Developmental Trajectories of Preschool Children's Bullying Behavior: Prediction of Peer Relationships

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Abstract

A longitudinal study was conducted with 425 preschool children during a one-and-a-half-year period to investigate the developmental trajectory of preschool children's bullying behavior and the prediction of peer relationships in this trajectory. The latent growth curve model (LGCM) and mixed growth model (GMM) were conducted on Mplus to investigate the normative development trajectory and heterogeneity of preschool children's bullying behavior. Results showed that: (1) In general, preschool children's bullying increased with age, and two significantly different sub-trajectories were identified through the model-fitting parameters. One was the "low-slow increasing" group, accounting for 88.47% of participants; the other group was the "high-fast decreasing" group, accounting for 11.53% of participants. (2) Peer rejection positively predicted preschool children's bullying behavior, while peer acceptance and gender were not significant predictors. This study uncovered preschool children's bullying behavior from a developmental perspective and provided further theoretical evidence for future intervention programs to reduce bullying behaviors.

Keywords: bullying, normative developmental trajectory, heterogeneity of development trajectory, peer relationships, preschool children

1. Introduction

Bullying can be understood as a goal-directed behavior in which individuals with more power intentionally target and cause harm to others with less power (Volk et al., 2014). Bullying has negative effects on children's physical and mental health, such as social withdrawal, loneliness, low self-esteem, and depression (e.g., Arseneault, 2017; Aslan, 2018). Extant studies on bullying behaviors mainly focused on childhood and adolescence (e.g., Haltigan & Vaillancourt, 2014; Reijntjes et al., 2013; Rettew & Pawlowski, 2016; Zheng et al., 2020; Zhou et al., 2020; Zych et al., 2020), while there were only a few studies conducted with preschool children. A survey conducted in the Netherlands with 6,379 preschool children (aged 5-6 years) found that one-third of them had been involved in bullying incidents, particularly 17% of them had been classified as perpetrators through teacher ratings during the past three months (Jansen et al., 2012). Additionally, another study in Finland conducted by Kirves and Sajaniemi (2012) found that among 6,910 children aged 3–6 years, 7.1% of them perpetrated bullying at least once a month during the last semester. Recently, in a large sample study in China, researchers using latent profile analysis identified three-class model, not involved class, physical bully-victim class, and verbal-physical victim class (Zhong et al., 2022). Findings from these studies elucidate that bullying occurs at an early age among younger children.

However, most of these extant studies mainly focused on the onset and types of bullying behaviors, as well as different roles in bullying incidents among preschool children (e.g., perpetrators and victims) (Alsaker & Gutzwiller-Helfenfinger, 2010; Crick et al., 2006; Malti et al., 2010; Monks et al., 2002; Ibrahim, 2020; Yang, 2014; Zhong, et al., 2022). Fewer studies investigated the development of bullying behaviors, especially bullying perpetration, among preschool children, yet it is an important direction that deserves more attention, as studies in this area can further uncover developing mechanisms of bullying since an early age stage, and thus help the

public better understand bullying behaviors in schools. Additionally, since most of these studies were conducted in Western countries, it is thus possible that due to contextual differences, these findings cannot be generalized to non-Western cultures. For instance, China has a collectivistic culture in which cohesion and harmony among group members are emphasized more than individual independence and achievement, as individuals always belong to different social groups (e.g., schools, communities) and sometimes need to sacrifice their own benefits for the sake of their groups (Zhao et al., 2021). Seniority is also accentuated in Chinese culture whereby junior group members are expected to follow senior members and sometimes even obey their orders (Kirkbribe et al., 1991). These unique cultural factors can affect bullying in schools. For example, children may belong to different peer groups in which different power dynamics among group members further shapes bullying perpetration, as well as its development. It is thus important to focus on the developmental trajectories of bullying behaviors among preschool children, in order to ascertain how intersectional age and culture shape the development of children's bullying behaviors in China. These potential new insights emerging from the Chinese context that can further contribute to the literature and better enrich our understanding of preschool children's bullying behavior as a whole. Therefore, this study adopted a longitudinal design and focused on the developmental trajectory of preschool children's bullying perpetration behavior, and the predictive effect of peer relationships on their bullying behavior in China.

1.1 The Developmental Trajectory of Bullying Behavior

Previous studies on the developmental trajectories of bullying in children and adolescents suggested that there were heterogeneities in the development of bullying perpetration (Espelage et al., 2018; de Vries et al., 2021; Haltigan & Vaillancourt, 2014; Reijntjes et al., 2013; Tremblay & Nagin, 2005; Zhou et al., 2020; Zych et al., 2020). Haltigan and Vaillancourt (2014) investigated the co-occurrence of bullying perpetration and victimization among children from grade five to eight using latent class models. They found that as these children grew older, there were two different developmental trajectories among bullies, "low bullying" and "moderate/increasing bullying." In China, Zhou et al. (2020) investigated school bullying among elementary and secondary school students. They found that 7.6% of children's bullying perpetration increased dramatically with age.

