



# The influence of school climate in bullying and victimization behaviors during middle school transition

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## ABSTRACT

This study analyses how perceived school climate variables (teacher–student relationships, student–student relationships, fairness of rules, school safety, and liking of school) influenced bullying and victimization behaviors during middle school transition in Portugal (fourth to fifth grade). A total of 671 middle school students participated in the study, of which 52.2% were boys. Bullying and victimization behaviors were assessed in three different time points (twice before middle school transition and once after) and perceptions of school climate were assessed twice (before and after middle school transition). Results showed that a more positive trajectory in students' perceptions of teacher–student relationships, student–student relationships, school safety, and liking of school between fourth and fifth grade was associated with a more positive trajectory in victimization behaviors, and a more positive trajectory in students' perceptions of fairness of rules in the same period was associated with a more positive trajectory in bullying behaviors. Additionally, regarding gender, boys showed a larger increase in victimization behaviors, but there were no differences due to classroom size. These results highlighted the importance of creating a positive school climate in middle school to reduce bullying and victimization behaviors during middle school transition.

## 1. Introduction

Several authors have recognized the transition to middle school as a time of developmental vulnerability—particularly for students' social relationships—resulting in an added risk for involvement in bullying (Farmer et al., 2015; Williford et al., 2014). This vulnerability is particularly important considering the stage–environment fit theory (Eccles & Midgley, 1989; Eccles et al., 1993), highlighting that students do better when the environment is suited to their developmental needs. Accordingly, negative consequences emerge when the environment is ill-suited to their needs. In Portugal, the transition to middle school occurs during a very precocious age: after fourth grade, when most students are nine years old (earlier than in most western countries; Arens et al., 2013; Coelho & Romão, 2016). Thus, the demands of middle school, such as (a) dealing with several subjects, homework, and teachers; (b) having classes in different classrooms; (c) taking care of their belongings; (d) remembering their school materials; (e) attending schools further from home do not fit the developmental stage of nine-year-old students (Arens et al., 2013). Eccles (2004) argued that an incompatibility exists between the demands of the middle school

transition and the needs of early adolescents, which increases the challenges experienced during this critical time. Given the earlier timing of the middle school transition in Portugal, this incompatibility identified by Eccles (2004) is likely to be even more noticeable.

Additionally, bullying has been acknowledged as a pervasive problem in schools worldwide (e.g., Coelho & Romão, 2016; Cross et al., 2018; Inchley et al., 2020; Williford et al., 2014). This phenomenon tends to peak during late childhood and early adolescence (Cross et al., 2018; Pepler et al., 2006), coinciding in many countries with students' transition from primary to middle school, namely in the Portuguese school system. Bullying is contextually dependent, occurring primarily within a relational context in school and classroom settings (Williford et al., 2014). Evidence suggests that rates of bullying often increase during the middle school transition because students display an increased reliance on their peer group for social support (Cross et al., 2018). This period is also when students renegotiate their peer group status and search for new social identities (Williford et al., 2014). However, although researchers have widely acknowledged that the middle school transition affects victimization and bullying behaviors, few studies analyze the trajectory of students' bullying and victimization

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behaviors during the transition to middle school—especially at the precocious age of nine.

Furthermore, because bullying is maintained within a social context, school climate factors may play an essential role in predicting decreases or increases of bullying and victimization risks during the middle school transition period. Likewise, understanding the association between bullying and school climate seems to be equally relevant, especially due to the changes introduced when students transition to middle school (Gage et al., 2014). Coelho, Romão, Brás, Bear, and Prioste (2020) highlighted this critical period concluding that the middle school transition strongly impacted several dimensions of school climate perceptions, which were enhanced by Portugal's abrupt middle school transition.

Currently, although some studies have indicated that the school environment is relevant to either facilitate or hinder students' academic achievement and emotional well-being (Coelho et al., 2020; Bear et al., 2011; Gage et al., 2014), few studies have examined the influence of school climate perceptions on the bullying and victimization patterns during the critical transition from elementary to middle school. The lack of studies is particularly noticeable for contexts where the transition takes place at an earlier age, such as in Portugal at age nine. Therefore, the present study analyzes the influence of school climate perceptions on the trajectories of bullying and victimization during the middle school transition.

### 1.1. School climate

School climate can be defined as the “quality and character of school life” that includes “norms, values, and expectations that support people feeling socially, emotionally, and physically safe” (Cohen et al., 2009, p. 182). School climate represents every aspect of the school experience: the quality of teaching and learning, school-community relationships, school organization, and the school environment's institutional and structural features (Wang et al., 2013).

Several authors have claimed that students' perceptions of a favorable school climate protect children from risk factors. Additionally, students' perceptions are positively associated with multiple indicators of physical and emotional safety. Studies have shown that a positive school climate is associated with fewer behavior problems (Bear et al., 2018; Thapa et al., 2013), a greater sense of school belonging (Allen et al., 2016), and higher academic achievement (Bear et al., 2011; Thapa et al., 2013). Additionally, Klein et al. (2012) found a significant relationship between school climate and higher levels of student involvement in risky behaviors (such as substance abuse, aggressive behavior, avoiding school, and sadness and suicidal thoughts).

### 1.2. School climate during the middle school transition

The transition from elementary to middle school has been acknowledged as one of the most difficult school transitions (Arens et al., 2013; Coelho & Romão, 2016). According to the stage-environment fit theory (Eccles, 2004), a “mismatch” often emerges between the nature of the middle school context and the needs of early adolescents, exacerbating challenges experienced during this time. School systems constitute a series of overlapping transitions, with the middle school transition requiring that students adapt to a new school environment (including differences in school size and climate), different social interactions, greater academic expectations and a change in adults' supervision simultaneously (Akos et al., 2015; Coelho & Sousa, 2020; Lane et al., 2015).

