



School bullying victimization and perpetration among Chinese adolescents: A latent class approach

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ABSTRACT

Understanding the unique patterns of school bullying involvement among adolescents is critical to developing efficient interventions for reducing school violence. The present study identifies latent classes of school bullying victimization and perpetration, focusing on traditional and cyberbullying among student peer networks. Data came from a national school bullying survey ($N = 3,675$) among students from 4th grade (primary school) to 12th grade (high school) across seven provinces in Mainland China. Latent class models identified latent subgroups of students by gender (1,903 females and 1,772 males) using four binary indicators: traditional bullying victimization, cyberbullying victimization, traditional bullying perpetration, and cyberbullying perpetration. We found four distinct latent classes for both genders, respectively. Three classes emerged in both male and female students (1) traditional and cyberbullying perpetrator-victims, (2) traditional bullying victims, and (3) minimal involvement. Although a bullying perpetrator class was identified in both male and female groups, male students in this class had a high probability of engaging in both traditional and cyberbullying behaviors against their school peers, whereas the bullying perpetrator class emerged in the female group was mainly involved only in traditional bullying. The findings revealed gender similarities and differences in the patterns of school bullying involvement in Chinese adolescents. In addition, covariates significantly associated with school bullying patterns included (a) attending boarding school, (b) level of schooling (e.g., primary, middle, and high school), and (c) self-perceived academic performance. Recommendations for school bullying interventions and future research directions are discussed.

1. Introduction

Bullying in school-age children and adolescents is a serious issue across countries. School bullying is associated with various outcomes, such as health and life satisfaction (e.g., Arnarsson et al., 2020; Carvalho, Branquinho, & de Matos, 2020; Chai, Xue, & Han, 2020a,b,c,d), suicidal ideation and behaviors (Holt et al., 2015), and academic performance (Juvonen, Yueyan, & Espinoza, 2011). School bullying occurs when a student is “exposed, repeatedly, and over time, to negative actions on the part of one or more other students” (Olweus, 2013, p. 755). Traditional bullying refers to face-to-face bullying behavior, including both direct forms (e.g., physical or verbal attacks) and indirect forms (e.g., emotional bullying, social isolation) (Cosma et al., 2020; Olweus, 1994). Cyberbullying refers to “using information and communication technologies (ICTs) to repeatedly and intentionally harm, harass, hurt and embarrass a target” (Peter & Petermann, 2018, p. 358). With the widespread use of the Internet and social media tools among young people (Anderson & Jiang, 2018; Michikyan & Suárez-Orozco, 2016), an increasing number of studies have focused on cyberbullying behavioral patterns in adolescents (e.g., Cosma et al., 2020; Khong et al., 2019;

Schneider, O'Donnell, Stueve, & Coulter, 2012; Waasdorp & Bradshaw, 2015; Wang et al., 2019). The present study continues to expand the empirical knowledge on bullying involvement among school-age children and adolescents, focusing on traditional and cyberbullying patterns within student peer networks and pattern-specific factors. Table 1.

1.1. The co-occurrence of traditional bullying and cyberbullying

Existing studies have confirmed the co-occurrence of traditional and cyberbullying among school-age children and youth. For example, Schneider et al. (2012) analyzed a sample of high school students in the United States. They reported that 16% were cyberbullying victims, of which about 60% also experienced in-person school bullying in the past year. Cosma et al. (2020) used a sample of adolescents aged between 11 and 15 years old across 37 countries to examine their victimization experiences: Although significantly fewer participants reported having experienced cyberbullying (compared to traditional bullying), for those who were victimized by cyberbullying (45.8%), almost half (46.5% for males and 45.3% for females) reported that they were also victimized by traditional bullying (Cosma et al., 2020). The study also reported that

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Table 1
Sociodemographic information and variables used in analyses.

	Female N (%)	Male N (%)	Full sample N (%)
<i>N</i>	1,903	1,772	3,675
Level of schooling			
Primary school	692 (36.36)	696 (39.28)	1,388 (37.77)
Middle school	522 (27.43)	498 (28.1)	1,020 (27.76)
High/vocational school	689 (36.21)	578 (32.62)	1,267 (34.48)
Father's education			
Below middle school	173 (9.09)	197 (11.12)	370 (10.07)
Middle school	618 (32.48)	534 (30.14)	1,152 (31.35)
High/vocational school	462 (24.28)	429 (24.21)	891 (24.24)
College	485 (25.49)	450 (25.4)	935 (25.44)
Above college	165 (8.67)	162 (9.14)	327 (8.9)
Mother's education			
Below middle school	296 (15.55)	231 (13.04)	527 (14.34)
Middle school	561 (29.48)	542 (30.59)	1,103 (30.01)
High/vocational school	421 (22.12)	398 (22.46)	819 (22.29)
College	487 (25.59)	432 (24.38)	919 (25.01)
Above college	138 (7.25)	169 (9.54)	307 (8.35)
Family socio-economic status			
Below average	254 (13.35)	291 (16.42)	545 (14.83)
Average	1,083 (56.91)	909 (51.3)	1,992 (54.2)
Above average	566 (29.74)	572 (32.28)	1,138 (30.97)
Attending boarding school			
Yes	1,527 (80.24)	1,480 (83.52)	668 (18.18)
No	376 (19.76)	292 (16.48)	3,007 (81.82)
Academic performance			
Below average	339 (17.81)	406 (22.91)	745 (20.27)
Average	769 (40.41)	647 (36.51)	1,416 (38.53)
Above average	795 (41.78)	719 (40.58)	1,514 (41.2)
School bullying (yes)			
Traditional bullying perpetration	259 (13.61)	378 (21.33)	637 (17.33)
Cyberbullying perpetration	100 (5.25)	188 (10.61)	288 (7.84)
Traditional bullying victimization	684 (35.94)	834 (47.07)	1,518 (41.31)
Cyberbullying victimization	276 (14.5)	382 (21.56)	658 (17.9)

