullying perpetration*. In Figure 2, the shaded arrows illustrate the covariances between the intercept and slope for each variable through the unconditional univariate growth model. The covariance between the intercept and slope in *normative adjustment* was negative, suggesting that those adolescents with higher baseline levels reported a reduced increase in *normative adjustment* over time. The negative covariance between the slope and intercept in *bullying perpetration* indicates that higher scoring at baseline reported a lower decrease in *bullying perpetration* over time. To test the relationships between the trajectories of *normative adjustment* and *bullying perpetration*, we performed a parallel growth curve analysis. The resulting model fit indicated a good fit of the data (see Table 3). The bold arrows in Figure 2 show the covariances between the intercepts and slopes across variables and the effects of gender and age as covariates through the parallel growth model. The negative association between the intercepts indicates that individuals with higher initial levels of *normative adjustment* have lower initial levels of *bullying perpetration* and vice versa. The significant covariance between the slope factors indicates that individuals who experienced the greatest increases in *normative adjustment* reported the greatest decreases in *bullying perpetration*. The positive covariance between the slope of *bullying perpetration* and the intercept of *normative adjustment* supports the idea that higher baseline levels in *normative adjustment* were associated with a greater decrease in *bullying perpetration*. The negative covariance between the slope of *normative adjustment* and the intercept of *bullying perpetration* indicates that higher baseline levels in *bullying perpetration* were associated with a lower increase in *normative adjustment*. Being a girl was associated with a greater decrease in *bullying perpetration*, while no gender differences were found in the changes in *normative adjustment*. Being a middle adolescent was associated with a greater increase in *normative adjustment*, and a lower decrease in *bullying perpetration*.

Discussion

The aim of this study was to explore the bidirectional relationship between the involvement of adolescents in bullying perpetration and normative adjustment, using longitudinal models which allowed us to verify their interdependence and evolution over time. The RI-CLPM enabled us to relate pupils' aggressive behaviours with their levels of normative adjustment in four time periods, while considering the possible differentiated effects at between- and within-person level. In line with the results of previous studies (Laninga-Wijnen et al., 2018; Mayeux & Kraft, 2018; Pozzoli et al., 2012), the model confirmed the negative relationship