This difficulty has been identified in several countries with different school configurations such as the United States (Akos et al., 2015), Australia (Cross et al., 2018), and Portugal (Coelho & Romão, 2016). Among other challenges, after transitioning, students must move from smaller and more supportive elementary school settings to larger and less-personal middle school settings (Williford et al., 2014); shift from

being the oldest in elementary school to the youngest in middle school (Coelho & Romão, 2016); and deal with larger peer groups, changing friendship structures and the subsequent desire to establish social dominance or belonging (Farmer et al., 2015; Reijntjes et al., 2013).

In Portugal, the elementary school comprises the first four grades (children from age six to nine). The elementary schools are smaller than middle schools, usually with smaller classes and with one teacher (who teaches the Portuguese language, math, and science). When students transition to middle school, they encounter nine subjects and one teacher per subject. Additionally, because they come from a smaller school, their social networks change, and the middle schools are commonly further away from their homes when compared to elementary schools.

School climate is particularly relevant during the transition to middle school (Lester & Cross, 2015) because this transition brings extensive changes to the school environment. For example, in their longitudinal study conducted in the US, Forrest et al. (2013) found that the transition to middle school negatively influenced students' school engagement and academic achievement. The middle school transition has also been associated with declines in students' school climate perceptions (Coelho et al., 2020; Madjar & Cohen-Malayev, 2016). However, the literature lacks consensus about which dimensions of school climate are more affected by the middle school transition. Forrest et al. (2013) found that the transition to middle school negatively influenced students' connectedness to teachers. In contrast, DePedro et al. (2016) found that a sense of safety had a protective effect on youth development in their cross-sectional US study. In Portugal, Coelho et al. (2020) found a decline of students' perceptions for all dimensions of school climate across the transition to middle school; however, the impact of this transition was more significant in students' perceptions of school safety, school liking, and teacher-student relationships.

Although DePedro et al. (2016) found no significant associations between gender and school climate, Coelho et al. (2020) found that boys reported steeper declines in the fairness of rules, school liking, and teacher-student relationships than girls after the middle school transition.

### 1.3. Bullying

Bullying is defined as a type of aggression between peers, that fulfills three criteria established by Olweus (1993): Bullying is (a) intentional (i.e., it aims to harm the victim); (b) repetitive over time; and (c) it involves an imbalance of power (i.e., the bully is more powerful than the victim). Three types of bullying—verbal, physical, and social/relational—are most recognized by researchers and school personnel (Harris et al., 2018). Harris et al. (2018) also concluded that due to students' increased computer and mobile phone use in recent years, cyberbullying has emerged as a new form of bullying. In this context, cyberbullying is an aggression that is intentionally carried out in an electronic context (e.g., e-mail, blogs, instant messages, text messages, social media) against a person who cannot easily defend themselves (Harris et al., 2018; Kowalski et al., 2012). Thus, bullying negatively affects the well-being of many children and adolescents (Hymel & Swearer, 2015), and it has been linked with mental health problems (e.g., Forrest et al., 2013). Bullying also negatively affects the school climate (Cross et al., 2018; Wang et al., 2013) and has been associated with fear of attending schools (Wang et al., 2014).

In Portugal, studies are lacking regarding bullying prevalence for students in the same age group as our study: i.e., elementary school (first to fourth grade). However, some research has focused on the prevalence of bullying for students aged 11 or 12. In a study using a Portuguese sample, Zequinão et al. (2019) reported that 26.3 % of students from the third to the sixth grade had been involved in bullying—15.3 % as victims and 4.6 % as aggressors, whereas 6.4 % were classified as victims-aggressors, i.e., students who bully some students but are also bullied themselves by other students. However, in a large cross-national dataset

study, Inchley et al. (2015) analyzed nationally representative samples of 11-, 13- and 15-year-olds, from 43 countries and reported that bullying prevalence ranged from 8.4 % (Italy) in 2019–2010 to 42.5 % (France) in 2010.

#### 1.4. Factors influencing bullying rates

##### 1.4.1. School climate and bullying prevalence

Cross-sectional studies conducted in Australia and the United States have shown that a positive school climate and positive teacher–student relationships are associated with less bullying and victimization (Aldridge, McChesney, & Afari, 2020; Guerra et al., 2011). Likewise, in a longitudinal study conducted in the US, Gendron et al. (2011) concluded that a supportive school climate predicted fewer bullying behaviors. In two studies using large samples in Australia (Aldridge et al., 2018; 2020), the authors concluded that not only school connectedness, teacher support, and rule clarity were negatively associated with bully victimization, but also that school climate was a significant predictor of bully victimization. A positive climate indicates that students experience school as a good place to be—where rules are fair and students are treated with respect.

##### 1.4.2. Transition to middle school and bullying prevalence

As previously mentioned, the transition to middle school encompasses numerous critical changes, such as students going from being the oldest in their former school to the youngest in their new school (Bowes et al., 2013). All these changes in school and social structures can result in increased feelings of loneliness and isolation, victimization, or lead to negative and disruptive behaviors (Lester & Cross, 2015). Thus, the middle school transition likely influences bullying prevalence. This notion is supported by an Australian three-year cluster randomized control trial which reported on a transition taking place after seventh grade. In this study, Cross et al. (2018) concluded that bullying generally increases during times of school transition.