gender differences in the victimization of cyberbullying varied across countries. In some countries, such as Canada, Germany, and France, girls were more likely to be victimized by cyberbullying. In contrast, in other countries, such as Greece, Spain, and Israel, boys reported significantly higher cyberbullying rates (Cosma et al., 2020). Similar findings that highlighted the co-occurrence of traditional and cyberbullying have also been documented in studies based in Asia. For example, Khong et al. (2019) conducted a survey with 3,319 adolescents aged between 12 and 17 based in Singapore. They reported that of those victimized by bullying, about one-third (30.3%) experienced both traditional and cyberbullying in the past six months. In addition, the study also suggested that male students were more likely to be victimized by traditional bullying, and the co-occurrence of traditional and cyberbullying victimization was more likely to be found in female students (Khong et al., 2019). In a Taiwanese study (Wang et al., 2019) with high school students, 19.3% reported experiencing cyberbullying in the past two months; almost half of those involved in cyberbullying also reported having experienced traditional bullying.

1.2. The co-occurrence of bullying perpetration and victimization

Earlier studies conceptualize bullying experiences of school-age children or youth from a dichotomized view, considering students

involved in bullying as either bullying perpetrators or victims and, consequently, analyzing the two groups separately (e.g., Finnegan, Hodges, & Perry, 1998; Rodkin & Hodges, 2003; Sourander, Helstela, Helenius, & Piha, 2000). Recent studies have recognized the potential overlap of school bullying perpetration and victimization and have increasingly given analytical attention to students who are both bullied by their peers and bullying others at school – a group referred to as the *perpetrator-victim group* (e.g., Chung & Lee, 2020; Lovegrove, Henry, & Slater, 2012; Pan, Liu, Lau, & Luo, 2017; Sterzing et al., 2020; Veenstra et al., 2005). For instance, Veenstra and colleagues (2005) grouped students into four different categories based on their bullying experiences – *bully*, *victim*, *bully/victim*, and *uninvolved*. They reported that male students, compared to their female counterparts, were more likely to be in the bully/victim group (male-to-female sex ratio = 2.43).

1.3. A latent class approach for studying bullying involvement patterns

To examine the patterns of bullying involvement, scholars have adopted latent class modeling, a statistical technique that is commonly understood as a person-centered approach, allowing researchers to identify latent groups in a sample based on participants' responses to a series of variables/indicators (Nylund-Gibson & Choi, 2018; Porcu & Giambona, 2016). Using latent class analysis, these studies have further confirmed the common existence of the bully-victim group as well as the co-occurrence of both traditional and cyberbullying in school-age children and youth (e.g., Chung & Lee, 2020; Giang & Graham, 2008; Hanish & Guerra, 2004; Lam, Law, Chan, Wong, & Zhang, 2015; Lovegrove & Cornell, 2013; Zhang et al., 2020). For example, Lam et al. (2015) employed a latent class growth analysis to examine bullying and victimization patterns among 536 students in junior secondary schools (grades 7 to 9) in Hong Kong. They found four distinct latent classes: neither bully nor victim (78%), bullies (10%), victims (3%), and bully-victims (9%). They also reported that students enrolled in schools with comparatively low academic performance tended to be classified into the group of either victim or bully-victim. Zhang et al. (2020) conducted a latent class analysis (LCA) with 20,722 Chinese middle schoolers in Guangdong, China, using binary indicators covering a wide range of bullying victimization items to assess verbal, physical, relational, and cyberbullying. Through the analyses, different victimization patterns were identified for male and female students, respectively. Specifically, most students (84% for male and 94% for female students) were classified as having no victimization. Both genders had high, moderate, and low victimization classes, and the verbal bullying class was identified in male students but not in the female group.

1.4. Cyberbullying in school-based peer networks

Despite the increase in studies attending to cyberbullying among adolescents, the majority measured cyberbullying in a rather general sense without specifying who the cyberbullying perpetrators were (see a review by Kowalski, Giumetti, Schroeder, & Lattanner, 2014). For example, in the study by Wang et al. (2019), cyberbullying victimization was measured with seven items, such as "how often has someone made or posted rude comments to or about you online" (p.3). Although the item effectively captured one typical bullying behavior online, it did not further ask whether "someone" was a person known, unknown, or a student peer from school. A similar framing of cyberbullying items was also found in other studies (e.g., Cosma et al., 2020; Khong et al., 2019; Schneider et al., 2012), in which cyberbullying experiences were not particularly tied to their school-based peer networks. Notably, some studies that examined who cyberbullying perpetrators were (e.g., Hemphill et al., 2012; Juvonen & Gross, 2008; Li, 2007; Várnai et al., 2020) have consistently shown that a considerable percentage of students experiencing cyberbullying were cyberbullied by their school-mates and peers. This result suggests that traditional bullying incidents among school adolescents may continue to take place outside of school

