

Influences of Teachers, Students and School Climate on Bullying Victimization: Evidence from China

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Abstract: *Given the common occurrence of school bullying incidents and high prevalence rates of victimization in China, this study aims to explore the association between multiple school-related predictors and Chinese adolescents' overall experiences with bullying victimization. Guided by the social-ecological framework for violence prevention, this study integrated different factors involving teachers, students, and school climate into one single research to detect the bullying problem more systematically and holistically. Further, the study applied the data from the 2018 Program for International Student Assessment while utilizing binary logistic regression analyses to perceive anti-bullying variables and their relationships with bullying victimization. The study revealed that teachers' emotional, instrumental, and informational support other than appraisal support were negatively associated with students' experiences of being bullied and victimized. The research also indicated that students' sense of belonging, a cooperative school environment, and classroom disciplinary climate played a buffering role in bullying victimization while competition in school settings adversely increased overall bullying exposure. The results have highlighted the integration of various predictors in influencing multiple social relations and school environments to battle against in-person bullying. The results also have implications for stopping cyberbullying to achieve inclusive school education for all in the post-COVID-19 era.*

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THE significance of bullying prevention and intervention has been well addressed in a series of initiatives taken by the Chinese government, including *The Guidance on the Prevention and Treatment of Bullying and School Violence* in 2016, *Comprehensive Plan on Strengthening the Management of Bullying among Primary and Middle School Students* in 2017, and the newly revised *Minor Protection Law* that took effect in 2021. However, school bullying still topped the agenda of this year's two plenary sessions of China's political bodies (2022 two sessions) and incidents of bullying victimization are often reported in media outlets. In one case, a teenager in Guangdong Province drowned after being slapped and knocked by peers in a restroom (Zuo, 2021); in another case, an adolescent from Anhui Province suffered from being bullied by a group of 12 schoolmates (China National Radio [CNR], 2022). These single incidents are just a tip of the iceberg and in fact, more instances of school bullying have surfaced with victimization constituting a major source of injuries (Li et al., 2020). Statistics from a national survey led by Central China Normal University has revealed that the proportion of students who had bullying experiences in 2019 and 2020 amounted to 32.4 percent (Zhao, 2021). Worse still, when classes were moved online due to the outbreak of the COVID-19 pandemic, cyberbullying (a form of bullying using the Internet) still persisted in China (Han et al., 2021). That is why legislators and deputies at the 2022 two sessions called on schools and communities to speed up the process of building a bullying-free, equitable, and inclusive campus for all. To achieve this goal, it is imperative for Chinese researchers and educators to identify intervention predictors pertaining to school violence and bullying victimization and work out detailed plans to reduce the incidence of bullying behaviors.

As for the factors predicting bullying victimization, teachers, students and school climate are generally regarded as three major components for assessing an engaging or a horrifying learning experience (e.g., Ahnert et al., 2012; Maxwell et al., 2017). Among them, teacher support (Flaspohler et al., 2009; Huang & Zhao, 2019), a fundamental need to belong (Underwood & Ehrenreich, 2014), a socially cooperative environment (Van Ryzin & Roseth, 2018a), and benign competition in one's immediate settings (Volk et al., 2015) have been respectively evidenced in previous bullying literature. Derived from classroom settings, management style or disciplinary climate is more associated with students' academic achievement (Sortkær & Reimer, 2018), but seldom mentioned to be directly linked to school bullying. Further, researchers' renewed attention to the fundamental relationships involving teachers, students, classroom settings, and school cultures could help to explain cyberbullying patterns during the COVID-19 pandemic (Vaillancourt

et al., 2021). But in the Chinese context, little has been known about the multiple school-related factors that jointly work on anti-bullying endeavors. Therefore, this empirical study aims to explore the association between the different facets of school learning and Chinese students' overall experiences with bullying victimization while controlling for such demographics as gender, age, student backgrounds, and grade repetition. Three overarching research questions have guided this exploration.

- (i) *How much variance in overall bullying experience is explained by school-related factors and demographics?*
- (ii) *Do school-related predictors have associations with high or low frequencies of bullying experiences?*
- (iii) *What intervention factors predict the likelihood of Chinese students' high or low exposure to bullying victimization?*

Literature Review

Theoretical Framework

Guided by the social-ecological framework for violence prevention (CDC, 2004), this study addresses the complex interplay between individual, relationship, community, and societal factors in relation to bullying and bullying victimization. Originating from Bronfenbrenner's (1979) social-ecological model (SEM), this updated framework offers an ecological angle to "investigate the combined impact of social contexts and influences on behavioral development" (Swearer et al., 2010, p. 42).

As **Figure 1** shows, a range of factors work to alert people to the possible risks for experiencing or perpetrating violence while the overlapping circles indicate how one level of factors influences another and how different levels of factors coexist to function on the entire model. At the individual level, prevention strategies may involve personal attitudes, beliefs, or behaviors that prevent or stop violence. At relationship and community levels, a person's close connection to family members and active interaction with schools/workplaces/ neighborhoods may provide a pathway for risk reduction and violence prevention, including teacher-student interaction, positive peer relations, and reliable school/work environments. The final level (societal factors) features social and cultural norms that encourage or hamper violence. The following sections briefly introduce the variables that fall within this framework, which will form the basis of the bullying model to be tested in our empirical study and help to understand anti-bullying efforts over time and beyond human-level impact.