However, conflicting results in the literature regarding bullying prevalence during middle school transition have arisen. In a longitudinal study conducted in the UK regarding transitions taking place at age 11, Bowes et al. (2013) concluded that victimization remained stable throughout this period. Likewise, in a large-scale longitudinal study conducted in the US exploring the transition taking place after fifth grade, Williford et al. (2014) reported that a large proportion of children who bully their classmates in elementary school continue to be perpetrators during middle school. However, several authors (Coelho & Marchante, 2021; Pellegrini & Long, 2002; Pepler et al., 2006) reported that bullying behavior increased during the transition to middle school. For example, in a Portuguese longitudinal study, fifth-grade students reported an increase in victimization behaviors and bullying behaviors after middle school transition (Coelho, Marchante, & Romão, 2019). In a cross-sectional study conducted in the Netherlands describing a transition taking place after sixth grade, Reijntjes et al. (2013) explained this increase in bullying prevalence served as a strategy for students to gain social dominance in their new school context and form new hierarchies when students transition into middle school. However, according to Williford et al. (2014), relatively few longitudinal studies have examined patterns of bullying and victimization during the middle school transition.

A longitudinal, multi-method, multi-agent perspective American study (Pellegrini & Long, 2002) and a large-scale Canadian study (Wang et al., 2016), which both reported about transitions occurring after fifth grade found that while bullying perpetration increased during the school transition, peer victimization decreased during the same period. Furthermore, in a longitudinal study conducted in the US describing a transition after fifth grade, Farmer et al. (2015), found higher rates of peer victimization and bullying perpetration among students who transitioned than among those who did not transition into a different school.

##### 1.4.3. Gender differences in bullying during middle school transition

Gender can impact bullying roles differently during the transition to middle school. Wang et al. (2016) conducted a natural experiment in Canada, comparing students who transitioned to middle school from fifth to sixth grade with students who remained in their elementary school over the same period. Results showed that victimization rates decreased for girls after the middle school transition. Likewise, several studies reported gender differences in perpetration—with boys bullying others more than girls—following the transition from elementary to middle school (Pellegrini & Long, 2002; Pepler et al., 2006; Wang et al., 2016). However, in a study using a Portuguese sample, no gender differences were found in victimization or bullying behaviors (Coelho & Marchante, 2021).

##### 1.4.4. Classroom size

Another variable that may influence the rate of victimization and bullying behaviors is class size. Several authors have reported differences in rates of victimization and bullying behaviors among classrooms and schools (Coelho & Marchante, 2021; Košir et al., 2020; Niesen & Wise, 2004). Specifically, in a Slovenian study using a large sample, Košir et al. (2020) concluded that classrooms comprise a more critical social context for bullying than schools. The researchers indicated that most studies reported a higher level of classroom-level variance than school-level variance; therefore, classroom characteristics (such as class size) should be considered when predicting victimization and bullying behavior. Additionally, Niesen and Wise (2004) concluded that the number of new peers also makes a difference: When several elementary schools merged into one secondary school, students' academic performance declined compared to when all students moved from a single elementary school. However, studies that analyze bullying and consider class size across the middle school transition are scarce.

## 2. Present study

Although numerous studies have focused on victimization and bullying behaviors in schools, there are still some gaps in the literature. Foremost, there is a lack of longitudinal research assessing the trajectory of victimization and bullying behaviors, especially during school transitions. Furthermore, most longitudinal studies regarding school climate have been conducted in high schools, (Daily et al., 2019), whereas studies focusing on the impact of school climate on bullying and victimization behaviors in middle school are scarce (Williford et al., 2014). Finally, the relevance of this study is heightened by the uniqueness of the middle school transition in Portugal (given that it occurs at a very early age) and the lack of studies analyzing the importance of school climate during this transition (Authors, 2020).

The principal aim of the present study was to examine the trajectory of bullying and victimization behaviors during the middle school transition, as well as to analyze the influence of individual (gender and individual perceptions of school climate) and classroom (classroom size) variables upon these trajectories. Given the extant literature (Coelho et al., 2019; Pellegrini & Long, 2002; Pepler et al., 2006; Reijntjes et al., 2013), we hypothesized that an increase in victimization (H1) and bullying behaviors (H2) will emerge during the middle school transition. Following Wang et al. (2016), we hypothesized that girls would report a decrease in victimization behaviors during the middle school transition (H3), while boys would report a larger increase in bullying behaviors than girls during the middle school transition (H4), following several authors' findings (Pellegrini & Long, 2002; Pepler et al., 2006; Wang et al., 2016).

The present study also had a second aim; to analyze if perceived school climate influences the trajectory of victimization and bullying behaviors throughout middle school transition. Given that previous studies (Allen et al., 2016; Bear et al., 2018; Thapa et al., 2013) focused more broadly upon the role of school climate generally, we extrapolated those results to the dimensions of perceived school climate to create the

hypotheses. Therefore, we hypothesize that a larger decrease in students' perceptions of teacher–student relationships (following Aldridge et al., 2020; H5), student–student relationship (H6), fairness of rules (H7), school safety (H8), and liking of school (H9) between fourth and fifth grade will be associated with a more pronounced increase in victimization and bullying behaviors during middle school transition.

Finally, given the lack of previous research, we also analyzed if classroom size influences victimization behaviors or bullying behaviors during the middle school transition?