and move to virtual spaces (Kowalski et al., 2014; Smith et al., 2008). For example, one UK study with secondary school students found that 57% of those victimized by cyberbullying reported that their cyberbullying perpetrators were from their school, and 49% reported that the perpetrators were their peers from the same school year cohort (Smith et al., 2008). Hemphill et al. (2012) conducted a study with students in Grades 5, 7, and 9 from Victoria, Australia, and the United States. They measured cyberbullying specifically as bullying behavior against other students online or via technologies (i.e., using technology, such as phone and internet, bullying another student). The study reported that 15% of the respondents engaged in cyberbullying in the past year, and that about 7% participated in both traditional and cyberbullying perpetration against their peers (Hemphill et al., 2012). A recent study sampled 6,088 Hungarian adolescents and used a latent class approach to analyze their experiences of both traditional and cyberbullying victimization and perpetration within school peer networks (Várnai et al., 2020). The study identified four classes of bullying patterns through a latent class model, including *victims of online bullying* (12.6%), *not affected* (61%), *involved in school-based bullying* (20.8%), and *involved in both school and online bullying* (5.5%); these emerged classes suggest that bullying among schoolmates could also primarily take on a cyber form without necessarily co-occurring with the face-to-face bullying. Overall, more research in school bullying is needed to continue to give particular attention to cyberbullying that takes place within student peer networks.

1.5. Aim of the present study

This present study examined the patterns of school bullying victimization and perpetration, focusing on both traditional and cyberbullying in a sample of Chinese students from 4th grade (primary school) to 12th grade (high school). We specifically focused on students' cyber and traditional bullying experience, whether they perpetrate against, or victimized by, their known schoolmates. In addition, we examined whether identified bullying involvement patterns are associated with students' schooling characteristics (including level of schooling, self-perceived academic performance, and boarding school status) and family socioeconomic status (including parents' education levels and family economic status).

2. Method

2.1. Sample

Data came from a national school bullying survey ($N = 3,675$) with students from 4th grade (primary school) to 12th grade (high school) in Mainland China. Participants were geographically sampled from schools located in seven regions, including the capital city (Beijing) and six provinces (Liaoning, Hunan, Jiangsu, Guangdong, Guizhou, and Gansu)¹. In each region, one primary school, one middle school, one high school, and one vocational training school² were conveniently selected. At each school site, for each grade level, one class was randomly selected. For primary schools, only students from grades 4 to 6 participated in the study, given the consideration of student literacy in reading and completing surveys. At each school site, a research assistant administered the data collection by distributing paper questionnaires to students. All students were informed that participation in the study was voluntary, and we obtained consent from parents and the teacher in

¹ Beijing is located in North China, and Liaoning, Hunan, Jiangsu, Guangdong, Guizhou, and Gansu are located in Northeast, South Central, eastern-central coastal, South, Southwest, and North-central China, respectively.

² Vocational training schools in China are equivalent to high schools but are preparing students for specific vocational tracks rather than focusing on academics. A total 178 students were from vocational training schools.

charge of each student class cohort. Students who consented to participate were given time to complete the survey independently during class time. With 3,777 surveys returned to the research team across all school sites, 3,675 were complete without missing data and included in the present study's final sample.

2.2. Measures

Traditional bullying and cyberbullying. We used ten items to measure bullying, including six items and four items focusing on traditional bullying and cyberbullying, respectively. The ten items were developed based on the 2015 School Crime Supplement to the National Crime Victimization Survey in the United States (National Center for Education Statistics, 2015; Lessne & Yanez, 2016) and adapted for the Chinese context (Chai, Xue, & Han, 2020a,b,c,d). Specifically, traditional bullying included six items representing six different forms of in-person bullying: (1) *making fun of other students in a hurtful way*, (2) *spreading rumors about other students*, (3) *threatening others*, (4) *physically pushing, shoving, stripping, or spitting on other students*, (5) *isolating other students on purpose*, and (6) *damaging others' belongings*. We asked students to report both perpetration and victimization of these two types of bullying based on their experiences in the past year using a four-point Likert scale (1 = *Never*, 2 = *Occasionally*, 3 = *Sometimes*, and 4 = *Often*). Cyberbullying included four types: (1) *making fun of other students online*, (2) *threatening or insulting online*, (3) *spreading rumors or disclosing private information about other students online*, and (4) *isolating other students online*. We asked students to report both perpetration and victimization of these two types of bullying based on their experiences in the past year using a four-point Likert scale (1 = *Never*, 2 = *Occasionally*, 3 = *Sometimes*, and 4 = *Often*). The four types of bullying involvement: traditional bullying perpetration, traditional bullying victimization, cyberbullying perpetration, and cyberbullying victimization had good internal consistency with alpha values being 0.88, 0.88, 0.91, and 0.86, respectively. In the present study, as student responses were skewed toward lower values with only a few reported *Often* (4), we dichotomized these four measures: It was coded 0 when a student reported *Never* to all items on one measure; otherwise, it was coded 1.