However, whether there are heterogeneities in the development of bullying behaviors of preschool children is still unclear. Barker et al. (2008) explored victimization in bullying incidents among preschool children (four to seven years old). They found three different trajectories groups: "low-increasing" group (it started at a low point, but increased over time), "moderate-increasing" group (it started at a moderate level and increased over time), and "high-chronic" group (it started at a high level, but the growth was low). Tremblay and Nagin (2005) found that children's physical bullying behaviors peaked between two and three-and-a-half years old but steadily decreased as they grew up. Crick et al. (1999) adopted correlation analysis to assess bullying behavior at a one-month interval, and found that both relational and physical bullying had a short-term stability. To the best of our knowledge, studies on the developmental trajectory of preschool children's bullying perpetration were still rare both in the Western context (Crick et al., 1999; Monks et al., 2002) and in China.

Hence, the first aim of this longitudinal study aimed to explore the developmental trajectory and heterogeneity of Chinese preschool children's bullying perpetration behavior from a developmental perspective by considering their growth effects.

1.2 Gender Difference of Bullying Behaviors Among Preschool Children

Findings on the gender difference in children's bullying behavior were inconsistent. Previous studies showed that girls displayed more relational bullying than boys (e.g., spreading rumors or socially excluding others). Boys displayed more physical bullying than girls (e.g., beating, cursing) (Andreou & Bonoti, 2010; Craig et al., 2000; Green et al., 2008; Ibrahim, 2020; Ostrov et al., 2004; Perren & Alsaker, 2006). Crick et al. (1999) adopted the method of teacher rating to investigate bullying behavior among 3–5-year-old preschool children and found that girls showed more bullying behaviors. Camodeca et al. (2019) adopted peer nominations to investigate bullying behavior among children and found that boys scored higher than girls. These inconsistent research findings may be caused by different age stages of participants and different evaluation methods of bullying behavior used in each study. In addition, research showed that young children could confuse bullying with aggressive-only behavior and not pay much attention to specific characteristics of bullying such as repetition, power imbalance, or intention, situations that often result in over-labeling incidents as bullying (Ey et al., 2019; Monks & Smith, 2006). In contrast, children above eight years old can distinguish between different types of bullying and understand the characteristics of bullying behavior (Smith et al., 2012). In light of this difference caused by age, teacher rating is often used to evaluate younger children's physical and relational aggression, as it is more effective than peer and self-reports (Douvlos, 2019).

1.3 Peer Relationship and Bullying Behavior

Peer relationship mainly refers to the interpersonal relationships established and developed in communication between peers or individuals on the same psychological development level (Bowker et al., 2000). Studies on the connection between peer relationships and bullying among preschool children were often based on a cross-sectional design, and peer relationship was indexed by peer status. Cathryn (2006) regarded the peer status of individuals at the level of group relations as an indicator to measure peer relations, and divided it into peer acceptance and peer rejection. Peer acceptance reflects the degree to which an individual is liked or accepted by peers, while peer rejection reflects the degree to which an individual is disliked and rejected by peers. This method has been widely used by scholars (Ji, et al., 2020; Song, et al., 2020). Results found that peer rejection significantly predicted peer victimization (Asla, 2018), while peer acceptance negatively predicted bullying (de Bruyn, et al., 2010).

 At the preschool stage, children must learn how to build peer groups, maintain relationships, obtain a reputation, and develop social skills (Fink et al., 2020; Rubin et al., 1998). As they grow up, their understanding of peers and social reputation (e.g., peer acceptance, peer rejection) improves (Ey et al., 2019; Rubin et al., 1998). Hanish et al. (2005) found that with the development of self-regulation, older children were more likely to adjust their behaviors based on different social occasions and decide who they want to interact with based on their social status compared to younger children. Thus, as children get older, peer acceptance may lead to less bullying perpetration, and peer rejection may result in more bullying.

1.4 The Current Study

As previous studies did not have a large sample size and bullying behaviors were only evaluated twice in this short period, the changes and heterogeneity of the developmental trajectories were hard to detect. Additionally, findings from these studies were identified with children in the Western context—whether and to what extent these trajectories can be applied to understand children's bullying in non-Western contexts is unclear. The current study has three main aims. First, whether the normative developmental trajectory of preschool children's bullying behavior increases, decreases, or remains stable as children grow. Second, whether there are any differences (e.g., gender or age) in individuals' initial bullying levels, the initiation of bullying, and the developmental tendency in terms of heterogeneous developmental trajectories. Finally, whether peer relationships (i.e., peer acceptance and rejection) would predict bullying behavior among preschool children. The study will help the public better understand bullying behaviors in kindergarten schools.