### 3. Method

#### 3.1. Participants

The sample was a convenience sample composed of 671 elementary (and later middle school) students of which 52.2 % were boys ( $n = 350$ ) and 47.8 % were girls ( $n = 321$ ). The participants' mean age was 9.20 ( $SD = 0.69$ ). Fourth-grade classes varied in size, with the total number of students per class ranging from 8 to 23 ( $M_{\text{classroomsize}} = 15.06$ ;  $SD = 4.58$ ). Classes were extremely homogeneous in terms of ethnicity (0.8 % of students were of Brazilian descent) and socioeconomic status. Students attended six Portuguese public middle schools, in the district of Lisbon. Data were gathered from three cohorts; the first cohort (year 12 of the program) was in the fourth grade in the 2015/16 school year and in the fifth grade in the 2016/17 school year; the second cohort (year 13 of the program) was in the fourth grade in the 2016/17 school year and in the fifth grade in the 2017/18 school year, and the third cohort (year 14 of the program) was in the fourth grade in the 2017/18 school year and in the fifth grade in the 2018/19 school year. Additional information about the participants is displayed in Table 1.

Regarding attrition, eight parents did not consent to their children's participation. Seven-hundred-sixty-six fourth-grade students participated in the first assessment, 760 (99.2 %) in the second assessment, and 671 (87.6 %) in the third assessment. The lower number of students present at the second moment of data collection was due to 11 students being absent due to sickness or other unknown reasons. The final sample size (671 students) was determined by using listwise deletion to exclude all participants that did not have a school climate score in fifth grade, because we were interested in analyzing the difference in the perceptions of school climate between fourth and fifth grade.

#### 3.2. Measures

##### 3.2.1. Bullying

The Bullying and Cyberbullying Behaviors Questionnaire-Short Form (BCBQ-SF; Coelho & Sousa, 2020) was used. The BCBQ-SF is a 20-item self-report measure intended to assess bullying (verbal, physical, social exclusion, defamation, and material) and cyberbullying behaviors (denigration, flaming and posting of negative images) in middle school students. The questionnaire includes two scales that assess two different participant role behaviors: bully and victims. The Victimization subscale (and the Bullying subscale each contain eight items

describing behaviors of either victimization (e.g., 'They spread rumors or lies about me') or bullying perpetration (e.g., 'I called them mean names, made fun or teased them'). Participants are asked to report how often they had been victims of or perpetrated each of the behaviors described during the previous school year on a five-point scale (1 = Never happened; 2 = Once or twice during the school year; 3 = 2 to 3 times a month; 4 = Once a week; 5 = Several times a week). The four additional items include questions regarding where the bullying episodes happened and if the bully is from a lower, the same, or a higher grade. The validation study (Coelho & Sousa, 2020) has established the reliability (victimization –  $\alpha = 0.79$ ,  $CI = 0.82$ ; bullying –  $\alpha = 0.82$ ,  $CI = 0.86$ ), convergent validity (victimization – AVE = 0.54; bullying – AVE = 0.56) and the appropriate factor structure of the BCBQ-SF through a Confirmatory Factor Analysis in a sample of 1003 students.

##### 3.2.2. School climate

The Delaware School Climate Survey - Students (DSCS-S) consists of 21 items organized into five sub-scales: teacher–student relations ( $\alpha = 0.85$ ; e.g., "Teachers care about their students"), student–student relations ( $\alpha = 0.77$ ; e.g., "Students get along with one another"), fairness of rules ( $\alpha = 0.73$ ; e.g., "School rules are fair"), school safety ( $\alpha = 0.86$ ; e.g., "Students feel safe in this school"), and liking of school ( $\alpha = 0.76$ ; e.g., "I am proud of my school"). The subscales are comprised of 3–4 items, except for the teacher–student relations subscale which is composed of 7 items. The instrument is based upon a bifactor model consisting of five specific factors and one general factor (School Climate). Students respond to each item using a 4-point Likert scale (1 - Strongly Disagree; 2 - Disagree, 3 - Agree, and 4 - Strongly Agree). Summing scores across items provides a total score ( $\alpha = 0.92$ ), with the negatively worded items reverse scored. The factor structure, reliability, and validity of scores on the Portuguese version of the DSCS-S have been well established in previous research (Coelho et al., 2020).

##### 3.2.3. Class characteristics

Official school records were used as a source of information for class characteristics (class size).

#### 3.3. Procedure

The questionnaires for assessing victimization and bullying behaviors were administered at different time points: T1, at the beginning of fourth grade (October) for a baseline assessment of victimization and bullying behaviors (regarding the third grade); T2, at the end of the fourth grade (June) for the assessment of fourth-grade perception of school climate and victimization and bullying behaviors immediately before transition; and T3, at the end of fifth grade (June), for an assessment of perceived fifth-grade school climate and bullying and victimization behaviors post-transition. All assessments were carried out in regularly scheduled classes and in the presence of the teacher. The questions were initially read aloud by the educational psychologist who was administering the questionnaires. The time that students took to complete the questionnaire was about 20 min per classroom. If a student

**Table 1**  
Descriptive Statistics – School Climate Variables across Gender, Cohort and Type of Transition.

Characteristic	Total (%)	Student-Student Relationships*	Fairness of Rules*	School Safety*	School Liking*	Teacher-Student Relationships*
		M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Total	671	−0.19 (0.50)	−0.15 (0.49)	−0.31 (0.55)	−0.20 (0.43)	−0.22 (0.38)
Gender						
Boys	350 (52.2 %)	−0.25 (0.40)	−0.20 (0.50)	−0.38 (0.59)	−0.25 (0.47)	−0.28 (0.43)
Girls	321 (47.8 %)	−0.12 (0.45)	−0.08 (0.47)	−0.23 (0.50)	−0.15 (0.38)	−0.16 (0.31)
Cohort						
Starting year 12	254 (37.9 %)	−0.11 (0.40)	−0.12 (0.39)	−0.19 (0.47)	−0.12 (0.39)	−0.18 (0.39)
Starting year 13	198 (29.5 %)	−0.19 (0.39)	−0.15 (0.35)	−0.35 (0.38)	−0.23 (0.25)	−0.20 (0.39)
Starting year 14	219 (32.6 %)	−0.27 (0.65)	−0.17 (0.67)	−0.40 (0.73)	−0.27 (0.60)	−0.28 (0.41)

Note.  $N = 671$ ; \* = Differences in school climate perceptions between 5th and 4th grade.



was not present during that period, or if all items were not answered ( $n = 21$ ), the psychologist returned the following week, thus resulting in no missing data at the individual level. The same educational psychologist, data collection method and setting were used for all assessments, although they took place in different schools.