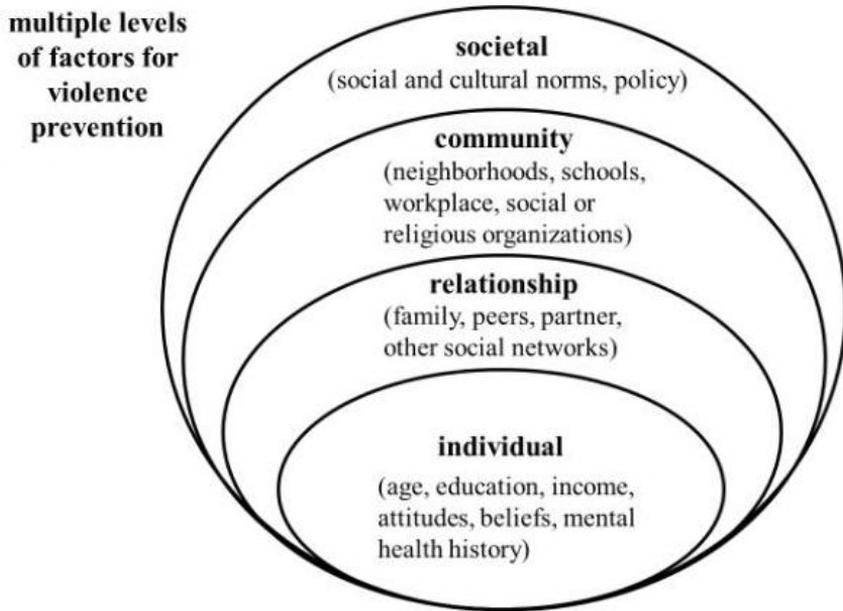


Figure 1: Social-Ecological Model - A Framework for Prevention.

Note: Adapted from Centers for Disease Control and Prevention (p.5), 2004, CDC.

Teacher Support

Students' healthy development cannot be sustained without the involvement of teachers, who provide support for, build trust in, and form close interpersonal relationships with students (e.g., Hughes et al., 2012; Quin et al., 2018; Ryan & Patrick, 2001; Wentzel et al., 2010). Moreover, such teacher-student relationships seem more collaborative rather than hierarchical (Schleicher, 2018). Tardy (1985) pointed out that teacher support as a form of social support was composed of four categories, namely emotional, instrumental, appraisal, and informational support. Emotional support is the type of teacher support that reflects love, concern, empathy, confidence, and patience; instrumental support refers to the substantial help passed on to the students in real need; appraisal support could be interpreted as the constructive feedback and appropriate evaluation system offered for students who will then know where and how to improve their learning behaviors; informational support is viewed as instruction, guidance, assistance, and counselling provided to help with students' problem-solving (Wentzel, 2016).

Previous literature has revealed that teacher support positively correlates with students' emotional and cognitive development (Quin, 2016; Quin et al., 2018) as well as with their interest in classroom activities (Lapointe et al., 2005) and their academic enjoyment (Ahmed et al., 2010; Ma et al., 2021). Despite much attention devoted to the connection between teacher support and academic performance, scholars have begun to realize the importance of anti-bullying efforts in the presence of teachers. Furlong and Chung (1995) early indicated in their empirical research that those non-victims are almost twice as likely as bullying victims to report the presence of a teacher to whom they can express their problems and pour out their feelings; other studies (e.g., Baik et al., 2019; Colarossi & Eccles, 2003; Mazzer & Rickwood, 2015) then emphasized the close relationship between teacher influences and students' well-being, which could further determine students' sense of security, problem behavior and victimization experience (Berkowitz & Benbenishty, 2012; McNeely & Falci, 2004). Besides, through analyzing the index of informational support, Huang and Zhao (2019) implied that teacher support could slightly mitigate bullying exposure, but they did not discuss the remaining three categories. Hence in this study, all four types of teacher support will be examined in relation to bullying victimization in China.

Students' Sense of Belonging

In educational settings, belonging is identified as the feeling of security, acceptance and inclusion a student connects to peers, teachers, and the school (Goodenow, 1993). Research shows that students' sense of belonging is closely linked to academic achievement (Wang & Eccles, 2012; Wang & Holcombe, 2010) and psychological adjustment (Lester et al., 2013; Loukas et al., 2016), and has sparked renewed concern for educators as a result of a high prevalence of bullying exposure (Duggins et al., 2016; Ma, 2003). Previous studies have suggested that the stronger a sense of belonging students have, the lower the level of bullying perpetration and victimization occurs (Goldweber et al., 2013; Raskauskas et al., 2010). Accordingly, we hypothesize that students' sense of belonging might play a buffering role in bullying victimization while influencing multiple relationships and different communities.

Classroom Disciplinary Climate

A major component of a positive classroom environment, disciplinary climate is provided when students listen to their teachers and peers attentively and focus only on their academic tasks without the interference of noise or

disorder (Moos, 1979). Three key elements characterize the variable: students' reverence for classroom rules as always, teachers' utmost responsibility for ensuring a favorable learning environment, and peers' disruptive-free behavior in the classroom (Cheema & Kitsantas, 2014; Matsumura et al., 2008). A positive disciplinary classroom secures more teaching and learning opportunities (Mostafa et al., 2018), better academic performance (Blank & Shavit, 2016), students' psychological wellbeing (Kim et al., 2021; Wang et al., 2020), and the efforts against bullying involvement (e.g., victimization and witnessing) (Kim et al., 2021). Additionally, an orderly, nondisruptive classroom can also facilitate students' sense of belonging (Organization for Economic Cooperation and Development [OECD], 2017) and benefit ethnic minorities and students in a disadvantaged position (Cheema & Kitsantas, 2014). In this research, we hypothesize that classroom disciplinary climate might predict bullying victimization while influencing various social relations.