2 Methods

2.1 Participants

Participants came from a middle-sized coastal city in East China with a population of around 700 million. Specifically, four kindergartens were selected randomly; three to four classes were sampled from each kindergarten, and there were about 30 students in each class. The children sampled for the study were healthy, without any potential physical and mental barriers. The study was conducted thrice every six months.

Since some participants withdrew from this longitudinal study or transferred to different kindergartens, sample attrition was unavoidable. Based on the research method and goals, only participants who attended the study at least twice when data was collected were included in the following analyses. Specifically, there were 425 children (219 boys and 206 girls; Mage = 42.51 months old, SD = 3.65) for the final data analysis. A total of 357 children (183 boys and 174 girls; M_{age} = 42.71 months old, SD = 3.68) were present for data collection at the first time-point. Further, 353 children (185 boys and 168 girls; M_{age} = 49.17 months old, SD = 4.97) were present for the study at the second time-point. Finally, 326 children (158 boys and 144 girls; M_{age} = 53.88 months old, SD = 4.06) were present for the study at the third time-point.

The average age of the mothers who reported at the first time-point was 31.83 years old (SD = 4.50), while the average age of the fathers was 32.73 (SD = 5.50) years. Regarding mothers' education level, 27.10% reported having obtained a bachelor's degree and above. A total of 29.10% reported having obtained an associate degree; 23.50% reported having obtained a high school degree and vocational training; 17.60% reported having obtained a junior high school degree and below; 2.70% did not report any educational background information. For fathers' education level, 23.00% reported having obtained a bachelor's degree and above. A total of 27.80% reported having obtained an associate degree; 25.40% reported having obtained a high school degree and vocational training; 12.00% reported having obtained a junior high school degree and below; 11.80% did not report any educational background information. In terms of the household income per capita, 19% reported a monthly income lower than RMB 2,000 (<USD312); 36.90% reported a monthly income within RMB 2,001–3,000 (about USD 312–468); 28.20% reported a monthly income within RMB 3,001–4,000 (about USD 468–624);

15.90% reported a monthly income above RMB 4,000 (>USD624).

In order to examine whether reduced participants affected the study results, independent sample t tests were conducted to detect differences among scores from participants who left the study and scores from participants who remained in the study at the second and third points. Results showed that between participants who left the study and participants who remained in the study, there were no significant differences in bullying behaviors ($t_1 = -0.681$, $p_1 = 0.496$; $t_2 = -1.091$, $p_2 = 0.276$), peer rejection ($t_1 = 0.974$, $p_1 = 0.331$; $t_2 = -0.577$, $p_2 = 0.564$), peer acceptance ($t_1 = 0.974$, $p_1 = 0.331$; $t_2 = -0.577$, $p_2 = 0.564$). There were also no significant gender differences between participants who left the study and participants who remained in the study ($\chi^2 = 0.303$, $p = 0.558$; $\chi^2 = 0.819$, $p = 0.336$), a result that shows no structural loss among participants.

2.2 Procedures

In this study, each class (around 30 children) in these full-day kindergartens is generally equipped with two to three staff; one is a nursery worker, while the others are full-time teachers. Children in China attend this kind of kindergarten when they are three to five years old, and their parents are required to give full consent as well as pay the tuition fees to kindergartens. The selection criteria for kindergarten teachers (e.g., passing physical checkup and exams) in China can ensure their competency in interacting with children and overseeing children's daily behaviors. Hence, the method of teacher ratings is ideal to investigate kindergarten children's bullying behavior, given that kindergarten teachers spend most of time with children and can observe their behaviors well.

Before the study, the researchers contacted the selected kindergartens, and the purpose of the current study was explained to the principals, primary care teachers, and parents. Teachers and parents provided written informed consent to the study. The university's ethics committee also approved this study. The study was first conducted when participants were admitted into the kindergarten (September 2016, T1) and were repeated twice every six months (April 2017, T2; October 2017, T3). Full-time teachers who agreed to participate in the study filled in the questionnaires that evaluate each child's bullying behavior in the classroom.

