

The Joint Effects of Childhood Emotional Abuse and Bullying Victimization on the Development of Adolescent Depressive Symptoms: Sequential Mediation or Accentuated Moderation?

Authors: Li Xi, Zhang Chang, Yu Ruize, Yin Yijia, Zhou Tong, Liu Wei, Chen Ning, Chen Ning

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Abstract

To examine the longitudinal joint effects of two types of interpersonal risk factors (childhood emotional abuse and adolescent bullying victimization) on the development of depressive symptoms in adolescents, a 2-year, 3-wave longitudinal survey was conducted with 521 middle school students. Analysis results based on latent growth curve models and their variants revealed that: (1) Both childhood emotional abuse and adolescent bullying victimization significantly and positively predicted adolescents' depressive symptoms, as manifested in both the initial intercept and growth slope; (2) The initial intercept and growth slope of bullying victimization mediated the relationship between childhood emotional abuse and adolescent depressive symptoms; (3) Regarding the initial intercept, childhood emotional abuse attenuated the positive predictive effect of bullying victimization on depressive symptoms, but no significant moderating effect was observed on the growth slope. These findings indicate that childhood emotional abuse and adolescent bullying victimization can not only independently predict the development of adolescent depressive symptoms but also exert joint effects, primarily manifesting as a longitudinal sequential mediation pattern (rather than an enhanced moderation pattern). Based on these conclusions, this paper integrates the interpersonal risk model of depression with the cumulative risk model into a cumulative interpersonal risk model, and identifies sequential mediation as the longitudinal effect pattern of interpersonal risk factors across developmental stages and relational systems on adolescent depression.

Full Text

The Joint Role of Childhood Emotional Abuse and Bullying Victimization in the Development of Adolescent Depressive Symptoms: Sequential Mediation or Enhanced Moderation?

LI Xi¹, ZHANG Chang¹, YU Ruize¹, YIN Yijia¹, ZHOU Tong¹, LIU Wei^{1,2}, CHEN Ning^{1,2}

¹School of Psychology, Shanghai Normal University, Shanghai 200234, China

²Lab for Educational Big Data and Policymaking, Ministry of Education, Shanghai Normal University, Shanghai 200234, China

Abstract

Adolescence is a distinctive developmental phase bridging childhood and adulthood, characterized by both opportunities and challenges across mental health and interpersonal domains. Depressive symptoms and bullying victimization are prevalent in adolescence. Meanwhile, the negative developmental consequences of childhood emotional abuse also tend to emerge during this period. The interpersonal risk model highlights the risk of developing depressive symptoms from interpersonal victimization, yet several details still require empirical validation: (1) Does childhood emotional abuse positively predict the developmental trajectories of bullying victimization and depressive symptoms in adolescence? (2) Is there a time-dependent correlation between bullying victimization and the developmental trajectory of depressive symptoms in adolescence? (3) Does childhood emotional abuse moderate the longitudinal relationship between bullying victimization and depressive symptoms in adolescence? (4) Does the developmental trajectory of bullying victimization mediate the longitudinal relationship between childhood emotional abuse and adolescent depressive symptoms? Given the negative impacts of childhood emotional abuse, bullying victimization, and depression on adolescent development, exploring their trajectories and interrelationships over time has important theoretical and practical implications.

A total of 521 high school students from China (Mage = 13.83 years, SDage = 1.40, 59.31% boys) were recruited to participate in a three-wave longitudinal survey study over a two-year period. The latent growth curve model (LGCM) and its variants were used to examine the mediating role of bullying victimization in the association between childhood emotional abuse and adolescent depressive symptoms, as well as the moderating effect of childhood emotional abuse on the relationship between bullying victimization and depressive symptoms. Parameter estimation was conducted using the Bayesian method. Convergence of the Markov Chain was indicated by the Potential Scale Reduction (PSR) below 1.025. Model fit was considered acceptable if the 95% credible interval of the Posterior Predictive Checking (PPC) includes zero.

The results revealed that: (1) childhood emotional abuse significantly and positively predicted both adolescent bullying victimization and depressive symptoms, as shown by both the initial intercept and the growth slope. (2) Bullying victimization significantly and positively predicted adolescent depressive symptoms in terms of both initial intercept and growth slope. (3) Bullying victimization served as a mediator in the relationship between childhood emotional abuse and adolescent depressive symptoms, influencing both the initial intercept and the growth slope. (4) Childhood emotional abuse weakened the effect of the initial intercept of bullying victimization on the initial intercept of depressive symptoms, but did not significant moderate the growth slope of depressive symptoms.

Findings indicate that childhood emotional abuse and adolescent bullying victimization both independently and jointly predict the development of depressive symptoms in adolescence. The joint effect was within a longitudinal sequential mediation model rather than an enhanced moderation model. Such results integrate the interpersonal risk model and the cumulative risk model into a cumulative interpersonal risk model, demonstrating how interpersonal risk factors operate sequentially across developmental stages and relational systems to influence the development of adolescent depressive symptoms. Practically, these findings highlight the need for a timely and multilayered approach in the prevention of bullying victimization and depression. Given the negative effect of childhood emotional abuse on individual' s ability to cope with subsequent interpersonal risks, timely implemented of interventions is crucial for mitigating the cumulative effect of risks over time, which may prevent the onset of severe mental health issues.