Cooperation and Competition

Skills of cooperation is nurtured in an educational setting where students learn together (usually in small groups) to fulfill well-structured learning tasks and accomplish a well-defined learning goal (Van Ryzin & Roseth, 2019; Zook, 2018). If properly created, a cooperative learning environment brings about a high level of peer relatedness or peer relations (Roseth et al., 2008; Van Ryzin & Roseth, 2018a), which in turn promotes the attainment of learning goals (Johnson et al., 2014) as well as encourages positive feelings and supportive interactions. Ultimately, benign spiral emerges with the repetition of collaborative learning atmosphere and positive social interactions within the group (Deutsch, 1949, 1962). After class, students still have the opportunity to enhance their favorable peer relations by relating each individual's contribution to the performance of the entire group. This type of cooperation with an emphasis on social contact and skills benefits anti-bullying behaviors and helps to reduce bullying victimization (Van Ryzin & Roseth, 2019).

The opposite side of school learning is perceived as having a climate of competition, in which students compare one another or work against each other to obtain their academic or social benefits (e.g., excellent grades and admission to prestigious universities) (Johnson & Johnson, 1978; Volk et al., 2015). Views differ as to whether competition should be fostered in the learning process. One perspective considers competition as being supported by in-group distinctions, social hierarchy, and socioeconomic backgrounds and hence linked to increased bullying (Volk et al., 2015); another opinion

identifies competition as a catalyst for student engagement and students' competitive instincts (Anderson, 2006); a third perception regards competition as potentially feasible depending on different disciplines and educational levels (Chen & Chen, 2014; Vandercruysse et al., 2013). Whatever views prevail and whatever environmental attribute is outlined, students need to learn to create and bolster positive social relations while taking advantage of every factor in the learning community (e.g., teacher and peers) to achieve what is to be achieved (Johnson & Johnson, 1978; Gutiérrez-Braojos et al. 2019). In this study, we hypothesize that both cooperation and competition might work together to influence school violence and bullying victimization while affecting different relationships and school environments.

Study Design

Previous bullying-related literature has identified that in both Chinese and non-Chinese contexts, gender, grade repetition (or the practice of having students remain in the same grade without promotion), and economic, social and cultural status (ESCS) all closely correlate with bullying exposure and bullying victimization. Therefore, this study regards the above literature-supported predictors as student-level control variables (as they might confound the bullying model) and centers the underlying mechanism of the association between the fore mentioned school-related predictors and bullying victimization for Chinese adolescents. In line with the theoretical model and out of the urge to identify anti-bullying factors in the Chinese context, we proposed the following three hypotheses for the present study (see **Figure 2**).

H₁: Teacher support (at the relationship level) significantly influences bullying victimization at school.

H₁₋₁: Emotional support significantly influences bullying victimization.

H₁₋₂: Instrumental support significantly influences bullying victimization.

H₁₋₃: Appraisal support significantly influences bullying victimization.

H₁₋₄: Informational support significantly influences bullying victimization.

H₂: Students' sense of belonging (at the community level) strongly predicts bullying victimization.

H₃: School climate (at the community level) greatly affects bullying victimization while influencing various social relations.

H₃₋₁: Classroom disciplinary climate strongly predicts bullying victimization.

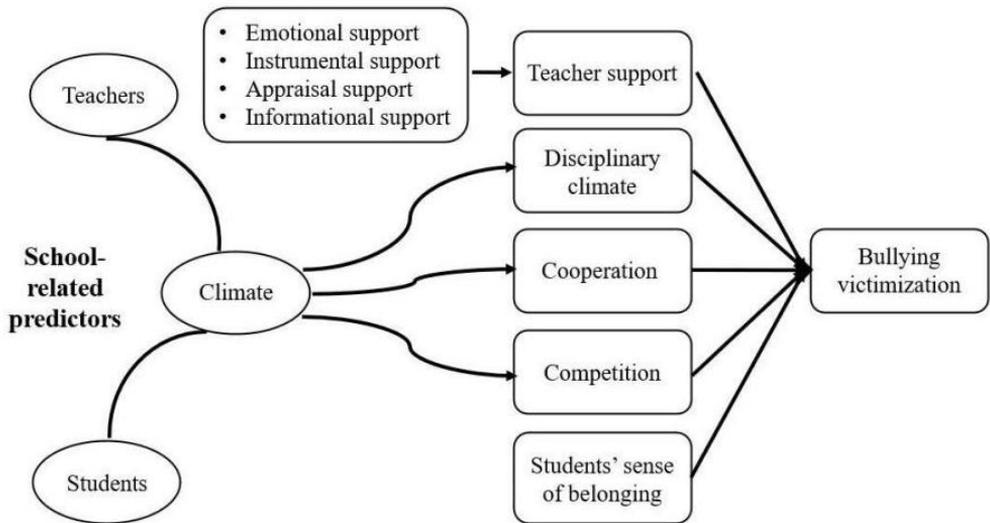


Figure 2: School-Related Predictors Hypothesized for Bullying Victimization.

H₃₋₂: Cooperation greatly influences bullying victimization.

H₃₋₃: Competition greatly influences bullying victimization.

Methods

Sample

This study analyzed the publicly available dataset from the 2018 Program for International Student Assessment (PISA 2018) conducted by OECD in China's Beijing, Shanghai, Jiangsu, and Zhejiang provinces (B-S-J-Z, China). PISA, a triennial survey featuring 15-year-olds, measures to what extent they have obtained the critical knowledge and skills essential for active involvement in society. PISA 2018 adopted a stratified two-stage sampling procedure to select sample students. In the initial phase, schools were chosen through systematic probability proportional to size (PPS) sampling (OECD, 2019c). In the subsequent phase, 42 students were selected with equal probability within each sampled school. For schools with a required number of students fewer than 42, all 15-year-olds were singled out (OECD, 2019c). Ultimately, 12,058 adolescents were selected from 361 schools, among which 4306 (35.7%) came from lower-secondary schools, 5594 (46.4%) from upper secondary schools, and 2158 (17.9%) from vocational schools. As stipulated by PISA's international protocol (OECD, 2019b), PISA 2018

China data met the minimum requirements of the weighted response rate for selected schools within participating countries/regions (85%) and that for students from those selected schools (80%). Before data collection, informed consent was acquired from principals, teachers, parents, and students. The secondary data analyses of PISA 2018 would be crucial for this study as the large-scale survey through a careful sampling process reflected the real bullying situation in Chinese schools.