2.3 Measurements

The Teachers' Questionnaire on Children's Social Roles (Belacchi & Farina, 2010) was used to measure bullying behavior among preschool children. This questionnaire has eight roles (Bully, Assistant, Reinforcer, Defender, Outsider, Consoler, Mediator, and Victim) with 24 items. Specifically, this study focuses on perpetrators' bullying behavior (e.g., making fun of classmates, joking about classmates, or doing a nasty trick or saying bad things to other children). The model fit index (see Table1) showed that this questionnaire has a good structural validity in the Chinese context. Cronbach's α coefficients were measured thrice and were 0.89, 0.85, and 0.94, respectively. Teachers were asked to evaluate preschool children's bullying perpetration behavior through this questionnaire, wherein a higher score meant that a child exhibited more bullying perpetration behavior. The Peer Relation Scale adopted from Chen et al. (1995) was used to measure preschool children's peer relations through the teacher rating method (e.g., liked by their peers, dislike by their peers; neglected by their peers; teased by peers). There are two dimensions, peer acceptance and peer rejection, in this scale. A higher score means a higher level of peer acceptance or peer rejection. Cronbach's α coefficients were measured three times, and they were 0.88, 0.88, and 0.91, respectively.

Table 1. Model fit index of the teachers' questionnaire on children's social roles

	χ^2/df	CFI	GFI	TLI	NFI	RMSEA
T1	3.193	0.960	0.955	0.947	0.943	0.053
T2	2.418	0.933	0.937	0.912	0.892	0.061
T3	3.458	0.939	0.909	0.921	0.918	0.079

Note: T1, first-round study (September 2016); T2, second-round study (April 2017); T3, third-round study (October 2017). CFI: comparative fit index; GFI: goodness of fit index; TLI: Tucker-Lewis coefficient; NFI: normal fit index; RMSEA: root mean square error of approximation.

2.4 Data Analyses

SPSS 22.0 was used for data entry, descriptive and regression analyses. The latent growth curve model (LGCM) was used to examine the normative developmental trajectory of bullying behavior and the relationship between

peer relations and bullying. The goodness of fit of the model was evaluated through chi-square statistics with the ratio χ^2/df ($\chi^2/df \leq 3$ is acceptable), the *CFI* (*CFI* ≥ 0.90 is acceptable), the *TLI* (*TLI* ≥ 0.90 is acceptable), and the *RMSEA* (*RMSEA* ≤ 0.08 is acceptable) as indicators of goodness-of-fit (Bentler, 1990; Bollen, 2014). A robust full information maximum likelihood estimation was employed, which could make use of all available data points (Little et al., 2014).

The growth mixture model (Muthén, 2004) was conducted on Mplus 8.0 to estimate the heterogeneous trajectories. Many models (models with different number of class) were built with random starting values. The best fitting model was selected by examining the information criteria (ICs) fit statistics, which included the Bayesian information criteria (BIC) and Akaike information criteria (AIC) (Raftery, 1995), the Lo-Mendell-Rubin likelihood ratio test (LMR) (Lo et al., 2001), the bootstrap likelihood ratio test (BLRT) and Entropy (McLachlan & Peel, 2000). The BIC is a commonly used fit index in which lower values indicate a more parsimonious model. Entropy is a measure of classification accuracy, with values closer to 1 indexing greater precision (Berlin et al., 2013; Nylund et al., 2007).

3. Results

3.1 Common Method Biases Test

Common method biases might exist, as this study relied solely on teachers' reports. Hence, Harman's single factor test was used to examine any common method biases (Zhou & Long, 2004), and rotated principal components analysis was used to analyze the items from the questionnaires. Results showed that the variance explained by the first factor was 10.54%, which was less than the critical value of 40%. Therefore, there were no severe common method biases in our research data.

3.2 Descriptive Analyses of Bullying Behavior

The mean and standard deviation of bullying behavior at the three-time points can be seen in Table 2. Results from descriptive analyses showed that the scores for bullying behavior were relatively low compared to the median. Correlation analyses (Table 3) showed that bullying behavior T1 was significantly negatively correlated with bullying behavior T3. Bullying behaviors T2 and T3 had a significantly positive correlation, and bullying behavior showed an increasing tendency. Bullying behavior at all three-time points had significant positive correlations with peer rejection ($p < 0.01$) and negatively correlated with peer acceptance ($p < 0.01$).

Table 2. Descriptive analyses of peer relationships and bullying behavior

	PJ T1	PJ T2	PJ T3	PA T1	PA T2	PA T3	BB T1	BB T2	BB T3
M	2.03	2.44	2.30	4.24	4.03	4.05	1.30	1.92	1.54
SD	1.16	1.18	1.20	1.54	1.31	1.44	0.95	0.89	1.19

Note: PJ, peer rejection; PA, peer acceptance; BB, bullying behavior; T1, first-round study (September 2016); T2, second-round study (April 2017); T3, third-round study (October 2017).