Keywords: childhood emotional abuse, bullying victimization, depressive symptom, cumulative interpersonal risk model, sequential mediation model

1.1 Childhood Emotional Abuse

Emotional abuse is the most prevalent form of child maltreatment worldwide, with 35.3% of children reporting experiences of emotional abuse [?]. It is defined as a caregiver-child relationship characterized by harmful interaction patterns [?]. Unlike emotional neglect, which is another subtype of psychological maltreatment, emotional abuse represents a harmful parenting investment that emphasizes more active and intentional harm by caregivers [?]. It involves any rejecting, humiliating, threatening, or demeaning behaviors directed at a child' s emotional well-being [?], reflecting negative emotional embedding during periods of high psychological plasticity. Research has shown that childhood emotional abuse is one of the most destructive negative experiences impairing children' s positive development, associated with the greatest number of adverse developmental outcomes [?]. It predicts a wide range of developmental problems across developmental stages, including interpersonal difficulties [?] and

mental disorders [?]. Therefore, childhood emotional abuse may actually be a more common and more detrimental form of child maltreatment that warrants greater attention.

1.2 Childhood Emotional Abuse and Its Relationship with Adolescent Depressive Symptoms and Bullying Victimization

Adolescence represents a critical transitional period in human development. The rapid development of neurological, physiological, and psychosocial functions during this stage makes it highly sensitive to negative experiences such as childhood emotional abuse [?]. Depressive symptoms (internalizing problems) and bullying victimization (externalizing risk) have been identified as typical consequences of childhood emotional abuse during adolescence [?, ?].

According to the interpersonal risk model, individuals who experience high levels of negative interpersonal experiences such as rejection and exclusion tend to develop more negative cognitive schemas and self-evaluations, thereby increasing their risk for depressive symptoms [?, ?]. Childhood emotional abuse, the focus of this study, represents a form of negative interpersonal experience with early-life significant others [?]. Empirical research has demonstrated that although all types of child maltreatment are positively associated with depression diagnosis and severity, emotional abuse emerges as the most consistent and strongest predictor of depression across domains, raters, and genders [?]. Childhood emotional abuse is associated with more severe depressive symptoms and increased risk for recurrent and persistent depressive episodes [?]. Based on these findings, we can hypothesize that individuals who experience more emotional abuse during childhood are likely to exhibit more depressive symptoms in subsequent development.

Beyond depression, the phenomenon of ‘revictimization’ and its ‘spillover effect’ among maltreated children has received considerable attention. Compared to non-maltreated children, children who have been victimized in one relational system (e.g., the family system) are more likely to experience further victimization in the same system or even in other relational systems (e.g., the peer system) [?, ?]. During adolescence, victimization in the peer system is often conceptualized as bullying victimization, defined as a negative psychological state resulting from repeated aggressive behaviors by others intended to cause harm or discomfort [?]. Longitudinal studies have shown that children who experienced parental emotional abuse before age 12 are at greater risk for peer intimidation and physical attacks at age 16 [?]. Neurocognitive research has also found that changes in neurocognitive functioning following family maltreatment make children more likely to become victims of their peers [?]. Therefore, bullying victimization in the peer system may be a potential consequence of emotional abuse from the family system during childhood.

Based on the above review, existing research has emphasized the associations between childhood emotional abuse and adolescent depressive symptoms and

bullying victimization, but several limitations remain. Most findings are based on static, discrete data from one or two time points [?, ?], which cannot reveal the dynamic mutual influences between variables over time [?]. In other words, how childhood emotional abuse as an early-life negative experience predicts the longitudinal development of depressive symptoms and bullying victimization during adolescence remains an important but unanswered developmental question.

1.3 The Relationship Between Bullying Victimization and Adolescent Depressive Symptoms

During adolescence, the expansion of social hierarchy consciousness [?] leads teenagers to use bullying as an instrumental strategy to enhance their social status [?], resulting in widespread bullying victimization. According to the interpersonal risk model for depression, bullying victimization, which represents negative peer relationships, is also associated with adolescent depressive symptoms. Individuals who experience bullying victimization similarly tend to develop more negative cognitive schemas and self-evaluations, thereby increasing their risk for depressive symptoms [?]. Furthermore, social rank theory posits that bullying victimization increases the likelihood of being evaluated as weak or incompetent [?]. This not only causes adolescents to lose important interpersonal relationships but also leads to social demotion (i.e., losing status within the original peer group and being excluded from it) [?]. The loss of relationships and social demotion are social stress factors emphasized by the interpersonal risk model as causes of depressive symptoms [?].

Correspondingly, longitudinal studies have identified longitudinal associations between bullying victimization and adolescent depressive symptoms. For instance, Cho et al. [?] found that bullying victimization and depressive symptoms showed a co-increasing trend between ages 12.5 and 14, with bullying victimization frequency at age 12.5 predicting depressive symptoms at age 16.8. Davis et al. [?] found that early bullying victimization experiences increased depression risk throughout middle school. Based on these findings, bullying victimization may be an interpersonal risk factor for adolescent depression. However, what remains unclear is how the developmental trajectory of bullying victimization dynamically relates to the developmental trajectory of depressive symptoms as time progresses during adolescence.