Dependent Variable

The dependent variable in PISA 2018 was measured from the perspective of the bullying victims (OECD, 2019a) and assessed by asking students to report how often they had experienced physical, verbal and social forms of school bullying during the past 12 months (see **Table 1**). Participants responded on a four-point Likert-type scale ranging from 1 = *never or almost never* to 4 = *once a week or more*. The corresponding items were then added up for the bullying scale with the internal consistency or reliability tested (Cronbach's $\alpha = 0.843$).

Demographic Variables

Included in the demographic variables were such student background predictors as age, gender, grade repetition, and the ESCS index (see **Table 2**). Age, a continuous variable, spanned from 15.33 to 15.77 years old (mean = 15.77, SD = 0.29). Gender and grade repetition were all used as dummy variables with "0" for boys/no grade repetition and "1" for girls/grade repetition. The ESCS index, a weighted score rooted in PISA 2018, contained three family background variables, namely home possessions, parents' highest educational levels, and their highest occupational status (OECD, 2019c).

Independent Variables

All the independent variables (teacher support, students' sense of belonging, cooperation and competition, classroom disciplinary climate) in the study were directly derived from the PISA 2018 database (see **Table 3**). To ensure validity and reliability of the independent scales applied to this research, scaling procedures and construct validation of context questionnaire data were well documented in the dataset with the internal consistency (Cronbach's alpha) all exceeding 0.800 (Cronbach's $\alpha > 0.800$) (OECD, 2019c).

Parallel with Tardy's (1985) and Wentzel's (2016) categorization of teacher support, this study applied four indices from PISA 2018: TEACHINT (rep-

Table 1: Dependent Variable: Bullying Scale.

Bullying Scale: 1 (never or almost never) to 4 (once a week or more)	1. Other students left me out of things on purpose.
	2. Other students made fun of me.
	3. I was threatened by other students.
	4. Other students took away or destroyed things that belonged to me.
	5. I got hit or pushed around by other students.
	6. Other students spread nasty rumors about me.

Table 2: Descriptive Statistics for Demographic Variables.

Continuous demographic variable(s)	Minimum	Maximum	Mean	SD	N	
Age (years)	15.33	16.25	15.77	0.29	12,058	
Categorical demographic variables	Variables	Frequency	%			
Gender	Female	5,775	47.9			
	Male	6,283	52.1			
	Grade Repetition	No	11,237	93.2		
		Yes	753	6.8		

Table 3: Independent Variables and Scale Reliabilities.

Teacher Support	Emotional Support (TEACHINT) Cronbach's $\alpha = 0.893$	It reflects teachers' love, concern, enthusiasm, and encouragement for students.
	Instrumental Support (DIRINS) Cronbach's $\alpha = 0.805$	It represents pedagogically tangible help (e.g., clear goals for learning, instructions, a short summary of the previous lesson, and checking questions on whether teaching has been understood) in student learning.
	Appraisal Support (PERFEED) Cronbach's $\alpha = 0.892$	It refers to the feedback on students' strengths in a subject, the areas that should be improved, and how the areas can be improved.
	Informational Support (TEACHSUP) Cronbach's $\alpha = 0.851$	It indicates guidance, assistance, and counseling provided to help students understand the subject.
Sense of Belonging Cronbach's $\alpha = 0.822$		It refers to students' perceptions of community connectedness and school inclusion.
School Climate	Disciplinary Climate in the Test Language Classroom (DISCLIMA) Cronbach's $\alpha = 0.892$	It measures order and discipline to be maintained in classroom settings.
	Perception of Cooperation (PERCOOP) Cronbach's $\alpha = 0.924$	It shows the environment where cooperation is addressed by students in target schools.
	Perception of Competition (PERCOMP) Cronbach's $\alpha = 0.829$	It refers to the environment where competitiveness is reported by students in target schools.

resenting emotional support), DIRINS (indicating instrumental support), PERFEED (reflecting appraisal support), and TEACHSUP (pointing to informational support). As for students' sense of belonging, the index naturally derived from the PISA data examined how easy it was for students to make friends at school, how they were welcomed or accepted by peers, and how they felt isolated or asocial in their community (Goodenow, 1993).

For school climate predictors in PISA 2018, disciplinary climate in the test language classroom (DISCLIMA), perception of cooperation (PERCOOP), and perception of competition (PERCOMP) were singled out for study. The disciplinary climate index described how orderly or disruptive the entire classroom environment appeared with higher values pertaining to positive climate appropriate for student learning and classroom communication. Meanwhile, the cooperation index asked respondents to assess if they value cooperation, collaborate with each other, and are encouraged to cooperate at school; the competition index required participants to report if they cherish competition and compete with each other in the school environment.

Analytic Procedure

Because the dependent variable (the bullying scale) was not normally distributed, we split it into a dummy one (high and low frequencies of being bullied or victimized) in response to the research questions. Low frequency means that participants never or almost never experienced the listed forms of bullying events while high frequency indicates that respondents experienced at least one of the listed bullying events a few times a year or more (see **Table 4**). Further, inspired by previous logistic regression models used to understand Chinese students' perceptions of and experiences with an educational phenomenon (Allen, 2019), we conducted the research developing a stepwise binary logit model (Pallant, 2016). Utilizing SPSS software Version 28.0, the whole analytical process of data began with the entrance of demographic variables to create a predictive model (Model 1), which was followed by the addition of other variables of interest, namely the teacher-support model (Model 2), the sense-of-belonging model (Model 3), and the school-climate model (Model 4). The final model (Model 5) ended up with all the above predictors.