Table 3. Correlation analysis of peer relations and bullying behavior

	1	2	3	4	5	6	7	8	9
1 PJ T1	1								
2 PJ T2	0.05	1							
3 PJ T3	0.02	0.08	1						
4 PA T1	-0.42**	0.04	-0.05	1					
5 PA T2	0.04	-0.53**	-0.08	-0.12*	1				
6 PA T3	-0.002	-0.01	-0.24**	0.06	0.10	1			
7 BB T1	**0.51****	-0.21**	-0.16*	**-0.25****	0.26**	0.12	1		
8 BB T2	0.17**	**0.45****	0.28**	-0.04	**-0.19****	-0.31**	-0.04	1	
9 BB T3	-0.02	0.11	**0.55****	-0.14*	-0.03	**-0.27****	-0.22**	0.34**	1

Note: PJ, peer rejection; PA, peer acceptance; BB, bullying behavior; T1, first-round study (September 2016); T2, second-round study (April 2017); T3, third-round study (October 2017). *$p<0.05$, ** $p<0.01$.

3.3 Normative Developmental Trajectory of Bullying Behavior

An LGCM model, which was used to examine the normative developmental trajectory of bullying behaviour, was estimated on Mplus 8.0, using a robust full information maximum likelihood estimation (Muthén & Muthén, 1998-2017). The goodness-of-fit index was $\chi 2 = 0$, df = 1, TLI = 1, CFI = 1, AIC = 2844.020, BIC = 2876.418, RMSEA = 0. This excellent fit index showed that this model is a saturated model (Wang, 2014). Results from the LGCM model found that the variance estimation of the intercept factor of bullying behavior was 0.147 ($p > 0.05$), and the variance estimation of the slope factor was 0.355 ($p < 0.001$). It indicated that there was no difference between individuals on the initial level of bullying. However, there was a significant difference between individuals on the increasing rate of bullying. The correlation coefficient between the intercept growth factor and the slope factor of bullying behaviors was -0.176 ($p < 0.05$). This meant that an individual's initial level of bullying was negatively related to the increasing rate of bullying. The values suggested individual differences in the growth of individuals' bullying behaviors, and there were heterogeneous sub-trajectories of bullying perpetration behavior among preschool children.

3.4 Heterogeneous Developmental Trajectories of Bullying Behaviors

A series of models that include one through six latent classes were fit to the data. The IC indices (AIC, BIC, and a-BIC), entropy, LMR, and BLRT are presented in Table 4. Fit indexes showed that as the number of latent class increased, the likelihood ratio χ^2, AIC, BIC, and aBIC (adjusted Bayesian information criteria) steadily decreased. Even though classification accuracies of the four-class (Entropy=0.890), the five-class (Entropy=0.906), and the six-class (Entropy=0.871) were higher than that of the second class (Entropy=0.823). Based on the fit indexes of LMR (<0.0001), BLRT (<0.0001) and the meaning of the actual class (number in each class should be no less than 5% of the total participants) (Nylund et al., 2007; Wang et al., 2014), the two-class trajectory model was the best fitting solution. The probability of participants in each class belonging to the two-class model was 96.30% and 87.00%, which showed that the accuracy of the two-class model was high. The GMM growth tendency of bullying behavior of the two -class trajectory model can be seen in Figure 1. Specifically, the thick lines (one solid line and one dotted line) refer to estimated means of bullying with the time change, while the thin lines represent individuals' estimated bullying.