1.4 Joint Effects of Childhood Emotional Abuse and Adolescent Bullying Victimization on Depressive Symptom Development

The cumulative risk model posits that stressors from various sources may accumulate across an individual's lifespan, forming a composite of multiple risk factors that jointly increase the potential for more severe adverse outcomes [?]. Integrating this with the interpersonal risk model discussed above, this study proposes an integrated cumulative interpersonal risk model. This model suggests that interpersonal risk factors across relational systems (family and peer

systems) and developmental stages (childhood and adolescence) accumulate continuously throughout children's development, jointly increasing the likelihood of depressive symptoms. This perspective is supported by some empirical research. For example, Goemans et al. [?] found additive effects of childhood maltreatment and peer victimization on mental health outcomes. More targeted research has also shown that interpersonal risks related to family and peers (including parent-child attachment, parenting styles, peer acceptance and rejection, and peer victimization) contribute both uniquely and cumulatively to adolescent depression [?].

What remains unclear, however, is the specific pattern through which these two interpersonal risk factors—childhood emotional abuse and adolescent bullying victimization—jointly influence the long-term development of adolescent depressive symptoms. Understanding this is important as it helps reveal the complexity of how risk factors affect developmental outcomes. Therefore, a key objective of this study is to more precisely characterize the joint effect patterns of different interpersonal risk factors on the development of adolescent depressive symptoms. Based on an analysis of the developmental stage and relational domain characteristics of the two variables examined in this study, and integrating previous theoretical and empirical investigations of relationships among different interpersonal risk factors [?], we can hypothesize that childhood emotional abuse and adolescent bullying victimization may not only unfold sequentially from childhood to adolescence (accumulating over time) [?] but also interact to amplify each other's effects (accumulating in terms of effect magnitude) [?].

Accordingly, this study proposes two distinct model structures from the perspectives of temporal accumulation and effect accumulation. First, the sequential mediation model, which suggests that interpersonal risk factors for depression accumulate sequentially over time. It posits that early emotional abuse may indirectly increase adolescent depression risk by triggering more subsequent bullying victimization. Although direct empirical evidence for this hypothesized pattern is lacking, existing research indicates that childhood emotional abuse may be associated with subsequent bullying victimization [?, ?], and that bullying victimization is a known predictor of adolescent depression [?, ?]. These findings provide partial support for the plausibility of the sequential mediation model. Second, the enhanced moderation model, which suggests that interpersonal risk factors for depression accumulate through interactive effects. It proposes that childhood emotional abuse, as a typical early adverse experience, may amplify the impact of bullying victimization on adolescent depressive symptoms. This hypothesized pattern aligns with the vulnerability-stress model of depression [?] and is supported by some empirical evidence. For instance, Rousson et al. [?] found that the association between later stressful events and depression was stronger for individuals with a history of child maltreatment. It is worth noting that these two hypothesized models are not necessarily competitive and may both be supported. Conversely, if both models are falsified, it would suggest that the effects of childhood emotional abuse and adolescent bullying victimization on the development of adolescent depressive symptoms may be relatively

independent.

1.5 Current Study

Existing research and theories have emphasized the depressive risks of childhood emotional abuse and adolescent bullying victimization, but several details and theoretical questions require confirmation through longitudinal empirical studies: (a) Does childhood emotional abuse predict the developmental trajectories of bullying victimization and depressive symptoms during adolescence? (b) Do the developmental trajectories of bullying victimization and depressive symptoms show time-dependent correlations during adolescence? (c) What model structure characterizes how these two interpersonal risk factors—across relational systems (family and peer systems) and developmental stages (childhood and adolescence)—jointly influence the development of adolescent depressive symptoms?

In summary, this study integrates the interpersonal risk model and cumulative risk model for depression into a comprehensive cumulative interpersonal risk model. Based on this integrated model, we constructed sequential mediation and enhanced moderation models of how childhood emotional abuse and adolescent bullying victimization influence the development of depressive symptoms. We propose the following hypotheses: **H1**: Childhood emotional abuse significantly positively predicts both the initial intercept and growth slope of bullying victimization during adolescence; **H2**: Childhood emotional abuse significantly positively predicts both the initial intercept and growth slope of depressive symptoms during adolescence; **H3**: Both the initial intercept and growth slope of bullying victimization significantly positively predict the initial intercept and growth slope of depressive symptoms; **H4**: Bullying victimization plays a longitudinal mediating role in the relationship between childhood emotional abuse and the development of adolescent depressive symptoms (as shown in Model Figure 1 [Figure 1: see original paper]); **H5**: Childhood emotional abuse moderates the longitudinal association between bullying victimization and adolescent depressive symptoms (as shown in Model Figure 2 [Figure 2: see original paper]).

Note: T1, T2, and T3 represent measurement data at three different time points. For example, ‘T1 victimization’ refers to bullying victimization measured at Time 1. The same notation applies to other variables.

Figure 1 Hypothesized Sequential Mediation Model

Figure 2 Hypothesized Enhanced Moderation Model

2. Method

2.1 Participants

A total of 612 middle school students from a public school in Anhui Province, China participated in this study. They completed three waves of questionnaire surveys over a two-year period at Time 1 (T1: November 2022), Time 2 (T2: November 2023), and Time 3 (T3: November 2024). Since this study used

Bayesian methods for parameter estimation (which by default simulate posterior distributions of missing data through Markov Chain Monte Carlo methods to provide more accurate parameter estimates), we did not explicitly impute missing values or exclude participants during data preprocessing, except for those with missing data on the independent variable (childhood emotional abuse) (91 participants) [?]. The final sample retained 521 valid participants (retention rate = 85.13%).

All retained participants were adolescents aged 11-17 years (Mage = 13.83 years, SDage = 1.40), including 309 boys (59.31%) and 212 girls (40.69%). There were 337 middle school students (64.68%) and 184 high school students (35.32%).