However, preliminary assumption tests revealed that for Models 3 and 4¹ (see *Appendix I*), the Hosmer and Lemeshow Goodness of Fit Tests were not passed (significance values all below 0.05), suggesting no support for these three models (Hosmer & Lemeshow, 2000). Hence, this study only concentrated on the other three models (i.e., Model 1: demographic model; Model 2: teacher-support model; Model 5: full-predictor model).

Table 4: Descriptive Statistics for Categorical Dependent Variable(s).

	Variables	Frequency	%
Bullying	Low	6,463	54.5
Scale	High	5,390	45.5

Table 5: Logistic Regression Analysis of Demographic, Teacher-Support and Full-Predictor Models.

Variables	Model 1 ^a			Model 2 ^b			Model 5 ^c		
	B	S.E.	Exp(B)	B	S.E.	Exp(B)	B	S.E.	Exp(B)
Gender	0.506 [‡]	0.037	1.658	0.524 [‡]	0.039	1.690	0.495 [‡]	0.040	1.640
Age	0.004	0.064	1.004	-0.104	0.066	0.901	-0.235 [‡]	0.069	0.791
Grade Repetition	0.245 [†]	0.078	1.278	0.264 [‡]	0.080	1.302	0.211 [*]	0.084	1.235
ESCS	-0.072 [‡]	0.017	0.930	-0.017	0.018	0.983	0.030	0.019	1.031
TEACHINT				-0.264 [‡]	0.025	0.768	-0.098 [‡]	0.027	0.907
DIRINS				-0.110 [‡]	0.025	0.896	-0.064 [*]	0.026	0.938
PERFEED				-0.022	0.024	0.978	0.30	0.025	1.031
TEACHSUP				-0.200 [‡]	0.028	0.819	-0.142 [‡]	0.030	0.867
BELONG							-0.454 [‡]	0.027	0.635
DISCLIMA							-0.311 [‡]	0.022	0.733
PERCOOP							-0.168 [‡]	0.023	0.846
PERCOMP							0.248 [‡]	0.022	1.281

Notes. ^{*} $p < 0.05$, [†] $p < 0.01$, [‡] $p < 0.001$

^a Demographic model, ^b Teacher-support model, ^c Full-predictor model

Results

Through binary logistic regression analyses, this study explored the likelihood that Chinese adolescents were exposed to high or low frequencies of being bullied or victimized. For Model 1 using age, gender, grade repetition, and ESCS, the likelihood-ratio test produced a chi-square value of 16,101.62 and was statistically significant ($p < 0.001$), indicating the logistic model was better than the null model without predictors. The chi-square value for the Hosmer-Lemeshow test was 11.07 with a significance level of 0.198 ($p > 0.05$), suggesting the data fit the above model well (Hosmer & Lemeshow, 2000). The statistical significance ($\chi^2(4, N = 11,847) = 224.125, p < 0.001$) of the demographic model implied that it was able to distinguish between respondents' high or low exposure to bullying experiences. Moreover, the

model as a whole explained 1.9% (Cox & Snell R square) and 2.5% (Nagelkerke R square) of the variance in the two bullying groups, and correctly classified 56% of the cases with a very small improvement of 1.5% in predictions. As presented in **Table 5**, three of the four demographic variables made a unique statistically significant contribution to the model (except for age, $p > 0.05$). This meant that male students were more likely to be found in the high-level bullying groups than girls when controlling for other factors in the model. The strongest predictor of reporting the high-level bullying groups was gender, recording an odds ratio of 1.658. Likewise, the odds ratio of being in the high-level bullying groups was positively associated with grade repetition ($p < 0.01$). For ESCS, its negative correlation with bullying exposure and bullying victimization was identified ($p < 0.001$).

In Model 2 with all teacher-support predictors added to the demographics, the likelihood-ratio test and the Hosmer-Lemeshow test again identified the model as being worthwhile with the former yielding a $\chi^2(8)$ of 15,498.97 ($N = 11,081$, $p < 0.001$) and the latter obtaining the chi-square value of $\chi^2(8)$ of 9.67 ($p > 0.05$). Moreover, able to distinguish between participants' high or low exposure to bullying behaviors ($\chi^2(8, N = 11818) = 786.503$, $p < 0.001$), the teacher-support model explained 6.4% (Cox & Snell R square) and 8.6% (Nagelkerke R square) of the variance in bullying groups, and correctly classified 61.2% of the cases with a modest improvement of 6.7% in predictions. As observed in **Table 5**, five of the eight predictors made a unique statistically significant contribution to the model (gender, grade repetition, TEACHSUP, DIRINS, TEACHINT). The two demographic variables (gender and grade repetition) of reporting the high-level bullying groups echoed those in Model 1, recording a slightly higher odds ratio of 1.690 and 1.302 respectively when compared with those in Model 1. Additionally, adolescents with more teacher support (TEACHINT, DIRINS, and TEACHSUP) were 0.768, 0.896, and 0.819 times less likely to be reported in the high-level bullying groups ($p < 0.001$). This pointed to the fact that emotional, instrumental, and informational support all played a buffering role in bullying victimization with emotional support being most conducive to anti-bullying efforts. Thus, Hypothesis 1 was partially supported except for the role of appraisal support.