Table 4. The summary of mixed growth model goodness-of-fit index

| GMM	K	G^2/LL	AIC	BIC	aBIC	Entropy	LMR	BLRT	Class probability
1C	8	-1787.553	3591.106	3623.522	3598.135	-	-	-	1
2C	**11**	**-1763.748**	**3549.495**	**3594.068**	**3559.161**	**0.823**	**<0.0001**	**<0.0001**	**0.885/0.115**
3C	14	-1753.006	3534.012	3590.741	3546.314	0.759	=0.1960	<0.0001	0.579/0.094/ 0.327
4C	17	-1715.593	3465.187	3534.072	3480.125	0.890	=0.0002	<0.0001	0.520/0.238/0.200/0.042
5C	20	-1679.530	3399.060	3480.101	3416.634	0.906	=0.0005	<0.0001	0.045/0.454/0.233/0.066/0.202
6C	23	-1666.929	3379.858	3473.056	3400.069	0.871	=0.0212	<0.0001	0.391/0.214/0.066/0.066/0.0064/0.200
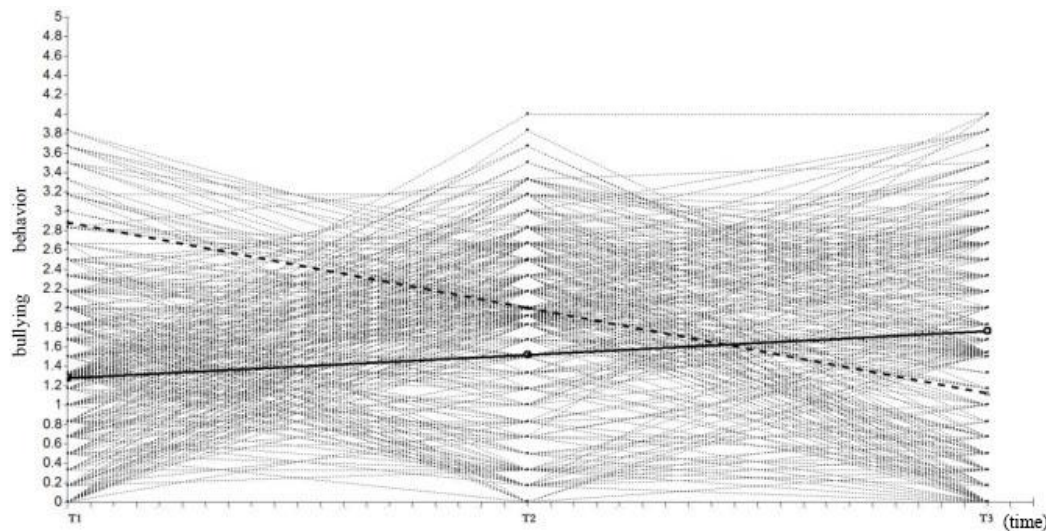
Figure 1. Two trajectory classes of bullying perpetration behaviors rated by teachers

Note: The solid line refers to the "low-slow increasing" group, while the dotted line refers to the "high-fast decreasing" group. Intensive thin lines are observed individual values.

In class 1 (solid line), the initial level of bullying behavior was low, with an average score of 1.27. With the time changes, it remained stable and increased slowly and was thus named the "low-slow increasing" group. There were 376 preschool children in this class, accounting for 88.47% of the total participants. The mean of the intercept factor (average value of bullying) was 1.52 ($p < 0.001$), and the mean of the slope factor (average growth rate of change in bullying) was 0.17($p < 0.001$). The correlation between the intercept factor and the slope factor was -0.25($p < 0.05$), indicating that the initial level of bullying behavior had a significant negative correlation with the growth rate. In class 2 (dotted line), the initial level of bullying behavior was high, with an average score of 2.88. With time changed, bullying behavior gradually decreased. This line was thus named the "high-fast decreasing" group. There were 49 preschool children in this group, accounting for 11.53% of the total participants. The mean of the intercept factor (average value of bullying) was 1.52 ($p < 0.001$), and the mean of the slope factor (average growth rate of change in bullying) was 0.17($p < 0.001$). The correlation between the intercept factor and the slope factor was -0.25($p < 0.05$), indicating that the initial level of bullying behavior had a significant negative correlation with the growth rate.

3.5 The Prediction of Peer Relations on Bullying Behavior

Peer acceptance and peer rejection at T1, T2, and T3 were analyzed as predictive variables that changed over time; gender was the covariate that did not change as time went by. An LGCM was used to examine the prediction of gender and peer relations on bullying behavior, and the goodness-of-fit index ($\chi2 = 26.884$, df = 8, p < 0.001, CFI = 0.936, TLI = 0.880, AIC = 3357.278, BIC = 3409.955, RMSEA = 0.075, SRMR=0.042) showed that the model had a good fit. The results found that the regression coefficient between gender and the average growth rate of bullying was -0.280 ($p = 0.211$), and the regression coefficient between gender and the average value of bullying was 0.242 ($p = 0.461$). It suggested that there were no gender differences in the initial level and slope changes of bullying behavior among preschool children.

Peer rejection significantly predicted preschool children's bullying behavior in the same period, and the regression coefficients were $\beta_{T1 \to T1} = 0.388$ ($p < 0.001$), $\beta_{T2 \to T2} = 0.308$ ($p < 0.001$), and $\beta_{T3 \to T3} = 0.295$ ($p < 0.001$). Nevertheless, peer acceptance did not significantly predict bullying behavior in the same period. Regression coefficients at three time points were $\beta_{T1 \to T1} = -0.143$ ($p = 0.667$), $\beta_{T2 \to T2} = -0.157$ ($p = 0.426$), $\beta_{T3 \to T3} = -0.125$ ($p = 0.430$). Additionally, the R3STEP method was used to verify the predictive effect of peer relationships and gender in the GMM of bullying behavior. When gender and peer relations were placed into trajectories, the predictions of gender and peer acceptance were not significant ($\beta = -0.355$, *SE* = 0.320, $p = 0.268$; $\beta = 0.166$, *SE* = 0.151, $p = 0.270$), but peer rejection significantly predicted bullying behavior ($\beta = -0.590$, *SE* = 0.201, $p<0.01$). After including predictive variables, the class accuracy of the mixed model improved from 0.823 to 0.836.