The evaluation took place after obtaining active consent from school boards and parents, through consent forms sent at the beginning of the school year (in fourth grade); the study followed the Portuguese Association of Psychologists (OPP) ethical standards and was approved by the Psychology for Positive Development Research Center.

### 3.4. Data analysis

First, to provide support for the reliability and validity of the measures used, confirmatory factor analyses were conducted for both instruments. The internal consistency was assessed with the study's sample using Cronbach's  $\alpha$  index. To further assess the reliability and the convergent validity of the instruments, the Composite Reliability (CR), and the Average Variance Extracted (AVE) were also calculated.

Next, to analyze if school climate was measured similarly at time 2 and time 3, a formal analysis of longitudinal measurement invariance (LMI) was run on the DSCS-S. Evaluations of longitudinal measurement invariance involve contrasts among several nested models. One model is said to be nested in another model if it can be obtained by placing additional constraints on the original model (Little et al., 2007). According to Widaman et al. (2010), an optimal approach to longitudinal evaluation of factorial invariance involves a two-step procedure. This procedure involves first creating a baseline unconstrained model, and subsequently testing LMI across time using a set of four nested models corresponding to four levels of factorial invariance (configural, metric, scalar, and strict), by continuously setting equality constraints on the parameters of the measurement model over time and comparing the models' fit indices.

Therefore, in the current study the baseline model used for the longitudinal measurement invariance test for the DSCS-S was the validated model. First, we assessed the fit of the model for each time point separately. Then a baseline model was estimated without any constraints to test whether the factor structure is similar between timepoints (configural invariance, i.e., model had identical number of factors, and each item loaded onto the same factor for each timepoint). Subsequently, a more restrictive level of invariance was tested, where the factor loadings are constrained to be equal across the two timepoints (i.e., metric invariance). The next level of LMI (scalar invariance) was examined by placing restrictions on all item intercepts to be equal over time. Finally, the fourth model required imposing further equality constraints for the variances and covariances, to assess strict invariance.

To evaluate invariance at each level, three measures of model fit were used: the comparative fit index (CFI), the Tucker Lewis index (TLI), and the root mean square error of approximation (RMSEA). The CFI and TLI provide estimates of model fit by comparing a given hypothesized model to a null model that assumes no relationship among the observed variables (Kline, 2011). Although we also report the  $\chi^2/df$  ratio statistic for all models, this statistic was not used because the chi-square difference test is sensitive to minor parameter changes in large samples (Chen, 2007). According to Hu and Bentler (1999), a model can be considered to have an adequate model fit if the CFI and the TLI are each above 0.90, and if the root mean square error of approximation (RMSEA) is below 0.08; however, if CFI and TLI are above 0.95 and RMSEA values are below 0.05, this indicates a good model fit. Therefore, each model was assessed by analyzing its own fit indices and comparing them with the model with lower restrictions. Invariance was deemed to have been met if the change in CFI ( $\Delta CFI$ ) between comparison and nested models is less than 0.02 (Cheung & Rensvold, 2002), and the change in RMSEA ( $\Delta RMSEA$ ) is lower than 0.015 (Chen, 2007). All models were obtained using maximum likelihood (ML) estimators in Mplus 8.7.

Finally, to test the hypotheses posed, we took into consideration that

students from the same classroom are much more likely to provide highly correlated responses (Kosir et al., 2020). Therefore, given the hierarchical and clustered nature of the study data set, and following Bliese et al. (2018), who suggested that low ICC values for higher level-3 predictors should not deter researchers from using multilevel linear modeling, we employed this statistical method in MLwiN 2.36 to test the current study's hypotheses.

Specifically, three-level models were used, because the three assessments were nested within the 671 students, which were nested within 42 school classrooms. Model fitness was assessed through the comparison of the function of log-likelihood, using a model deviance test to compare the log-likelihoods. In this case, the fit of the model is better when the difference between models is statistically significant after adjusting for the differences in degrees of freedom, i.e., the second model is significantly smaller than the previous one.

A series of models were created for both outcomes (these are available in the Supplemental materials). First, an unconditional model (Model 0) with no predictors was run to analyze between-classrooms variance; the intercept was used as a random effect in all the models. Model 1 is a growth curve model in which the effect of continuous time on the outcome is treated as linear and allowed to vary across individuals (random slope) to assess within-individual variation. Next, gender, cohort, and the differences in each of the school climate dimensions were entered as explanatory variables at the individual level (Model 2). For Model 3, classroom size (grand-mean centered) was entered as explanatory variables at the class level. In the final models, a series of cross-level interactions terms were specified using dummy coding, these cross-level interactions included Gender\*Time, School Climate Dimensions\*Time and ClassroomSize\*Time.

To assess the normality assumption, first we checked the distribution of residuals at all three levels by using normal probability plots. Straight-line plots of generated normal scores against the standardized residuals indicated normally distributed residuals.