Little's MCAR test for the missing data pattern was significant ($\chi^2 = 57.16$, $df = 20$, $p < 0.001$), indicating that data were not missing completely at random. Specific chi-square and t-test results showed no significant differences between retained and attrited participants in age at the first measurement ($t(610) = 0.75$, $p = 0.452$), gender ($\chi^2(1) = 0.01$, $p = 0.99$), or school level ($\chi^2(1) = 2.76$, $p = 0.097$). However, significant differences were found in bullying victimization ($t(610) = 2.12$, $p = 0.034$) and depressive symptoms ($t(610) = 2.72$, $p < 0.01$), indicating that attrited participants had lower levels of bullying victimization and depression than retained participants. Each survey was administered by trained psychology graduate students. This study was approved by the Academic Ethics and Moral Committee of Shanghai Normal University (Approval No. 2024146).

2.2 Measures

2.2.1 Childhood Emotional Abuse The brief screening version of the Childhood Trauma Questionnaire developed by Bernstein et al. [?] was used to retrospectively assess participants' perceived emotional abuse during childhood (e.g., during elementary school or earlier). The scale consists of five items measuring a single dimension (e.g., 'Someone in my family called me "stupid," "lazy," or "ugly"'). Items were rated on a 5-point Likert scale ranging from 0 = 'never' to 4 = 'almost always'. Across the three waves of the current sample, the Cronbach's alpha internal consistency coefficient for the childhood emotional abuse scale was 0.79. Confirmatory factor analysis indicated good model fit (CFI = 0.93, TLI = 0.86, SRMR = 0.04), demonstrating reliable and valid measurement of childhood emotional abuse.

2.2.2 Bullying Victimization The Olweus Child Bully/Victim Questionnaire, revised by Zhang and Wu [?], was used to measure the frequency of bullying victimization. The questionnaire includes six items (e.g., 'Some classmates give me insulting nicknames, swear at me, or tease and mock me'). Items were rated on a 5-point Likert scale ranging from 1 = 'never' to 5 = 'several times a week'. Across the three waves of the current sample, the Cronbach's alpha internal consistency coefficients for the Olweus Child Bully/Victim Questionnaire were 0.84, 0.85, and 0.79, respectively. Confirmatory factor analysis

indicated good model fit (T1: CFI = 0.94, TLI = 0.89, SRMR = 0.04; T2: CFI = 0.92, TLI = 0.96, SRMR = 0.06; T3: CFI = 0.94, TLI = 0.89, SRMR = 0.04), demonstrating reliable and valid measurement of adolescent bullying victimization.

2.2.3 Depressive Symptoms Depressive symptoms were assessed using the short version of the Center for Epidemiological Studies Depression Scale (CES-D), originally developed by Radloff [?] and simplified by Andresen et al. [?]. The CES-D consists of 10 items (e.g., ‘I felt that everything I did was an effort’). Items were rated on a 4-point Likert scale ranging from 0 = ‘rarely or none of the time’ to 3 = ‘most or all of the time’. Across the three waves of the current sample, the Cronbach’s alpha internal consistency coefficients for the short CES-D were 0.82, 0.83, and 0.84, respectively. Confirmatory factor analysis indicated good model fit (T1: CFI = 0.92, TLI = 0.89, SRMR = 0.06; T2: CFI = 0.94, TLI = 0.92, RMSEA = 0.10, SRMR = 0.06; T3: CFI = 0.90, TLI = 0.88, SRMR = 0.07), demonstrating reliable and valid measurement of adolescent depressive symptoms.

2.3 Data Processing and Analytic Strategy

SPSS version 26 was used for data management and descriptive analysis, while all other analyses were conducted using Mplus version 8. First, two latent growth curve models (LGCM) with time-invariant covariates were constructed to examine the longitudinal relationships between childhood emotional abuse and bullying victimization, and between childhood emotional abuse and depressive symptoms. Second, a parallel-process latent growth curve model (PP-LGCM) was constructed to investigate the longitudinal relationship between bullying victimization and depression during adolescence. Third, the PP-LGCM was combined with mediation analysis to examine the mediating role of bullying victimization in the relationship between childhood emotional abuse and depressive symptoms. In this model, childhood emotional abuse was treated as a time-invariant independent variable (as shown in Model Figure 1). Finally, latent moderated structural equations (LMS) were combined with LGCM to assess the moderating effect of childhood emotional abuse on the relationship between bullying victimization and depressive symptoms (as shown in Model Figure 2).

In the above analyses, participants’ gender and school level were included as control variables. The factor loadings for the intercept and slope of bullying victimization and depressive symptoms were set to 0, 1, and 2 (with equal intervals between the three measurement occasions). The original mean values were 1.21 for the initial intercept and 0.01 for the growth slope of bullying victimization, and 0.72 for the initial intercept and 0.09 for the growth slope of depressive symptoms. Given that Bayesian estimation offers several advantages over traditional methods—including greater accuracy (as evidenced by smaller absolute bias and better interval coverage), better performance with small sam-

ples, greater model flexibility, and higher convergence rates [?]-model testing followed the approach of Fang and Wen [?] and used Bayesian methods for parameter estimation. Convergence of Markov chains was indicated by a Potential Scale Reduction (PSR) value less than 1.025. Model fit was considered acceptable if the 95% confidence interval of the Posterior Predictive Checking (PPC) included zero [?].