In the final model (Model 5) with all independent variables added, the likelihood-ratio test achieved a $\chi^2(12)$ of 14,525.39 ($N = 11,723$, $p < 0.001$), suggesting that the model was better than the null model with all predictors removed. The Hosmer-Lemeshow test yielded a $\chi^2(8)$ of 9.68 ($p > 0.05$), indicating that the data fit the model well. The whole model again signified its ability to differentiate between respondents' high or low frequen-

cies of bullying exposure ($\chi^2(8, N = 11,723) = 1,627.086, p < 0.001$). Moreover, the model as a whole explained 13% (Cox & Snell R square) and 17.3% (Nagelkerke R square) of the variance in bullying groups, and correctly classified 65.8% of the cases with a remarkable improvement of 11.2% in predictions. Ten of the 12 predictors made a unique statistically significant contribution to the model (gender, age, grade repetition, TEACHSUP, DIRINS, TEACHINT, DISCLIMA, PERCOMP, PERCOOP, and BELONG) except for ESCS and PERFEED ($p > 0.05$). The two demographic variables (gender and grade repetition) of reporting the high-level bullying groups recorded a slightly lower odds ratio of 1.640 and 1.235 compared with those in Models 1 and 2. Statistically insignificant in the previous two models, age ($p < 0.001$) this time witnessed a 0.791 likelihood increase in the high-level bullying groups. For the three forms of teacher support (TEACHINT, DIRINS, and TEACHSUP), they displayed similar patterns as were revealed in Model 2, reporting a mitigating effect on the high level of bullying exposure with instrumental support (DIRINS) replacing emotional support (TEACHINT) in Model 2 as the most effective form of teacher support for anti-bullying endeavors. Here in the full-predictor model, the first hypothesis was again basically supported. Regarding the newly added factors in the model, students with a strong sense of belonging, in a better disciplinary climate, and in a cooperative environment were respectively 0.733, 0.846, and 0.635 times less likely to be identified in the high-level bullying groups ($p < 0.001$). On the contrary, students in the school settings that fostered competition among peers were 1.281 times more likely to report a high level of bullying victimization ($p < 0.001$). Thus, Hypothesis 2 was fully supported while Hypothesis 3 only was partially supported.

Discussion

Applying PISA 2018 China data and utilizing binary logit regression analyses, this study has added to the empirical experience by investigating the relationship between multiple intervention factors and bullying victimization involving teachers, students, and school climate in the Chinese context. From the perspective of student characteristics, male adolescents, grade repeaters (regardless of their gender), younger students, and low-income students/students from disadvantaged families are more likely to be bullied and victimized, as has been reported in a variety of Chinese literature (e.g., Ba et al., 2019; Huang & Zhao, 2019; Li et al., 2020; Lian et al., 2021; Yu & Zhao, 2021). In this sense, top priority needs to be given to the above types of students when intervention measures are introduced locally or nationwide.

Second, the research findings have verified that teacher support emotionally, informationally, and instrumentally moderates school bullying and bullying victimization. This could link teachers to their practical assistance and substantial help students can seek in case of bullying occurrence. Such support at the relationship level could extend beyond daily instructions provided for adolescents and penetrate further into almost every aspect of classroom learning, eventually benefiting multiple levels of influencing factors within the social-ecological framework. For example, student-perceived love, concern, enthusiasm, encouragement, and guidance are beneficial not only to students themselves, but to teacher-student communication channels, peers' recognition, positive school climate, and a set of core social values to be preserved. To minimize bullying exposure for all students, teachers are encouraged to treat students more fairly, evaluate their behavioral and mental progress more proactively, and offer timely support to those in academic difficulties and with life or socializing problems (Bosworth et al., 2018). However, appraisal support, identified as a teacher's feedback on students' strengths or weaknesses, is more directly associated with their behavioral engagement (Carvalho et al., 2020) and academic performance (e.g., Carvalho et al. 2014; Fyfe & Rittle-Johnson, 2016; Wei & Xie, 2017), thus requiring more empirical evidence to identify its possible correlation with bullying victimization.

Third, consistent with previous Chinese studies (Huang, 2020; Li et al., 2020), this research has illustrated that students' sense of belonging acts as an important buffer against the detriment of bullying victimization. This indicates that students' identification with and connectedness to a peer group or a school environment at the community level are viewed as major social resources to protect student learning against being hampered by school violence/bullying victimization (Adams & Hannum, 2018).

For school climate, the findings have demonstrated that a disciplinary, cooperative environment supported anti-bullying endeavors. Specifically, this study augments prior research on cooperative learning by showing that a cooperative environment reduces bullying victimization while promoting peer relatedness across the entire student population (Ryzin & Roseth, 2019). However, a socially competitive climate in this study tends to catalyze bullying victimization, urging schools and educators to reconsider the balanced relationship between cooperation and competition in bringing about student engagement and facilitating anti-bullying behaviors in school settings (OECD, 2019a). Besides, a positive school climate cannot be maintained without the participation of teachers, who help students cultivate such classroom habits as being friendly to and respectful for peers as well as becoming social, feeling inclusive, and fostering values that will form certain school

norms. The connectedness within the entire school system will in turn benefit teachers, students, and schools, and eventually bullying prevention and control efforts.

Therefore, a single bullying incident is interpreted not as an isolated phenomenon that probably causes victimization, but as the social behavior dynamically incorporated into an intricate network of interpersonal relationships, institutional factors, community contexts, and policy components. As is reflected in the socio-ecological framework, its interactive and reciprocal nature implies that individual behavior influences and is influenced by multiple levels of factors while shaping and being shaped by the socio-cultural environment (Salihu et al., 2015; Townsend & Foster, 2011). In this sense, to better understand students' bullying behaviors is not to split them from the larger social context—schools in which students acquire knowledge, communicate with teachers, get along with peers, develop egos, and gradually form the way a school culture is fostered or ruined. This may point to the necessity of creating improved school conditions for increasing anti-bullying awareness on campus and encouraging sustained behavioral change on bullies. The close contact between schools and individuals also promotes the building of a nonviolent campus and effectively supports the implementation of anti-bullying programs/policies.