## 4. Results

Further information and descriptive statistics for the participants are displayed in Tables 1 and 2. Confirmatory factor analyses provided support for the reliability and convergent validity of both instruments used. For the bullying instrument both subscales displayed good values of reliability and validity (victimization –  $\alpha = 0.84$ , CR = 0.90, AVE = 0.535; bullying  $\alpha = 0.85$ , CR = 0.91, AVE = 0.561); whereas for the School Climate instrument displayed mostly adequate values (Student-student relationships – CR = 0.82, AVE = 0.538; Fairness of the rules – CR = 0.77, AVE = 0.526; School safety – CR = 0.82, AVE = 0.610; School liking – CR = 0.80, AVE = 0.50; Teacher-student relationships – CR = 0.92, AVE = 0.52. Victimization and bullying behaviors varied significantly between classes, the intra-class correlation (ICC) indicated that 10.5 % of the variation in victimization and 11.7 % of the variation in victimization and bullying occurred between classes.

The results of the analysis of the LMI of the DSCS-S indicated that, overall, the factor structure of the DSCS-S adequately fit the longitudinal data. First, all model fit values were adequate for both time points (CFI and TLI > 0.90, RMSEA < 0.08), allowing for further examination of the LMI. Next, as displayed in Supplemental Table 1, the assumption of configural equivalence was met because each of the scales in the hypothesized model fit well across the two waves of data collection (i.e., the model had an identical number of factors, and each item loaded onto the same factor for each time point). Furthermore, because the differences between the nested models in CFI ( $\Delta CFI$ ) were all less than 0.02, and the changes in RMSEA ( $\Delta RMSEA$ ) were lower than 0.015, it can be considered that the instruments' metric, scalar, and residual variance invariance was also supported across time.

**Table 2**

Descriptive Statistics – Victimization and Bullying across times, per Gender, Condition and Type of Transition.

	Participants					
	Time 1		Time 2		Time 3	
	n = 766		n = 760		n = 671	
	Victimization <i>M</i> ( <i>SD</i> )	Bullying <i>M</i> ( <i>SD</i> )	Victimization <i>M</i> ( <i>SD</i> )	Bullying <i>M</i> ( <i>SD</i> )	Victimization <i>M</i> ( <i>SD</i> )	Bullying <i>M</i> ( <i>SD</i> )
Boys	1.49 (0.57)	1.36 (0.49)	1.46 (0.52)	1.32 (0.45)	1.81 (0.67)	1.35 (0.45)
Girls	1.36 (0.44)	1.22 (0.35)	1.34 (0.40)	1.23 (0.85)	1.52 (0.52)	1.16 (0.26)
	t(764) = 3.47**		t(758) = 2.92**		t(669) = 6.20***	
	t(764) = 4.83***		t(758) = 1.67		t(669) = 6.76***	
Cohort Starting Year 12	1.43 (0.54)	1.26 (0.43)	1.39 (0.48)	1.23 (0.38)	1.65 (0.61)	1.26 (0.38)
Cohort Starting Year 13	1.50 (0.55)	1.43 (0.53)	1.45 (0.50)	1.44 (0.48)	1.76 (0.60)	1.31 (0.41)
Cohort Starting Year 14	1.36 (0.45)	1.20 (0.29)	1.36 (0.42)	1.17 (0.26)	1.63 (0.64)	1.21 (0.36)
	F(2,763) = 4.58*		F(2,757) = 2.02		F(2,668) = 2.84	
	F(2,763) = 18.66***		F(2,757) = 9.55***		F(2,668) = 3.06*	

Note. \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

#### 4.1. Victimization behaviors

The results for victimization behaviors are displayed in Table 3 (and detailed in Supplementary Table 2). Adding the within-individual predictor (time) was significant; time remained a significant predictor after adjusting for all predictors, indicating that victimization behaviors significantly increased during the middle school transition. Individual significant predictors were gender and the difference in students' perceptions of student-student relationships between fifth and fourth grade, being a boy and a student with a more positive evolution in student-student relationships from fourth to fifth grade was associated with higher levels of victimization behaviors. Neither class size nor the

cross-level interaction between classroom size and time was a significant predictor of victimization. However, there were five significant cross-level interactions between level 1 and 2 predictors, namely between time, on one hand, and gender, differences in student-student relations, school safety, school liking, and teacher-student relationships, on the other hand. Therefore, boys reported a significantly higher increase in victimization behaviors during middle school transition than girls, whereas students with a more positive evolution in student-student relationships, school safety, school liking, and teacher-student relationships between fourth and fifth grade reported a more positive trajectory in victimization (i.e., a decrease in victimization than students with larger decreases in the perceptions of school climate dimensions) during the middle school transition.

**Table 3**

Multilevel Model Analysis Final Models for Victimization and Bullying Behaviors.