Bullying behavior in the "low-slow increasing" group declined from 88.47% ($n = 376$) to 85.41% ($n = 363$), and bullying behavior in the "high-fast decreasing" group increased from 11.53% ($n = 49$) to 14.59% ($n = 62$). Peer rejection effectively predicted the class that bullying behavior belongs to. Compared to participants in the "low-slow increasing" group, those in the "high-fast decreasing" group were 80.39% less likely to be involved in peer bullying ($[(e^{0.590}-1) \times 100] = 80.39$). This finding also showed that constant peer rejection increased bullying behavior.

4. Discussion

The study investigated the developmental trajectory of bullying behavior among preschool children and the predictive effect of peer relations using LGCM and GMM models. Results confirmed the heterogeneity and individual differences in bullying behavior among preschool children's development. Further, peer relationships played an important role in preschool children's bullying development, with peer rejection as the main factor leading to more bullying behavior.

4.1 Normative Developmental Trajectories of Preschool Children's Bullying Behavior

The study found the overall development of preschool children's bullying behavior increased as they grew older, and the score of bullying behavior at the second time point (around age 4) was the highest, which was consistent with previous studies conducted in the Western context (Barker, 2008; Fink et al., 2020; Ilola et al., 2016). Particularly, the development of preschool children's social skills influenced their bullying behaviors. As they grew older, children obtained better social cognition and verbal skills, and had more chances to interact with their peers, a situation that further increased the frequency of bullying behaviors (e.g., verbal and physical aggressive bullying) (Fink et al., 2020; Jenkins et al., 2017; Vlachou et al., 2011). At the third time point, preschool children's bullying behavior score was lower than at the second time point. It can be explained by Cote et al. (2006), as they found that physical bullying declined in most children as they moved from preschool to elementary school. The possible reason was that as preschool children grew older, they were gradually capable of carrying out bullying in different formats (e.g., direct physical and verbal bullying, or indirect, relational bullying), and indirect bullying may take over physical and verbal bullying (Vlachou et al., 2011), which was more challenging for teachers to detect (Alsaker, 2001). Additionally, previous studies showed that teachers were likely to condone relational bullying (Yoon & Kerber, 2003; Huang et al., 2018), which might not fully recognize all types of bullying (Oldenburg et al., 2015). All the above reasons may explain the decline in the third time point.

4.2 Heterogeneous Developmental Trajectory of Preschool Children's Bullying Behavior

The study found two latent trajectory groups—the "low-slow increasing" group and the "high-fast decreasing" group in preschool children's bullying behavior. Specifically, 88.47% of preschool children in this study were in the "low-slow increasing" group. This result was in line with the developmental trajectories of bullying victimization from Barker et al. (2008), in which 71% of preschool children were in the "low/increasing" group and 25% of them were in the "medium/increasing" group. As children grew up, their increased interactions with peers may result in more bullying behaviors (Nansel et al., 2005). Additionally, verbal and indirect bullying may increase due to the children's developing cognitive and verbal skills (Mccarty et al., 2016; Vlachou et al., 2011). Further, compared to indoor activities where parents and teachers can supervise children's behaviors, the increase in children's outdoor activities with less supervision from parents and teachers might also increase their bullying behaviors, as they obtain more freedom to interact with their peers (Adams, 2008; Ibrahim, 2020; Vlachou et al., 2014; Vlachou et al., 2016). In this study, no high bullying group emerged from the modeling process, which was inconsistent with the "high/stable" victimization class found by Barker et al. (2008).

This inconsistency can be explained by the uniqueness of Chinese culture and the Chinese educational system. Mainly, moral education is an essential component in the Chinese curriculum design (Shu, 2016), as traditional Chinese philosophies (e.g., *Confucianism* that promotes propriety in interpersonal relationships (Chou & Cheng, 2020) have influenced Chinese people for thousands of years. Further, contemporary socialist ideologies (e.g., *Harmonious Society* that promotes virtues such as courtesy for citizens to comply with; Liu, 2008; Zhao et al., 2021) play a significant role in Chinese culture. As children gradually grow, teachers in senior kindergarten classes start moral education through storytelling or games to promote prosocial behaviors and prevent bullying. This curriculum design has been helpful in terms of reducing preschool children's bullying behaviors (Zhang, 2009).