Limitations

Despite our focus on school-based factors in bullying victimization and the strength in integrating multiple predictors to address the issue holistically, there exist limitations in this study. First, at the individual and relationship levels, only student-perceived teacher support was taken into consideration, but in fact in the entire school community, the involvement of school administrators, principals, and other school leaders would never be ignored (Ministry of Education [MOE], 2021). Their active participation in building an appropriate school climate and use of process-oriented strategies (Bosworth et al., 2018) could exert a far-reaching impact on anti-bullying endeavors and reduction of victimization. Besides, this study only featured 15-year-olds in general in the test language classroom, but seldom explored the subcategories of this student body including those marginalized or at-risk groups who are prone to be bullied or victimized (e.g., students with disabilities and under-achieving students) (MOE, 2017, 2021). Hence, future studies can be realized in showing concern for special student groups as well as considering professionals (e.g., school counselors) and school leadership in the battle against bullying.

Implications

The present study has provided implications for minimizing the impacts of bullying victimization and the development of different intervention measures from the perspective of school settings, especially in the context of Chinese schools. Theoretically, the research allows for the room to perceive school bullying and school violence as something complicated yet interconnected that springs from a combination of multiple influences upon individual behaviors. Thus, the interaction of various levels of factors for violence prevention could offer an effective mechanism for the understanding of how school bullying occurs and what to do with bullying before it begins. Empirically, the findings adds to the Chinese-based evidence of the association between school-based predictors and anti-bullying awareness. Since the enactment of the Comprehensive Plan on Strengthening the Management of Bullying among Primary and Middle School Students in 2017, great importance has been attached to anti-bullying education for all and bullying prevention before it develops (MOE, 2017). Based on the experience of anti-bullying legislation in other countries, China adheres to the principle of prevention as a primary concern and intervention as a top priority in an effort to push forward the establishment of an anti-bullying campus. Under such circumstances, this research regards a harmonious classroom climate and a positive school environment as the starting point to develop a sense of security, form social values (e.g., justice, unity, collaboration, and responsibility) amid cultivation of self-awareness, and eventually curb bullying behaviors on campus.

At the micro level, teachers play an indispensable part in teaching students what to learn and how to shape values as they spend a large proportion of time listening to adolescents' voices and building rapport (Schleicher, 2018). In this process, teachers' role in assisting the young to identify bullying behaviors and timely stop victimization cannot be taken no notice of. Noteworthy, imperative to bullying intervention is teacher training, which means teachers' skilled coping strategies relieve students' anxiety in confronting bullying and help to form appropriate management styles of classroom learning (Di Stasio et al., 2016). As suggested in the study, teacher training is feasible in promoting a sense of school belonging, improving classroom disciplinary climate, and balancing the skills of cooperation and competition. For school climate, our study points to all stakeholders who join the entire school community in creating a caring, inclusive atmosphere, not only teachers and student victims in the forefront of this anti-bullying battle. Also in climate building, our findings have recognized social comparison and intense competition as crucial characteristics that deserve educa-

tional practitioners' scrutiny and deliberation over their own teaching practices (Di Stasio et al., 2016).

However, the lingering impacts of the COVID-19 pandemic have made bullying patterns somewhat different. While strengthening online learning, the pandemic still secures cyberbullying as mentioned above. But the fact lies in that with the decrease in in-person bullying, cyberbullying follows a downward trend (Bacher-Hicks et al., 2021). This echoes previous evidence that cyberbullying rarely occurs independently of in-person bullying (Waasdorp & Bradshaw, 2015). In order to work out strategies for coping with cyberbullying, close attention would be paid to such fundamental relationships in educational reforms and anti-bullying attempts as teacher-student interactions, peer-to-peer relations, classroom environments and school cultures (Vaillancourt et al., 2021). Therefore, this study may provide a route to the understanding of cyberbullying in China that in a sense replicates the patterns of in-person bullying and bullying victimization. Although it is still pending to see how a positive classroom climate plays a role in adapting the bullied to the school life, the emphasis upon multiple relations within the school system offers an angle to propose intervention measures aimed at achieving equity and inclusivity for all schoolchildren in the post-COVID-19 era.

Note:

1. For the failed models (Model 3: the sense-of-belonging model and Model 4: the school-climate model), please refer to the online appendix for details.