	Victimization		Bullying	
	$\beta_{0ijk} = 1.40 (0.08)^{***}$		$\beta_{0ijk} = 1.29 (0.07)^{***}$	
	Co-efficient	SE	Co-efficient	SE
	$\beta$		$\beta$	
Classroom				
ClassRoom Size	0.01	0.01	0.01	0.01
Student				
Gender (if Boys)	0.12**	0.04	0.13***	0.03
Cohort	-0.03	0.04	-0.04	0.03
Student-Student Relationships	0.15**	0.05	-0.02	0.04
Fairness of Rules	0.03	0.05	0.19***	0.04
School Safety	0.08	0.05	0.04	0.04
School Liking	-0.09	0.05	-0.05	0.05
Teacher-Student Relationships	-0.04	0.07	-0.09	0.06
Time				
Time	0.05***	0.01	-0.03***	0.01
Interactions				
Gender (if Boys) $\times$ Time	0.04**	0.01	0.005	0.03
Student-Student Relationships $\times$ Time	-0.12***	0.02	-0.02	0.03
Fairness of Rules	-0.02	0.02	-0.09**	0.03
School Safety $\times$ Time	-0.04*	0.02	-0.03	0.03
School Liking $\times$ Time	-0.07***	0.02	-0.02	0.04
Teacher-Student Relationships $\times$ Time	-0.05*	0.02	0.001	0.04
Classroom size $\times$ Time	-0.003	0.002	-0.003	0.003
Estimates of Variance Parameters				
Repeated Measures	0.045***	0.003	0.212***	0.007
Individual Intercept	0.174***	0.012	0.154***	0.018
Individual Slope	0.009***	0.002	0.017*	0.007
Individual Covariance	0.005	0.004	-0.033***	0.009
Intercept/Slope				
Classroom Intercept	0.032**	0.010	0.030***	0.007
Deviance (-2loglikelihood)	1481.107		2280.080	
Estimated parameters	22		22	

Note. \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ ; SSR = Student-Student Relations; FR = Fairness of Rules; SS = School Safety; SL = School Liking; TSR = Teacher-Student Relations (Differences between 5th and 4th grade).

#### 4.2. Bullying behaviors

Table 3 also displays the results for bullying behaviors (detailed in Supplementary Table 3). The within-individual predictor (time) remained a significant predictor of bullying behaviors after adjusting for all predictors, indicating that bullying behaviors significantly decreased during middle school transition (see Final Model, Table 3). Significant individual predictors were gender and the difference in students' perceptions of fairness of rules between fifth and fourth grade; being a boy or students with a more positive evolution in the fairness of rules between fourth and fifth grade was associated with reporting perpetrating more bullying behaviors than girls and students with a less positive evolution of fairness of rules. Neither classroom size nor the interaction between time and classroom size were significant predictors of bullying behaviors. However, there was one significant cross-level interaction between level 1 and 2 predictors, between time and differences in the fairness of rules. Therefore, students with a more positive evolution in the fairness of rules during fourth and fifth grade reported a more positive trajectory in bullying behavior (i.e., displayed a more noticeable drop in engaging in bullying behaviors than students with larger decreases in the perception of fairness of rules) during the middle school transition. Finally, there was statistically significant negative covariance between intercepts and slopes, which implies that students who had higher initial levels of bullying behaviors display a steeper decrease in those behaviors during the analyzed period.

## 5. Discussion

The current study sought to address several important gaps in bullying research. One of the principal gaps was the lack of longitudinal studies focusing on the trajectory of victimization and bullying behaviors during school transition periods, particularly during middle school in Portugal, where this transition occurs at a relatively early age (Authors, 2020). Another gap in the literature was the lack of studies analyzing how changes in school climate may influence bullying and victimization behaviors in middle school, given that most previous

studies involved high school populations (Daily et al., 2019). Therefore, the current study addressed these gaps and analyzed the influence of school climate perceptions upon the trajectory of bullying and victimization behaviors during the middle school transition in Portugal.

The results from the current study showed that, after middle school transition, students reported an increase in victimization behaviors, but they also reported a decrease in bullying behaviors when compared to when they were in fourth grade. The increase in victimization behavior is aligned with several authors (Coelho et al., 2019; Farmer et al., 2015), but the current study's results contradict Wang et al. (2016), who had reported a decrease in victimization behaviors during a middle school transition taking place after fifth grade. However, the decrease in bullying behaviors after the middle school transition contradicted previous reports by several authors (Coelho et al., 2019; Pellegrini & Long, 2002; Pepler et al., 2006). These authors had reported increases in bullying behaviors during middle school transition. This pattern of results can be mostly explained by Stage-Environment Fit Theory (Eccles & Midgley, 1989; Eccles et al., 1993); this theory identified a relationship between the changes in the developmental needs of youths and the changes in the social contexts in which they live. In this study, two of the most pronounced changes in the social context of these youths is the disruption of their social networks, during a time when social connections are becoming more salient and the shift from being the oldest in elementary school to the youngest in middle school (Coelho & Romão, 2016). These two factors are likely to explain the increasing victimization behaviors and diminishing bullying behaviors because, at this stage, the strategy of gaining social dominance in their new school environment—which explains increases in bullying prevalence in other studies (see Reijntjes et al., 2013)—might not be as relevant because they are the youngest students in middle school. Furthermore, students who reported higher levels of bullying behaviors in fourth grade also reported the largest decrease in these behaviors in fifth grade. Therefore, it is unlikely that younger students are bullying older students; it is much more likely that at least part of the bullying is being perpetrated by older students. This could partially explain both the increase in victimization and the decrease in perpetration.

There were gender differences in the trajectory of victimization behaviors, boys showed a larger increase than girls in victimization. However, the results in the trajectory of bullying behaviors were similar for both genders. Therefore, the results of the current did not support hypotheses three and four, and although they are in line with Wang et al. (2016) who had reported about a transition taking place one year later (after fifth grade), they are not aligned with several previous studies (Pellegrini & Long, 2002; Pepler et al., 2006; Reijntjes et al., 2013). These authors had reported gender differences in bullying behaviors following middle school transitions that took place after sixth grade, a time when social dominance strategies might be more relevant. Although, middle school transition took place after sixth grade, a time when social dominance strategies might be more relevant.