2.4 Common Method Bias

Since this study collected data through self-report measures, it was necessary to test for common method bias. Harman's single-factor test was used to assess common method bias [?]. Results showed that the maximum factor variance explanation rate was 29.22%, which is below the general empirical standard of 40%. This indicates that no serious common method bias was present in this study.

3. Results

3.1 Descriptive Statistics and Correlations

The means, standard deviations, and correlation coefficients for all variables at each time point are presented in Table 1 . Results showed that, except for the correlation between bullying victimization at the first time point and depressive symptoms at the second and third time points, bullying victimization and depressive symptoms measured at each time point showed significant positive correlations ($r_s = 0.22-0.39$, $p_s < 0.001$). Childhood emotional abuse showed significant moderate positive correlations with bullying victimization and depressive symptoms across all three measurements ($r_s = 0.16-0.45$, $p_s < 0.001$).

Table 1 Means, Standard Deviations, and Correlation Coefficients of Variables Used in the Hypothesized Model

Note: Gender and school level are dummy variables (male = 1, female = 2; middle school = 1, high school = 2). 'T1 bullying victimization' refers to bullying victimization measured at Time 1, and other variables follow the same notation. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The same applies below.

3.2 Longitudinal Measurement Invariance Tests

Following Chen's [?] recommendations for measurement invariance testing, if the change in CFI between adjacent models is less than 0.010 and the change in RMSEA is less than 0.015, the more parsimonious model is supported. The study compared four nested models (configural, weak, strong, and strict invariance) for bullying victimization and depressive symptoms across the three measurement points. As shown in Table 2 , strong invariance was supported for both bullying victimization and depressive symptoms across time points. Therefore, the data for bullying victimization and depressive symptoms could be used for longitudinal analysis.

Table 2 Longitudinal Measurement Invariance Tests

3.3 Testing Longitudinal Relationships Between Childhood Emotional Abuse and Adolescent Outcomes

Two LGCMs with time-invariant covariates were used to examine the longitudinal relationships between childhood emotional abuse and bullying victimization, and between childhood emotional abuse and depressive symptoms. For the analysis of depressive symptoms, trace plots and PSR results (PSR = 1.01 at the 200th iteration reported by TECH8) indicated convergence of the Markov chain. The posterior predictive checking 95% CI [-17.97, 14.33] included zero, indicating good model fit. As shown in Figure 3 [Figure 3: see original paper], childhood emotional abuse was significantly positively associated with both the initial intercept ($\beta = 0.38$, $p < 0.001$, 95% CI [0.27, 0.49]) and growth slope ($\beta = 0.39$, $p < 0.001$, 95% CI [0.14, 0.68]) of adolescent depressive symptoms.

Figure 3 Predictive Effect of Childhood Emotional Abuse on Adolescent Depressive Symptoms

Note: All β values are standardized path coefficients; dashed lines indicate non-significant paths. For graphical simplicity, only key effect values are reported.

For the analysis of bullying victimization, trace plots and PSR results (PSR = 1.02 at the 1100th iteration reported by TECH8) indicated convergence of the Markov chain. The posterior predictive checking 95% CI [-16.00, 13.33] included zero, indicating good model fit. As shown in Figure 4 [Figure 4: see original paper], childhood emotional abuse was significantly positively associated with both the initial intercept ($\beta = 0.24$, $p < 0.001$, 95% CI [0.12, 0.37]) and growth slope ($\beta = 0.15$, $p = 0.002$, 95% CI [0.04, 0.27]) of bullying victimization.

Figure 4 Predictive Effect of Childhood Emotional Abuse on Adolescent Bullying Victimization

3.4 Testing the Longitudinal Relationship Between Bullying Victimization and Depressive Symptoms

A PP-LGCM was used to examine the longitudinal relationship between bullying victimization and adolescent depressive symptoms. The analysis showed that trace plots and PSR results (PSR = 1.02 at the 800th iteration reported by TECH8) indicated convergence of the Markov chain. The posterior predictive checking 95% CI [-2.95, 44.76] included zero, indicating good model fit. As shown in Figure 5 [Figure 5: see original paper], the initial intercept of bullying victimization was significantly positively associated with the initial intercept of depressive symptoms ($\beta = 0.68$, $p < 0.001$, 95% CI [0.56, 0.80]). The growth slope of bullying victimization was significantly positively associated with the growth slope of depressive symptoms ($\beta = 0.71$, $p < 0.001$, 95% CI [0.51, 0.91]). However, the initial intercept of bullying victimization was not significantly

associated with the growth slope of depressive symptoms ($\beta = -0.14$, $p = 0.119$, 95% CI [-0.36, 0.09]).

Figure 5 Longitudinal Association Between Bullying Victimization and Depressive Symptoms

3.5 Testing the Sequential Mediation Model

A PP-LGCM with childhood emotional abuse as the independent variable was used to test the mediating role of bullying victimization between childhood emotional abuse and adolescent depressive symptoms. The analysis showed that trace plots and PSR results (PSR = 1.02 at the 1200th iteration reported by TECH8) indicated convergence of the Markov chain. The posterior predictive checking 95% CI [-5.89, 45.47] included zero, indicating good model fit. As shown in Figure 6 [Figure 6: see original paper], childhood emotional abuse was significantly positively associated with the initial intercept ($\beta = 0.26$, $p < 0.001$, 95% CI [0.14, 0.38]) and growth slope ($\beta = 0.12$, $p = 0.019$, 95% CI [0.01, 0.24]) of bullying victimization. Childhood emotional abuse was also significantly positively associated with the initial intercept ($\beta = 0.19$, $p = 0.002$, 95% CI [0.07, 0.31]) and growth slope ($\beta = 0.27$, $p = 0.001$, 95% CI [0.09, 0.44]) of depressive symptoms. The initial intercept of bullying victimization was significantly positively associated with the initial intercept of depressive symptoms ($\beta = 0.61$, $p < 0.001$, 95% CI [0.47, 0.75]) and significantly negatively associated with the growth slope of depressive symptoms ($\beta = -0.25$, $p = 0.023$, 95% CI [-0.49, -0.01]). The growth slope of bullying victimization was significantly positively associated with the growth slope of depressive symptoms ($\beta = 0.59$, $p < 0.001$, 95% CI [0.39, 0.81]).