Furthermore, the difference might also result from the evaluation method of bullying behavior (i.e., both self-report and teacher rating) that Barker et al. (2008) used. However, although both these methods can improve the chance of identifying bullying, as mentioned earlier in the Introduction section, young children might not use the self-report method appropriately, due to the fact that they may not understand the different characteristics of

bullying (e.g., repetition, power imbalance) (Monks & Smith, 2006). Hence, teacher rating is more effective in evaluating young children's physical and relational bullying behaviors (Alsakser & Valkanover, 2001).

In this study, 11.53% of children belonged to the "high-fast decreasing" group. Children in this group had a high initial level of bullying perpetration behavior, but the bullying behavior also decreased rapidly, and there were always some children expressing a higher level of bullying behavior at each time point. However, there were no continuous and repetitive appearances of these bullying behaviors because young children's interaction with peers might be more transient, and their roles in these interactions were easier to change (Ilola et al., 2016). Additionally, kindergarten was the first social environment that preschool children experienced, their executive functioning and emotional regulation were not mature enough to deal with issues arising from this environment. They might thus exhibit the high initial level of bullying behavior as coping mechanisms to deal with issues in their new environment. However, as they grew older, they gradually developed sophisticated problem-solving strategies that could avoid peer conflicts and thus reduced bullying behaviors (Camodeca & Coppola, 2016; Huang et al., 2018; Moyano et al., 2019).

When it came to gender, there were no gender differences in the developmental tendency of bullying behavior. It might because that physical and relational bullying was not reported separately in the current study. Although previous studies showed that girls displayed more relational bullying and boys displayed more physical bullying (Ibrahim, 2020), both boys and girls may show the similar frequency of bullying behaviors.

4.3 Prediction of Peer Relations on Preschool Children's Bullying Behavior

In this study, peer rejection significantly predicted preschool children's bullying behavior in the same period, which is consistent with recent studies conducted in the Western context (Aslan et al., 2018; Camodeca et al., 2015; Camodeca & Coppola, 2019). Asher and McDonald (2009) found that among children who encountered peer rejection, approximately half of them exhibited bullying behaviors. Additionally, this finding improved our understanding of the connection between peer relationships and bullying in the Chinese context, as some previous studies conducted in China only found that peer rejection was negatively related to bullying among elementary and middle school students (Yang, 2014; Wang & Chen, 2000). However, peer acceptance did not significantly predict preschool children's bullying behavior. Recent studies have suggested that as children grew up, they had more advanced social and verbal skills to help them form peer groups and adjusted peer relationships, a process that further destabilized their previous peer relations (Jenkins et al., 2017; Jenkins et al., 2018).

4.4 Limitation and Future Directions

This study has some limitations. First, the longitudinal study was only conducted three times. Future studies can further expand the longitudinal design to preschool children's entire kindergarten education, in order to better capture the developmental trajectories of their bullying behaviors at the preschool stage. This design can also help us better understand how changes in peer relationships affect preschool children's bullying perpetration behavior over time. Second, Camodeca et al. (2015) emphasized the importance of understanding preschool children's bullying behaviors in various contexts. Thus, future studies can further explore the different contexts in which children's bullying behaviors may occur (e.g., both inside and outside the classroom) and how peer relations affect bullying behaviors in these contexts. Third, this study only investigated preschool children's bullying behavior from the perspective of perpetration, however, there are other roles in bullying events such as victims, moderators and so on. Future studies can further examine the developmental trajectories of preschool children's bullying behaviors by considering different perspectives (e.g., victimization, moderation), different bullying formats (e.g., physical, verbal, and relational), and the different roles played (e.g., bystanders, victims, perpetrators) to better understand bullying behavior among preschool children. Lastly, as we found that peer rejection significantly predicted preschool children's bullying behavior, researchers and practitioners can further think about how relevant bullying prevention and intervention can be implemented to improve preschool children's peer relationships and thus reduce their bullying behavior.

5. Conclusion

Overall, this study found that preschool children's bullying behavior increased as they grew older and that their bullying behaviors were heterogeneous. There were also significant individual differences in their bullying behaviors, as two different sub- trajectories emerged from this study. Peer rejection also significantly predicted bullying behavior among preschool children. This study provided important theoretical implications for future empirical studies to further investigate children's bullying behaviors from a developmental perspective. Findings from this study also provide important implications for the design and implementation of bullying intervention programs and services to reduce children's bullying behaviors at an early preschool stage.

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