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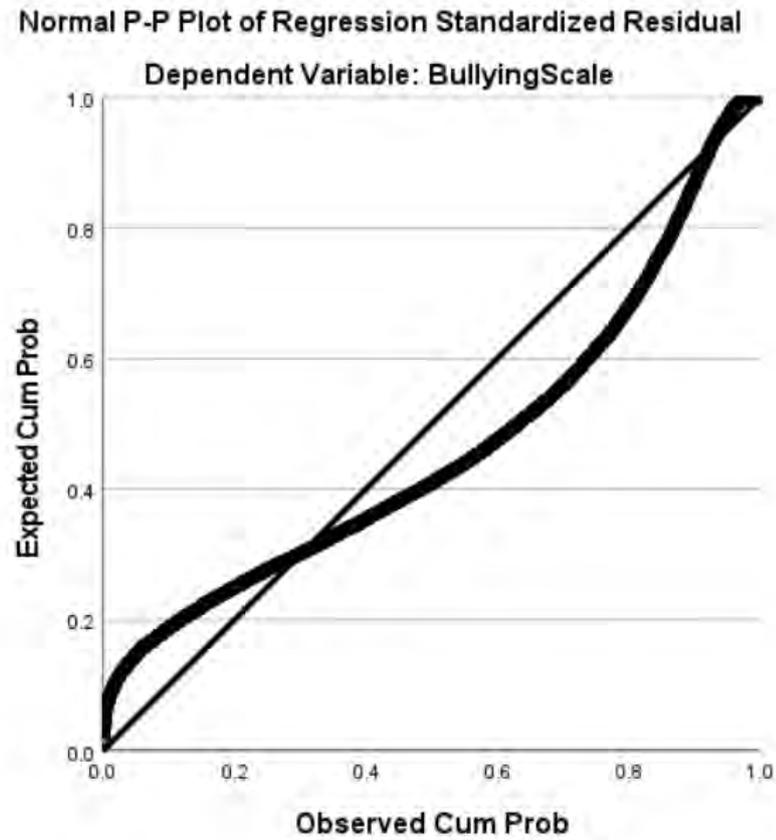
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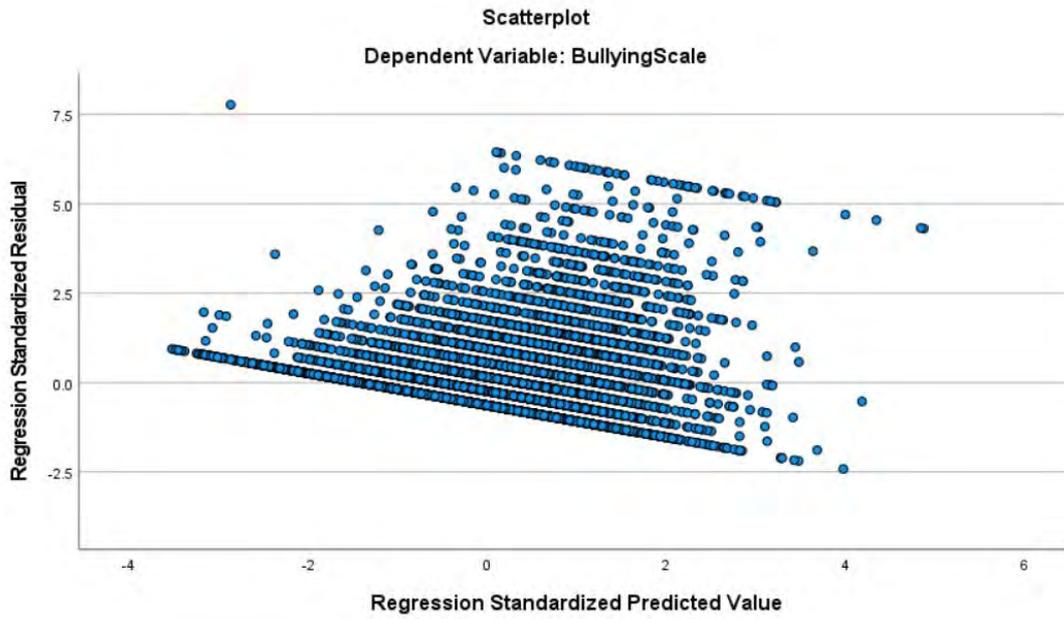
Appendix I

Figure S1. Normal P-P Plot of Regression Standardized Residual.



Note. The points did not lie in a reasonably straight diagonal line from bottom left to top right. This would suggest major deviations from normality and multiple regression analyses did not fit for statistics.

Figure S2. Scatterplot of Standardized Residuals.



Note. In the Scatterplot of the standardized residuals, the residuals appeared as a clear or systematic pattern, higher on one side than the other. This suggested that multiple regression analyses did not fit for statistics.

Table S1. Multiple Regression Analysis of Demographic, Teacher-support, Sense-of-belonging, School-climate, and Full-predictor Models.

Variables	Model 1 ^{a, b}	Model 2	Model 3 ^c	Model 4 ^d	Model 5 ^e
	β	β	β	β	β
Gender	.169‡	.165‡	.178‡	.146‡	.149‡
Age	-.008	-.019‡	-.030‡	-.030‡	-.039‡
Grade Repetition	.048‡	.047‡	.043‡	.045‡	.039‡
ESCS	-.050‡	-.025†	-.012	-.016	.001
TEACHINT		-.113‡			-.016
DIRINS		-.019			.009
PERFEED		.017			.045‡
TEACHSUP		-.108‡			-.076‡
BELONG			-.283‡		-.215‡
DISCLIMA				-.208‡	-.169‡
PERCOOP				-.153‡	-.071‡
PERCOMP				.119‡	.112‡

Notes. * $p < .05$, † $p < .01$, ‡ $p < .001$

^a Demographic model, ^b Teacher-support model, ^c Sense-of-belonging model, ^d School-climate model, ^e Full-predictor model

Table S2. Logistic Regression Analysis of Sense-of-belonging and School-climate Models.

Variables	Model 3 ^a			Model 4 ^b		
	<i>B</i>	<i>S.E.</i>	<i>Exp(B)</i>	<i>B</i>	<i>S.E.</i>	<i>Exp(B)</i>
Gender	.568‡	.039	1.765	.457‡	.039	1.580
Age	-.136*	.066	.873	-.158*	.067	.854
Grade Repetition	.215†	.081	1.239	.238†	.082	1.269
ESCS	-.008	.018	.651	-.007	.019	.993
BELONG	-.640‡	.026	.527			
DISCLIMA				-.409‡	.020	.664
PERCOOP				-.344‡	.021	.709
PERCOMP				.246‡	.022	1.279

Notes. * $p < .05$, † $p < .01$, ‡ $p < .001$,

^a Sense of Belonging, ^b School Climate

Preliminary assumption tests revealed that for Models 3 and 4, the Hosmer and Lemeshow Goodness of Fit Tests were not passed (significance values all below .05), suggesting no support for these two models.