Other covariates. We included covariates in the multinomial regressions: parents' education, family socioeconomic status, level of schooling, boarding school status, and academic performance. Parents' education included father's and mother's highest education completed, each of which was measured with five levels of education: below *middle school* (1), *middle school* (2), *high/vocational school* (3), *college* (4), and *above college* (5). Family socioeconomic status included three levels (1 = *Below average*, 2 = *Average*, and 3 = *Above average*), an item reported based on the student's self-perception of how well their family was situated socially and financially in their local region. Level of schooling included three categories (1 = *Primary school*, 2 = *Middle school*, and 3 = *High/vocational school*). Boarding school status is a binary variable (0 = *Not attending boarding school* and 1 = *Attending boarding school*). Last, the academic performance included three levels (1 = *Below average*, 2 = *Average*, and 3 = *Above average*), an item based on the respondent's self-perceived academic performance compared with their peers from the same class cohort.

2.3. Data analysis

To identify unique patterns of school bullying involvement in students, we employed a latent class approach, including four binary indicators: (a) traditional bullying perpetration, (b) cyberbullying perpetration, (c) traditional bullying victimization, and (d) cyberbullying victimization. To assess model fit, we used the following fit indices: Log-likelihood (LL), Bayesian information criterion (BIC); adjusted Bayesian information criterion (ABIC); Lo-Mendell-Rubin adjusted likelihood ratio test (LMR Adj. LRT), and boot-strapped likelihood ratio test (BLRT). Although the Akaike information criterion (AIC) is another

commonly used information criterion for latent class/profile model selection, we decided not to use the AIC, as previous simulation studies have shown that the AIC tends to overestimate the number of classes (e.g., Tein, Coxe, & Cham, 2013; Yang, 2006). Of other fit indices, BIC, ABIC, and BLRT have been identified as consistently outperforming other ones in estimating the correct number of classes (Morgan, 2014; Nylund, Asparouhov, & Muthén, 2007; Tein et al., 2013; Tofighi & Enders, 2006).

In addition, both the parsimony principle and model interpretability (Porcu & Giambona, 2016) were given consideration when selecting final models. Multinomial logistic regression analyses, as part of the three-step LCA approach (Asparouhov & Muthén, 2014) in Mplus 8.3, were employed to estimate the predictive power of six auxiliary variables: father’s education, mother’s education, family socioeconomic status, level of schooling, boarding school status, and academic performance. Other analyses were conducted in Stata 16. In the present study, we also modeled male and female samples separately to gain a better understanding of gender-specific patterns of bullying involvement, a distinction which was consistent with previous studies that adopted LCAs and have shown different class models emerging for male and female students (e.g., Zhang et al., 2020).

3. Results

The sample consisted of 1,903 female students (51.8%) and 1,772 male students (48.2%); 1,388 (37.8%) were in primary school (4th–6th grades), 1,020 were in middle school (27.8%), and 1,267 (34.4%) were in high school at the time of the survey. Nearly one-fifth attended boarding school ($n = 668$, 18.2%). In the sample, 41% ($n = 1,518$) reported having been a victim of traditional bullying (female: 36%; male: 47%) in the past year; 18% were victimized by cyberbullying behavior (female: 15%; male: 22%). Comparatively, fewer students disclosed the perpetration of traditional or cyberbullying against other students. Specifically, 17% reported having been involved in traditional bullying behavior toward their peers (female: 14%; male: 21%), and about 8% reported cyberbullying behavior (female: 5%; male: 11%). Overall, compared to their male counterparts, fewer female students reported their involvement in both school bullying victimization and perpetration.

3.1. Model fit assessment

A variety of fit indices listed in Table 2 were used when assessing LCA models for male and female groups. For the male student group, the fit indices consistently supported the four-class model. Specifically, both the BIC (6129.001) and ABIC (6068.64) reached the lowest values at the four-class model, compared with two-, three-, and five-class models. The value of entropy was 0.96, demonstrating an excellent accuracy of classification. In addition, at the five-class model, p values of LMR adj.

LRT and BLRT became significant, indicating that compared with the four-class model, the five-class model did not significantly improve the model with one fewer class (i.e., the four-class model). Therefore, we determined that the best-fitting model for the male student group was the four-class model. For the female student group, both LMR Adj. LRT and BLRT supported the four-class model, as the p values of these two fit indices were no longer significant for the five-class model. The value of entropy was 0.91, indicating that the classification accuracy for the four-class model was better than other models. Although the ABIC reached the lowest value at the four-class model (5362.183), the BIC supported the three-class model. As several studies have shown, ABIC often outperforms BIC (Yang, 2006), especially when the sample size is large, because BIC “favors smaller sample sizes” and “the penalty for model complexity increases as the sample size increases” (Tofighi & Enders, 2006, p. 319). Since 1,903 female students were included in this analysis (i.e., fairly large), we decided to rely on the ABIC. In addition, all other indices also support the four-class model. Therefore, we selected the four-class model as the best-fitting model for the female student group.