Figure 6 Results of Sequential Mediation Model Testing

As shown in Table 3, the mediation effect analysis revealed that the initial intercept of bullying victimization significantly mediated the relationship between childhood emotional abuse and the initial intercept of depressive symptoms ($\beta = 0.16$, $p < 0.001$, 95% CI [0.08, 0.25]). The growth slope of bullying victimization significantly mediated the relationship between childhood emotional abuse and the growth slope of depressive symptoms ($\beta = 0.07$, $p = 0.019$, 95% CI [0.01, 0.15]). However, the initial intercept of bullying victimization did not significantly mediate the relationship between childhood emotional abuse and the growth slope of depressive symptoms ($\beta = -0.07$, $p = 0.023$, 95% CI [-0.15, 0.01]).

Table 3 Results of Mediation Effect Testing

Note: ‘I’ in parentheses = Initial Intercept, ‘S’ in parentheses = Growth Slope. ‘Childhood emotional abuse \rightarrow bullying victimization (I) \rightarrow depressive symptoms (I)’ represents the mediating effect of the initial intercept of bullying victimization in the relationship between childhood emotional abuse and the initial intercept of depressive symptoms. The meaning of other paths in the table

can be understood by reference to this example. All β values are standardized path coefficients.

3.6 Testing the Enhanced Moderation Model

A moderated PP-LGCM was used to test the moderating effect of childhood emotional abuse on the relationship between bullying victimization and adolescent depressive symptoms. The analysis showed that for the baseline model without interaction terms, trace plots and PSR results (PSR = 1.02 at the 400th iteration reported by TECH8) indicated convergence of the Markov chain. However, the posterior predictive checking 95% CI [63.32, 114.25] did not include zero, indicating poor model fit. As shown in Figure 7 [Figure 7: see original paper], the initial intercept of bullying victimization was significantly positively associated with the initial intercept of depressive symptoms ($\beta = 0.61$, $p < 0.001$, 95% CI [0.48, 0.74]). The growth slope of bullying victimization was significantly positively associated with the growth slope of depressive symptoms ($\beta = 0.62$, $p < 0.001$, 95% CI [0.43, 0.83]). The interaction term between childhood emotional abuse and the initial intercept of bullying victimization was significantly negatively associated with the initial intercept of depressive symptoms ($\beta = -0.12$, $p = 0.014$, 95% CI [-0.21, 0.02]), but not significantly associated with the growth slope ($\beta = 0.06$, $p = 0.215$, 95% CI [-0.09, 0.21]). The interaction term between childhood emotional abuse and the growth slope of bullying victimization was not significantly associated with the growth slope of depressive symptoms ($B = -0.09$, $p = 0.08$, 95% CI [-0.21, 0.04]).

Figure 7 Results of Enhanced Moderation Model Testing

Note: ‘Childhood emotional abuse \times bullying victimization intercept’ represents the interaction term between childhood emotional abuse and the initial intercept of bullying victimization; ‘Childhood emotional abuse \times bullying victimization slope’ represents the interaction term between childhood emotional abuse and the growth slope of bullying victimization. For graphical simplicity, only key effect values are reported. All β values are standardized path coefficients.

4. Discussion

4.1 Childhood Emotional Abuse and Adolescent Depressive Symptoms

In this study, LGCM analyses revealed that childhood emotional abuse significantly positively predicted both the initial intercept and growth slope of adolescent depressive symptoms. This indicates that childhood emotional abuse not only leads to more depressive symptoms at the beginning of adolescence (initial intercept) but also contributes to a faster worsening trajectory of these symptoms over time (growth slope). These longitudinal findings provide empirical support for the interpersonal risk model of depression and highlight the delayed and long-term negative effects of childhood emotional abuse on children’s mental

health, addressing limitations of previous cross-sectional or discrete-time data in exploring the dynamic developmental associations between childhood emotional abuse and depressive symptoms [?, ?].

Schema theory provides a powerful explanatory framework for the long-term mechanisms through which childhood emotional abuse increases bullying victimization and depressive symptoms. It posits that the content of individuals' cognitive schemas is strongly influenced by early relationships with caregivers, and these schema beliefs, internalized from early experiences, become embedded in subsequent psychological development and influence its course [?].

Specifically, childhood emotional abuse as a typical negative early experience reflects caregivers' rejecting, demeaning, or humiliating attitudes toward children [?]. When caregivers consistently respond to children's emotional needs with abusive or harmful behaviors, these repeatedly reinforced negative attitudes become internalized as stable cognitive schemas, leading children to develop negative self-beliefs such as 'I am stupid,' 'I am worthless,' or 'I am unlovable' [?]. These negative self-schemas, solidified by early emotional abuse experiences, highly overlap with core depressive symptoms such as low self-esteem and feelings of worthlessness [?], thereby effectively predicting the severity of depressive symptoms in early adolescence. Furthermore, from a developmental psychopathology perspective, childhood emotional abuse may also impair the healthy development of key psychological functions such as self-identity [?] and emotion regulation [?]. Damage to these critical psychological functions makes children more vulnerable to adaptive problems in their ongoing interactions with the environment, thereby exacerbating the progression of depressive symptoms and demonstrating the long-term promoting effect of childhood emotional abuse on depressive symptom development.