Previous studies showed that bullying created a climate of fear, mistrust, and intimidation (Low & Ryzin, 2014), whereas a supportive, fair, and respectful school climate predicted less victimization and perpetration (Guerra et al., 2011). Given the results reported previously in the literature, we had hypothesized that a smaller drop in perceived school climate (operationalized through perceived school climate dimensions) in the fifth grade, would be associated with a more positive trajectory in victimization and bullying behaviors during middle school transition and this hypothesis was mostly confirmed. More positive trajectories in students' perceptions of school climate dimensions from fourth to fifth grade in teacher-student relationships, student-student relationships, school safety, and liking of school were associated with a more positive trajectory in victimization behaviors, although for teacher-student relationships and school safety this association was weaker. However, only one school climate dimension was associated with the trajectory of bullying behaviors; a more positive trajectory of students' perceptions of fairness of rules was associated with decreasing

bullying behaviors. These results are in line with the work of Aldridge et al. (2020), who suggested that schools might be able to reduce the prevalence of bullying by enhancing students' sense of belonging and support at school, as well as the clarity of school rules and expectations. The results may also be best understood considering stage-environment fit theory (Eccles & Midgley, 1989; Eccles et al., 1993), smaller drops in perceived school climate are likely to correspond to a better fit between the environment and students' developmental needs, leading to more positive outcomes.

Finally, regarding the research questions posed, classroom size did not influence victimization and bullying behaviors throughout middle school transition. Although no previous studies are detailing the influence of class size, the results of the current study are similar to those reported by Niesen and Wise (2004) regarding the influence of class size upon academic results.

In sum, the present study contributed to improving our understanding of the relationship between victimization and bullying behaviors, on one hand, and perceived school climate, on another hand during a middle school transition that takes place earlier than in most settings. Students reported that victimization behaviors increased (most noticeably for boys) and that their bullying behaviors decreased. The combination of these two results may be explained by a higher occurrence of bullying by students from higher grades, aligned with studies that concluded that fifth graders are often bullied by older peers (Authors, 2020). Results also showed that students' perceptions of school climate during middle school transition are relevant, students who reported a more positive trajectory in their perceptions of several school climate dimensions during this period also reported a more positive trajectory in victimization behaviors. Furthermore, perceptions of fairness of rules during middle school transitions are associated with the trajectories of bullying behaviors.

### 5.1. Implications

To prevent bullying and victimization, and considering the Stage Environment Fit Theory, the middle school setting should try to minimize the differences between elementary and middle school students, to have smaller drops perceived school climate in middle school.

Considering bullying behaviors, as proposed by Gage and collaborators (2014), the schools should invest in creating a positive perceived school climate to promote the prevention of bullying perpetration and victimization. Additionally, the schools should invest efforts to create a better perception of fairness of rules and school safety (Aldridge et al., 2020). Since the fifth graders are more often bullied by older students, in the middle school context, intervention strategies should be created to enable the involvement of older students, which may facilitate a better adjustment in the perceptions of the school climate of fifth-grade students who are adapting to a new school setting and social network (e.g. mentoring programs involving fifth-graders and older students). Additionally, several authors (Cohen & Smerdon, 2009; Cross et al., 2018) suggested that successful transition programs need to involve all the school community members including teachers, staff, and parents. Implementing programs that support students in their transition is also likely to lead to better outcomes in bullying behaviors. As such, to promote a more positive transition to middle school, intervention programs that address social, academic, and logistic factors and involve the whole school community should be implemented.

### 5.2. Limitations

One limitation of this study resides in that it only followed students during their first year in middle school and, as such, did not allow for an examination of the development of bullying and victimization behavior throughout middle school. Another limitation is that the study only analyzed students that are transitioning to middle school at age 9 and did not simultaneously assess older students. To fully understand

bullying and victimization behaviors during the middle school transition, it would be important to compare transitions in different ages in different countries. A third limitation is that we did not model levels of school climate; therefore, we cannot make any conclusions regarding how safe or supportive a school climate was perceived to be—only whether a student's perceptions changed from elementary to middle school.

A final limitation is that results are based solely on students' self-reports. Even though student reports are valid for understanding the child's perspective, this methodology presents several weaknesses: they can be vulnerable to self-presentation strategies or influenced by social desirability (Hymel & Swearer, 2015), and memory biases (especially because they depend on student's recollections of events that have taken place in the previous school year). However, as the study followed students throughout middle school transition, it was not possible to obtain teacher reports because there was a total change in teachers between elementary and middle school.

### 5.3. Future studies

Future studies should analyze how perceived school climate dimensions change throughout middle school to determine the trajectories of bullying behaviors through middle school years (fifth and sixth grade). It will be important to address this study in different countries, to understand the role of development factors (age and stage of development) and contextual factors. Given the transactional relationships between bullying and victimization behaviors, it would be important that future studies addressed their longitudinal association throughout the middle-school transition. Finally, future studies could analyze the impact of middle school transition support programs in perceived school climate trajectories.

## 6. Conclusion

In conclusion, the results of the present study not only confirm the importance of school climate perceptions for victimization and bullying behaviors, but they specifically highlight that school climate perceptions are crucial for these behaviors during middle school transition. Results showed that middle school transition negatively impacted the trajectory of victimization behaviors, although the same pattern was not observed for bullying behaviors. Also, this study highlighted the possible vulnerability that students face when they transition into middle school at such an early age, which can explain the trajectory in victimization and bullying behaviors across the transition.

Maintaining students' school climate perceptions throughout the transition period seemed to have a positive effect on victimization and bullying behaviors trajectory, where it is more advantageous for fifth-grade students that the differences perceived in school climate are minimal. According to these results, fifth-grade students who perceive their middle school as safe and having similar fairness of rules as their elementary showed a more positive trajectory in bullying behaviors.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Data availability

Data will be made available on request.

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## Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.cedpsych.2022.102111>.

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