3.2. Class memberships

Male subgroup. As shown in Fig. 1, class 1 was labeled “traditional and cyber perpetrator-victim,” including 147 male students, accounting for 8.3% of the total subsample. Students in Class 1 had high probabilities of being involved in the perpetration and victimization of both traditional and cyber forms of bullying. Those in Class 2, “traditional bullying victim,” had an extremely high probability of being victimized by traditional bullying, including over a third of the students ($n = 689$; 38.9%). Class 3 was the largest class estimated through the four-class model, comprising male students who were neither a victim nor a perpetrator of traditional or cyberbullying. We labeled this class “minimal involvement,” a class that included half of the male students ($n = 905$; 51.1%). Class 4 had 31 students, accounting for only 1.7% of the male subsample, who had a moderate-to-high probability of traditional bullying perpetration and a very high probability of cyber-bullying perpetration. Therefore, we named this class “cyber and traditional bullying perpetrator.”

Female subgroup. As shown in Fig. 2, this group had four classes, including class 1, “traditional and cyber perpetrator-victim”; class 2, “traditional bullying victim”; class 3, “minimal involvement,”; and class 4, “traditional bullying perpetrator.” Unlike with the male group, we did not identify a class of “cyber and traditional bullying perpetrators” among the female students; instead, the perpetrator class in the female student group was characterized as mainly involved in only traditional bullying. Specifically, the traditional and cyber perpetrator-victim group (class 1) accounted for 4.31% of the female sample ($n = 82$). The traditional bullying victim group (class 2) included 608 female students (32%). Class 3 was the largest class, including 1,162 individuals (61.06%) who had minimal bullying involvement. Finally, the

Table 2
Model fit indices for latent class analyses by gender.

Class No.	LL	#par	BIC	ABIC	Entropy	LMR Adj. LRT	BLRT p value	Smallest class size
Male group (n = 1,772)								
1	-3666.741	4	7363.401	7350.693	n/a	n/a	n/a	n/a
2	-3116.225	9	6299.768	6271.176	0.756	1072.3 ($p < 0.001$)	<0.001	541
3	-3020.836	14	6146.39	6101.913	0.949	185.8 ($p < 0.001$)	<0.001	169
4	-2993.442	19	6129.001	6068.64	0.959	53.36 ($p < 0.001$)	<0.001	31
5	-2992.785	24	6165.087	6088.84	0.915	1.2 ($p = 0.5233$)	0.600	18
Female group (n = 1,903)								
1	-3179.652	4	6389.508	6376.8	n/a	n/a	n/a	n/a
2	-2700.709	9	5469.379	5440.786	0.791	933.17 ($p < 0.001$)	<0.001	395
3	-2651.417	14	5408.551	5364.073	0.881	96.04 ($p < 0.001$)	<0.001	100
4	-2639.537	19	5422.546	5362.183	0.91	23.148 ($p < 0.001$)	<0.001	51
5	-2638.443	24	5458.115	5381.867	0.882	2.13 ($p = 0.1662$)	0.3	15

Note. #par = number of estimated parameters; LL = Log-likelihood; AIC = Akaike information criterion; BIC = Bayesian information criterion; ABIC = adjusted Bayesian information criterion; LMR Adj. LRT = Lo-Mendell-Rubin adjusted likelihood ratio test; BLRT = bootstrapped likelihood ratio test.

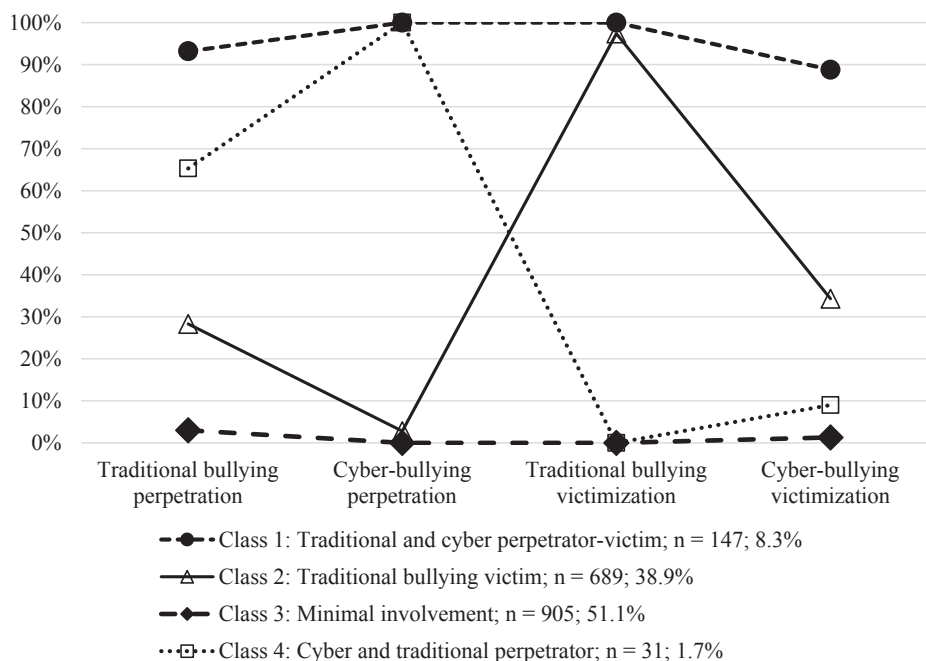


Fig. 1. Latent class probabilities of bullying victimization and perpetration based on the four-class model for male students.