4.2 Childhood Emotional Abuse and Adolescent Bullying Victimization

LGCM analyses also revealed that childhood emotional abuse was significantly positively associated with both the initial intercept and growth slope of bullying victimization during adolescence. This finding indicates that children who experienced more severe childhood emotional abuse not only suffered higher levels of bullying victimization at the beginning of adolescence (initial intercept) but also showed a faster increasing trend in victimization over time (growth slope).

These results are consistent with the cross-lagged findings of Liang et al. [?] regarding childhood emotional abuse and peer victimization, highlighting the cross-relational system and cross-developmental stage spillover effect of childhood emotional victimization. That is, victimization experiences in the family system during childhood spill over into the peer system during adolescence. This not only confirms the long-term and cross-contextual nature of early trauma experiences' impact on social adaptation but also provides new empirical evidence for understanding the dynamic association between family and peer systems.

From the perspective of attachment theory, childhood represents a critical period for early socialization, and the quality of interactions with significant family others plays a foundational role in the development of children's socio-emotional competencies [?]. Childhood emotional abuse, as a destructive early attachment experience, not only damages the formation of a secure base but also seriously hinders the normal development of interpersonal skills [?]. This developmental deficit tends to make individuals more susceptible to interpersonal conflicts in peer contexts outside the family system, thereby significantly increasing vulnerability to bullying victimization.

Further, from the perspective of cognitive schema theory, individuals who experience emotional abuse during childhood tend to develop maladaptive victim schemas characterized by self-vulnerability and interpersonal threat [?]. These schemas manifest in interpersonal interactions as prominent over-compliance, social withdrawal tendencies, and low self-efficacy—psychological and behavioral characteristics that align closely with typical criteria used by bullies to select victims [?]. This makes children who experienced emotional abuse more likely to be selected as bullying targets. Additionally, adolescence is a critical period for peer relationship restructuring and group status differentiation, during which teenagers are more likely to use bullying as a means to enhance and maintain group status [?]. The interaction between these negative cognitive-behavioral patterns formed through early abuse experiences and the developmental socio-ecological characteristics of adolescence ultimately leads to the cross-system, cross-stage spillover negative developmental effect of childhood emotional abuse—namely, the longitudinal trajectory of bullying victimization during adolescence.

4.3 Bullying Victimization and Adolescent Depressive Symptom Development

The analysis of bullying victimization and depressive symptoms found that both the initial level and growth slope of adolescent bullying victimization significantly positively predicted the initial level and growth slope of depressive symptoms. This result indicates a high degree of dependency between the development of bullying victimization and depressive symptoms during adolescence. Bullying experiences not only affect early depressive symptoms (initial intercept) but also dominate the subsequent dynamic developmental trend of depressive symptoms (growth slope), providing important longitudinal evidence for the interpersonal risk model of depression.

The predictive effect of the growth slope of bullying victimization on the growth slope of depressive symptoms deserves particular attention, as it suggests a long-term cascading effect of bullying experiences on depression development [?]. This effect may stem from two sources:

First, from the perspective of social motivation theory, bullying victimization hinders the fulfillment of adolescents' need for social belonging. Adolescence

is a critical developmental stage characterized by significantly enhanced peer attachment, during which teenagers place great importance on integrating into peer groups [?]. However, being bullied disrupts previously harmonious interpersonal patterns and emphasizes the presence of conflictual interactions [?], causing adolescents' fundamental need for social belonging to be continuously frustrated. This lack of social belonging is significantly positively associated with depression risk [?], constituting a potential risk factor for depressive symptom development.

Second, from the perspective of social rank theory, bullying victimization undermines the fulfillment of adolescents' need for positive social evaluation. During adolescence, with the expansion of social hierarchy consciousness, teenagers develop a psychological need to obtain and maintain high social evaluation among peers [?]. However, bullying experiences often lead individuals to be labeled as 'weak' or 'losers' within the peer group [?]. This evaluative demotion within the peer group tends to increase adolescents' risk for depression associated with social withdrawal [?].

4.4 Joint Effects of Childhood Emotional Abuse and Adolescent Bullying Victimization

This study also found that childhood emotional abuse and bullying victimization had joint effects on the longitudinal development of adolescent depressive symptoms, manifesting as a sequential mediation pattern rather than an enhanced moderation pattern. Specifically, childhood emotional abuse can indirectly promote the temporal accumulation of interpersonal risk factors by accelerating the development of bullying victimization during adolescence, thereby exerting a sustained impact on the worsening of adolescent depressive symptoms. However, the study did not find a longitudinal interaction effect between childhood emotional abuse and bullying victimization in terms of effect magnitude. This indicates that the influence of emotional abuse and bullying victimization on adolescent depressive symptoms operates through sequential mediating mechanisms over time rather than through interactive effects.