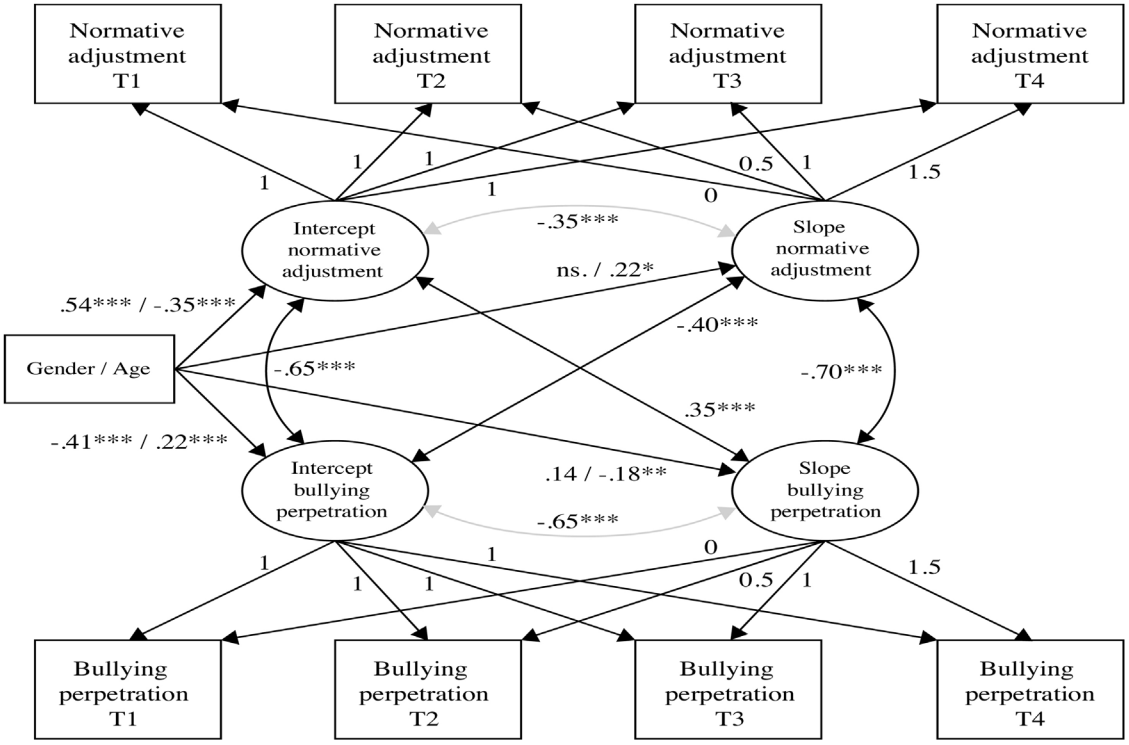

Figure 2. Results of growth curve analyses.
Note. Standardized coefficients based on unstandardized coefficients are shown. Shaded covariances correspond to the unconditional univariate growth model. Covariances and predictors in bold correspond to the parallel growth model. For covariates, the results are presented in gender/age.
* $p < .05$. ** $p < .01$. *** $p < .001$.

between the study variables and their continuity over time, which conditions the mutual influence on state characteristics.

On the between-person level, the involvement of adolescents in acts of bullying is linked to lower normative adjustment. The results also show that this inter-subject behaviour is replicated at the intra-subject level through the within-person level, so that there is a cycle of influence between the two constructs. Students who displayed a greater increase in normative adjustment tended to show less involvement in undesirable behaviour such as aggression, and vice versa. That is, according to the Hypothesis 1, normative adjustment predicts bullying perpetration, in the same way that bullying perpetration predicts the subsequent normative adjustment at the within-person level (Hypothesis 2). Although previous studies have highlighted the need to focus on adolescents with high levels of bullying aggression and low normative adjustment (at the between-person level), the findings of the present study stress the importance of noticing the possible changes that may occur in normative adjustment and bullying perpetration among adolescents (at a within-person level), as this can influence changes between the two phenomena without the need for high or low levels compared to their peers. The present findings highlight the relevant role of compliance with school norms, as a cause and a consequence to bullying behaviours. To prevent peer aggression is necessary to pay attention to students' motives and attitudes toward school norms, but also to be involved in bullying will worsen the level of compliance with a system that regulates the quality of peer relationships (Herrera-López et al., 2016). The approach of a longitudinal analysis is a potentiality of this study as it allows to know the direction and evolution of the influence of normative adjustment on bullying perpetration over time. The results identified also that gender and age did not moderate the negative association between normative adjustment and bullying perpetration, contrary to Hypothesis 3. Despite previous and our descriptive results identify differences in bullying and normative adjustment (Romera, Luque et al., 2022; Smith et al., 2019), it does not imply that the association between both is influenced by gender and age.

Conducting a growth curve analysis of the variables has enabled us to overcome the limitations inherent to previous cross-sectional investigations and to verify the trend of these behaviours over time. Here, the trajectory of bullying tends to decrease over time, while normative adjustment tends to increase. These results confirm the hypothesis 4 and 5. Previous studies have identified a decreasing tendence in bullying in middle school, explained by the social and cognitive development at these ages (Cho & Lee, 2020) and a more adjusted behaviour to school norms (Ettekal & Shi, 2020). Moreover, according to hypothesis 6, we found a negative common development between normative adjustment and bullying perpetration over time. The increase in normative adjustment over time was associated with a decrease in bullying perpetration. These results support the overlap between both variables, implying that changes in one variable imply inversely changes in the other one.

This research has certain limitations. Firstly, there is a bias in the selection of the sample, which was deliberately limited to one specific geographical area: if the models proposed were applied to schoolchildren from other communities, this would give greater validity to the results obtained. Second, it should be noted that self-reports were used exclusively for the adolescents' behaviour, with a single group of informants. Thirdly, only two variables were explored. It would be interesting to analyse the effect of other variables whose relationship with bullying and normative adjustment

is identified, as popularity. Need for popularity could explain the relationship between both variables precisely because adolescents continually strive for prominence and prestige within their peer group and going against norms may be considered as a strategy to achieve this popularity (Romera et al., 2021). It would also be of interest to extend the study of the effect of normative adjustment to prosocial defensive behaviour, and to teachers views of adolescents' attitudes towards classroom norms.

The results of this study may guide educational intervention programs towards fostering improvements in peer relationships in schools and bullying prevention. This study highlights the importance of engage students in school norms in a way that they value them and incorporate in their lifestyle (Llorent et al., 2021). It is also essential to establish school norms accepted and transferred to their daily relationships to prevent undesirable behaviour like bullying behaviour (Mora-Merchán et al., 2021). The challenge for education is therefore to try adolescents recognise an interdependence between their attitude to school and their psychological, social and emotional well-being, which encourages them to develop supportive links with the school in order to improve school climate in schools.

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