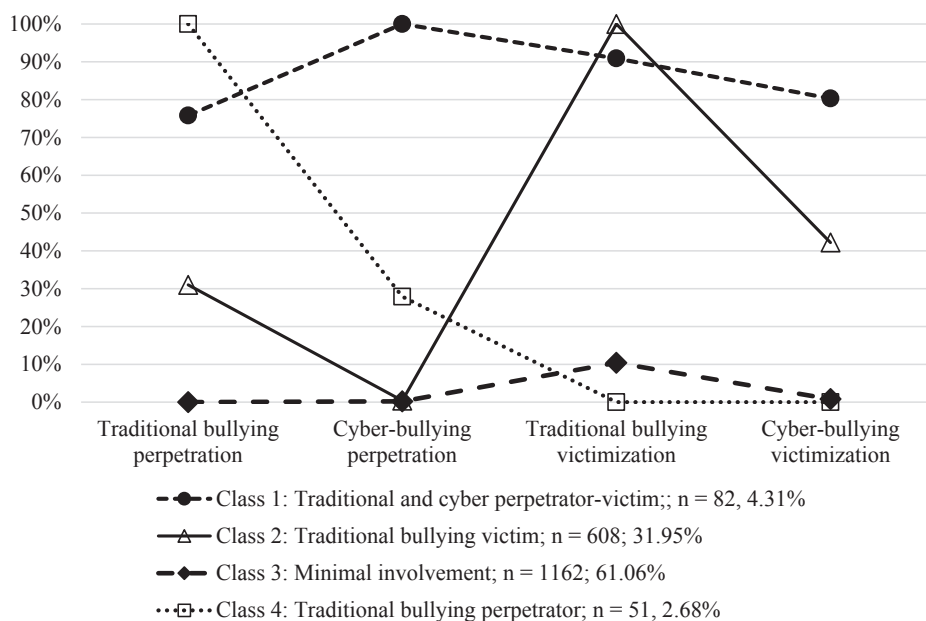


Fig. 2. Latent class probabilities of bullying victimization and perpetration based on the four-class model for female students.

traditional bullying perpetrator group (class 4) was the smallest class, including 51 female students (2.68%).

3.3. Associated factors

We used multinomial logistic regressions to identify significant factors associated with particular classes and presented the results in Table 3 (male students) and Table 4 (female students). We used the “minimal involvement” classes (Class 3) as the reference group for both genders when conducting the multinomial regression models.

Shown in Table 3, male students attending primary schools (OR = 4.43, $p < 0.001$; compared with high/vocational school students), attending middle schools (OR = 1.87, $p = 0.024$), and those attending

boarding school (OR = 2.85, $p < 0.001$) were more likely to be classified in the group of traditional and cyber perpetrator-victim (Class 1). Students in primary schools (OR = 3.68, $p < 0.001$) and middle schools (OR = 1.77, $p < 0.001$; compared to high school students), and those attending boarding schools (OR = 1.37, $p = 0.046$) were more likely to be in the group of traditional bullying victim (Class 2). Compared to above-average academic performance, below average academic performance was associated with higher odds of being traditional and cyber bullying perpetrator-victims (OR = 1.78, $p = 0.023$) and being traditional bullying victims (OR = 2.01, $p < 0.001$). We also found that as the mother’s education increased, the odds of being traditional bullying victims in male students decreased (OR = 0.86, $p = 0.021$). compared to those with family economic statuses above average, students in families

Table 3
Multinomial logistic regression results for male students.

	Class 1 vs. Class 3		Class 2 vs. Class 3		Class 4 vs. Class 3	
	OR [95% CI]	<i>p</i>	OR [95% CI]	<i>p</i>	OR [95% CI]	<i>p</i>
Level of schooling						
Primary school	4.43** [2.59, 7.58]	<0.001	3.68*** [2.79, 4.86]	<0.001	1.82 [0.63, 5.25]	0.267
Middle school	1.87* [1.08, 3.21]	0.024	1.77** [1.34, 2.35]	<0.001	0.44 [0.12, 1.58]	0.207
High/vocational school (ref.)						
Father's education	0.84 [0.65, 1.1]	0.205	1.06 [0.93, 1.22]	0.38	1.07 [0.54, 2.16]	0.840
Mother's education	0.96 [0.75, 1.24]	0.775	0.86* [0.75, 0.98]	0.021	0.96 [0.47, 1.98]	0.911
Family economic status						
Below average	2.29* [1.24, 4.22]	0.049	1.42* [1.00, 2.02]	0.049	2.64 [0.78, 8.96]	0.120
Average	0.89 [0.53, 1.48]	0.688	0.95 [0.74, 1.22]	0.68	1.89 [0.73, 4.91]	0.189
Above average (ref.)						
Attending boarding school (yes)	2.85* [1.74, 4.67]	<0.001	1.37* [1.01, 1.86]	0.046	1.34 [0.39, 4.64]	0.643
Academic performance						
Below average	1.78* [1.08, 2.94]	0.023	2.01** [1.51, 2.68]	<0.001	0.75 [0.22, 2.55]	0.644
Average	0.91 [0.56, 1.49]	0.715	1.35* [1.06, 1.72]	0.017	0.86 [0.37, 2.01]	0.721
Above average (ref.)						