For the sequential mediation model, it reveals the longitudinal dynamic process of adolescent depression development, emphasizing the temporal accumulation effect of depressive risk factors in different interpersonal systems. Specifically, distant childhood emotional abuse (an interpersonal risk factor in the childhood family system) can accelerate adolescent depression development by promoting the emergence and exacerbation of proximal adolescent bullying victimization (an interpersonal risk factor in the peer system). Combined with the theoretical analysis above, it can be speculated that childhood emotional abuse may increase bullying victimization during adolescence by disrupting the development of normal social skills [?] and promoting the formation of maladaptive victim schemas [?], which in turn hinders the fulfillment of needs for social belonging [?] and maintaining positive social evaluation and status [?], thereby indirectly promoting and accelerating the emergence and development of depressive symp-

toms.

This finding validates and extends both the cumulative risk model and the interpersonal risk model for depression. Traditional cumulative risk models focus only on the dose-effect of risks experienced by individuals at developmental cross-sections [?], while interpersonal risk models focus only on the mechanisms through which interpersonal factors affect depression [?]. Neither deeply reveals the joint effects of multiple risk factors and their longitudinal impact on individual development. The cumulative interpersonal risk model constructed based on the sequential mediation pattern in this study not only reveals the independent effects of different interpersonal risk factors on adolescent depression development but also emphasizes the cross-temporal joint effects of interpersonal risk factors across relational domains. It demonstrates that early interpersonal risk factors can form a chain reaction of risk accumulation over time, indirectly exacerbating adolescent depression development by increasing the emergence of subsequent interpersonal risk factors in other domains.

For the enhanced moderation model, it was not supported in terms of longitudinal development (growth slope), indicating that the exacerbation of childhood emotional abuse and adolescent bullying victimization did not produce a significant synergistic enhancement effect in predicting the developmental trajectory of adolescent depressive symptoms. From the perspective of developmental cascade theory [?], this may be because although both childhood emotional abuse and adolescent bullying victimization are negative interpersonal experiences, their mechanisms of influence on depression development may differ. As analyzed previously, childhood emotional abuse primarily affects the development of individuals' self-cognition [?, ?], while adolescent bullying victimization more strongly influences social cognition [?, ?]. This difference in mechanisms may prevent the two risk factors from producing synergistic enhancement effects.

However, the enhanced moderation model at the initial intercept showed that childhood emotional abuse could interact with the initial intercept of bullying victimization to influence the initial intercept of depressive symptoms, with childhood emotional abuse weakening the effect of adolescent bullying victimization' s initial intercept on the initial intercept of depressive symptoms—contrary to the 'enhanced moderation' hypothesis. From the perspective of resiliency theory, this reverse moderation effect may reflect complex mechanisms of post-traumatic adaptation. Specifically, childhood emotional abuse as an early trauma may form a trauma-adapted state (such as emotional numbing) through a form of 'psychological inoculation,' thereby creating a degree of 'immunity' to subsequent traumatic events (such as bullying victimization) [?]. In other words, the effects of childhood emotional abuse occur first, creating more severe initial depressive symptoms, which then weaken the additional impact of adolescent bullying victimization on initial depressive symptoms. However, the differential effects of the enhanced moderation model on growth slope versus initial intercept indicate that this 'immunity' effect is limited. If bullying victimization during adolescence continues to worsen, the immunizing effect

caused by childhood emotional abuse becomes dysregulated and cannot inhibit the continued development of depressive symptoms. This finding provides a new perspective for understanding the complex effects of early trauma experiences: although early trauma may bring some form of short-term adaptation, this adaptation may come at the cost of long-term mental health.

4.5 Contributions and Limitations

At the theoretical level, this study found that two types of interpersonal risk factors (childhood emotional abuse and adolescent bullying victimization) not only independently influence the development of adolescent depressive symptoms but also jointly affect adolescent depressive symptoms through sequential mediation. These conclusions extend the interpersonal risk model and cumulative risk model for depression into a cumulative interpersonal risk model, and identify the longitudinal effect pattern of interpersonal risk factors across developmental stages and relational systems on adolescent depression as sequential mediation rather than enhanced moderation. At the practical level, these findings emphasize the timeliness and multi-level nature of interpersonal risk intervention and depression prevention, suggesting that particular attention should be paid to the prevention and mitigation of early depressive risk factors to avoid the accumulation of risks over long-term development that could lead to more serious mental health problems.

Despite these contributions, this study has several limitations. First, although the study tracked the development of participants' depressive symptoms over a relatively long period (2 years), the sample size was limited, which weakens the external validity of the findings. Future research could expand the sample size and diversify the sample composition in terms of age, region, socioeconomic status, and other demographic characteristics to enhance the stability and generalizability of the results. Second, the childhood emotional abuse examined in this study was based on retrospective self-reports. Although this data collection method has been commonly used in previous research [?, ?], it cannot clearly establish temporal precedence between variables. Future studies could adopt longer-term prospective tracking to compare the longitudinal effects of different types of childhood maltreatment on adolescent depressive symptoms.

In summary, this study found that two interpersonal risk factors across relational systems and developmental stages (childhood emotional abuse and adolescent bullying victimization) not only independently predict the development of adolescent depressive symptoms but also exert joint effects, primarily manifested as a longitudinal sequential mediation pattern (rather than an enhanced moderation pattern). Specifically, childhood emotional abuse can indirectly promote the temporal accumulation of interpersonal risk factors by exacerbating bullying victimization during adolescence, thereby exerting a sustained impact on the worsening of adolescent depressive symptoms. However, childhood emotional abuse does not form a longitudinal interaction with adolescent bullying victimization in terms of effect magnitude to accelerate the development of ado-

lescent depressive symptoms.

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