Note. **p* < 0.05 ***p* < 0.01 ****p* < 0.001. Class 1 = Traditional and cyber perpetrator-victim; Class 2 = Traditional bullying victim; Class 3 = Minimal involvement; Class 4 = Cyber and traditional perpetrator. ref. = reference group.

Table 4
Multinomial logistic regression results for female students.

	Class 1 vs. Class 3		Class 2 vs. Class 3		Class 4 vs. Class 3	
	OR [95% CI]	<i>p</i>	OR [95% CI]	<i>p</i>	OR [95% CI]	<i>p</i>
Level of schooling						
Primary school	3.01** [1.57, 5.78]	0.001	8.92*** [5.87, 13.56]	<0.001	3.56** [1.65, 7.66]	0.001
Middle school	1.32 [0.70, 2.49]	0.394	1.70* [1.07, 2.70]	0.025	1.11 [0.46, 2.71]	0.814
High/vocational school (ref.)						
Father's education	0.82 [0.59, 1.16]	0.259	0.86 [0.71, 1.06]	0.152	1.01 [0.71, 1.44]	0.954
Mother's education	0.92 [0.68, 1.27]	0.623	1.06 [0.87, 1.28]	0.593	0.68* [0.46, 0.99]	0.045
Family economic status						
Below average	0.83 [0.36, 1.89]	0.653	1.17 [0.70, 1.97]	0.549	1.13 [0.32, 3.97]	0.850
Average	0.41** [0.22, 0.76]	0.005	1.06 [0.76, 1.48]	0.727	1.70 [0.78, 3.70]	0.184
Above average (ref.)						
Attending boarding school (yes)	1.57 [0.84, 2.91]	0.155	1.76** [1.18, 2.62]	0.006	0.84 [0.34, 2.09]	0.705
Academic performance						
Below average	2.29* [1.22, 4.30]	0.010	2.99*** [2.00, 4.47]	<0.001	1.37 [0.56, 3.32]	0.491
Average	0.94 [0.52, 1.69]	0.837	1.12 [0.81, 1.55]	0.502	1.06 [0.55, 2.05]	0.862
Above average (ref.)						

Note. **p* < 0.05 ***p* < 0.01 ****p* < 0.001. Class 1 = Traditional and cyber perpetrator-victim; Class 2 = Traditional bullying victim; Class 3 = Minimal involvement; Class 4 = Traditional bullying perpetrator. ref. = reference group.

with below average economic status were more likely to be traditional and cyber perpetrator-victims (OR = 2.29, *p* = 0.049) and traditional bullying victims (OR = 1.42, *p* = 0.049).

Shown in Table 4, female primary schoolers, compared with high school students, were more likely to be classified into the traditional and cyber perpetrator-victim group (Class 1; OR = 3.01, *p* = 0.001), the traditional bullying victim group (Class 2; OR = 8.92, *p* < 0.001), and the traditional bullying perpetrator group (Class 4; OR = 3.56, *p* = 0.001), respectively. Middle school students were also more likely to be traditional bullying victims (OR = 1.7, *p* = 0.025) than high school students. Compared to those with family economic statuses above average, students who had families with average economic status (OR = 0.41, *p* = 0.005) were less likely to be in the traditional and cyber victim-perpetrator group. Attending boarding school (OR = 1.76, *p* = 0.006) was also associated with higher odds of being traditional bullying victims. Female students with below-average academic performance were more likely to be traditional and cyber perpetrator-victims (OR = 2.29, *p* = 0.01) and traditional bullying victims (OR = 2.99, *p* < 0.001), respectively. Last, as mother's education increased, the odds of being traditional bullying perpetrators decreased significantly (OR = 0.68, *p* = 0.045).

4. Discussion

This study employed a latent class approach and examined the patterns of both traditional and cyber school bullying victimization and perpetration among students from grades 4 to 12 (primary, middle, and high schools) in China. In addition, latent class models were estimated by gender (male and female). In both male and female groups, over half of the students reported having had minimal bullying involvement (51% for males and 61% for females). Second, the class of traditional bullying victims emerged in male and female groups, accounting for about one-third of the participants in each subsample (39% for male students and 32% for female students). The cyber perpetrator-victim class also emerged in both genders but accounted for <10% of both subsamples (8% for the male group and 5% for the female group). Although a bullying perpetrator class was identified in both male and female groups, male students in this class had a high probability of engaging in both traditional and cyberbullying behaviors against their school peers (i.e., they were in the class of cyber and traditional bullying; *n* = 31, 1.7% of all the male students), whereas the bullying perpetrator class emerged in the female group was mainly involved only in traditional bullying (i.e., they were the conventional bullying class perpetrator, *n* = 51, 2.68%). Notably, compared to the other three classes, the perpetrator class in both males and females included a much smaller number of students. This finding is consistent with previous studies across

different countries that the prevalence of bullying perpetrators (especially perpetrators of both traditional and cyberbullying) remained the lowest in samples of school-aged participants (e.g., Lee & Shin, 2017; Selkie, Fales, & Moreno, 2016; Shin, Braithwaite, & Ahmed, 2016; Thomas et al., 2017; Wang et al., 2019).

It is worth noting that in our study, cyberbullying did not emerge as a distinct class independent from traditional bullying in both male and female groups. Instead, cyberbullying clustered with traditional bullying, forming the traditional and cyber victim-perpetrator class for both genders and the cyber and traditional perpetrator class for male students. Cyberbullying in the present study is conceptualized as one dimension of school bullying from offline to a virtual space – bullying against school peers online. Therefore, this finding implies that it might be typical that cyberbullying perpetrated by schoolmates in the present Chinese student sample was likely extended to online platforms from face-to-face bullying at school. Our finding is inconsistent with the study by Várnai et al. (2020) in which a distinct latent class of cyberbullying was identified in Hungarian adolescents. Given the limited empirical work that specifically focused on cyberbullying within student peer networks, more similar research should take place to advance our understanding of typical patterns on how offline school-based bullying may be extended to online platforms and the extent to which students may continue to be bullied by the same or different schoolmates online (Mitchell & Jones, 2015). Preventative strategies and interventions toward reducing school bullying must include cyberbullying, especially for cyberbullying behaviors within student peer networks (Shin et al., 2016). Continued research into bullying patterns, including both offline and online behaviors, will significantly facilitate the development of these school-based prevention and intervention strategies.

Previous studies have shown that high school students tend to have lower odds of being bullying victims or victim-bullies (e.g., Goldbach, Sterzing, & Stuart, 2018). Studies have shown that as students move into higher grades (e.g., from grade 6 to grade 7), their involvement in bullying tends to decrease (e.g., Bulut, Xiao, Rodriguez, & Gorgun, 2020; Pan et al., 2017). For instance, a longitudinal study with Chinese children in grades four to six shows that students involved in bullying tended to transition to noninvolvement in bullying as they move into higher grades (Pan et al., 2017). Consistent with these previous studies, we also found that for both genders, primary or middle schoolers were more likely than high school students to be involved in school bullying, as victims, or both victims and perpetrators.

The significance of attending boarding school for the occurrence of bullying found in our sample is consistent with earlier studies in which more bullying involvement is reported among boarding school students than those attending day schools (Pfeiffer & Pinguart, 2014). This may be due to the prolonged time students get to spend with one another in boarding schools, a situation that allows for more opportunities for conflicts and aggressive behavior to happen. For students in boarding schools, as they spend a tremendous amount of time socializing with their peers, it is critical to promote and maintain a positive school climate as well as to have sufficient and timely teacher support for students when bullying behaviors take place (Mucherah, Finch, White, & Thomas, 2018).

Consistent with other studies (Goldbach et al., 2018; Juvonen et al., 2011; Lam et al., 2015), we reported that lower academic performance was associated with higher odds of victimization, particularly with being victimized by traditional forms of bullying. However, this finding in the context of cross-sectional survey design needs to be interpreted with caution, as we are unable to draw causal inferences to claim whether a lower academic performance is a result of bullying victimization or instead of a predictor of victimization. Bullying victimization and low academic performance can be social stressors for many students and hence may closely interact and influence one another. The confirmed association between the two, however, requires school educators to give attention to both. For instance, it is nevertheless essential to consider students' victimization experiences of school bullying when

developing ways to promote their academic performance (Juvonen et al., 2011). As academic performance is one of the critical student outcomes, future research also needs to examine the interconnectedness between academic performance and school bullying and potential causal relationships between the two.

5. Limitations

Several limitations in the present study need to be acknowledged. First, the measures of four types of bullying involvement are binary, indicating whether one particular kind of bullying perpetration or victimization occurred in the past year. The binary indicators fall short in capturing bullying frequency and intensity, all of which are essential dimensions of bullying victimization and perpetration. Second, social desirability may play a role in affecting the self-reporting of bullying involvement (Paulhus, 2002), as previous studies have shown a significant association between social desirability and self-reporting behaviors of perpetration or aggression (e.g., Bell & Naugle, 2007; Donat, Rüprich, Gallschütz, & Dalbert, 2020). For instance, in the context of the present study, when administering a survey in a school or class setting, some students might have felt more inclined to give answers considered more “desirable” by their teachers. Since we did not measure social desirability in the present sample, it remains uncertain whether and the extent to which students might have underreported bullying involvement. Third, we did not assess participants' use of social media, technologies, and/or online tools during their time in and outside of school. These measures would have strengthened our findings related to cyberbullying involvement if included in the analyses as covariates, given the established link between the use of social media and cyberbullying (e.g., Craig et al., 2020; Kircaburun et al., 2019). Last, the study's cross-sectional nature does not allow for causal inferences, even though we identified several significant factors associated with particular patterns of bullying involvement.

6. Conclusion

This study employed a latent class approach to examine both traditional and cyber school bullying perpetration and victimization patterns among Chinese children and adolescents. Principal findings contribute to the school bullying literature: (1) Traditional bullying victimization remained relatively high in both male and female students; (2) the perpetrator class in male students clustered traditional and cyberbullying, whereas the perpetrator class in female students involved traditional bullying only; (3) a much lower percentage of students reported being bullying perpetrators; and (4) academic performance, boarding school attendance, and level of schooling were important factors associated with school bullying involvement. These findings are meaningful for developing anti-school bullying interventions, policies, and future research.

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.

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