

Relative deprivation as a mechanism underlying the relation between child maltreatment and adolescents' non-suicidal self-injury urges

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ABSTRACT

Background and objective: Given the high co-occurrence of various forms of childhood maltreatment (CM) and its negative effects on non-suicidal self-injury (NSSI) urges, investigating the mechanism between multiple CM and NSSI urges is crucial.

Participants and setting: Study 1 (a cross-sectional study) recruited 5181 adolescents from China ($M_{age} = 16.10$, $SD = 1.42$). In Study 2, a subset of Study 1 (1564 adolescents, $M_{age} = 15.80$, $SD = 1.44$) was tracked three times (T1: June 2023, T2: November 2023, T3: April 2024) to further explore the potential causal relationships among variables.

Methods: Latent profile analysis (LPA) was used to explore the potential profiles based on different types of CM. Then, a mediation model was constructed to explore the mediating role of relative deprivation between profiles of CM and NSSI urges. All variables were assessed using self-report questionnaires.

Results: Three subgroups were identified: low CM, high emotional neglect, and high CM groups. Study 2 confirmed the results of Study 1 that relative deprivation (T2) mediates the association between subgroups and NSSI urges (T3). Compared to the low CM group, the mediating effect via relative deprivation is 0.39 (95 %CI = [0.20, 0.62]), 0.49 (95 %CI = [0.20, 0.83]) in the high emotional neglect and high CM groups, respectively.

Conclusions: This study highlights the importance of using a person-centered approach to consider the heterogeneity of subgroups based on CM in understanding NSSI urges. It suggests that experiencing CM has a multifaceted negative effect on adolescents and exacerbates urges involving NSSI by inducing relative deprivation.

1. Introduction

Non-suicidal Self-injury (NSSI) is defined as the intentional and direct harm to one's own body tissue without suicidal intent (Nock,

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2010). Individuals who engage in NSSI often exhibit a higher prevalence of mental disorders (i.e., depression, bipolar disorder, anxiety), increased interpersonal problems, and even more suicidal ideation and behaviors (Franklin et al., 2017; Plener et al., 2018). With rapid socioeconomic development and growing competitive pressures of China, mental health problems have become increasingly prominent. Adolescents are in a critical developmental stage characterized by physical and cognitive maturation, as well as significant hormonal fluctuations, all of which frequently contribute to mental health challenges (Kundakovic & Rocks, 2022). Furthermore, recent epidemiological evidence indicates that 24.7 % of Chinese adolescents engage in NSSI during their lifetime (Qu et al., 2023). This strikingly high prevalence not only underscores the severity of this public health issue but also calls for attention from researchers and clinicians alike.

According to the ideation-to-action theory, the transition from ideation to actual behavior is not instantaneous but rather unfolds gradually (Klonsky et al., 2018). Consequently, it is an opportune window to implement preventive measures when the idea of engaging in NSSI arises in order to mitigate NSSI behaviors among adolescents. NSSI urges, which refer to a strong desire to engage in NSSI, serve as a crucial potential predictor of NSSI behavior both longitudinally and within everyday life (Hepp et al., 2021; Turner et al., 2019). Studying NSSI urges—rather than enacted behaviors—offers a novel preventive advantage by identifying modifiable targets before harm occurs, while also uncovering unique psychological processes that are inaccessible when studying NSSI behavior. Moreover, targeting NSSI urges to prevent individuals from NSSI behavior was confirmed to be an effective way (Hepp et al., 2021). Hence, investigating the potential influencing factors and the mechanisms of NSSI urges holds significant importance in the endeavor to prevent adolescents from engaging in NSSI behaviors.

1.1. The relationship between childhood maltreatment profiles and NSSI urges

Childhood maltreatment refers to all types of neglect or abuse by caregivers, and 30.8 % of the participants reported experiencing at least one type of CM (Brown et al., 2018). Thus, it is necessary to treat CM as a multidimensional construct across various dimensions rather than treating the effects of different dimensions separately. Recent studies have identified meaningful subgroups of CM, such as a poly-victimized and a low abuse group (Debowska et al., 2017). However, emerging evidence suggests the poly-victimized population comprises distinct subgroups, notably a rare high neglect and abuse subgroup (Davis et al., 2018; Ye et al., 2024) and a neglect-dominant subgroup (Cohen et al., 2017; Warmingham et al., 2019). While the neglect-dominant subgroup has been reliably identified in sample of Chinese primary school students (Shen et al., 2024), it remains conspicuously absent in a sample of Chinese middle school students (Zhang et al., 2022). The absence of neglect-dominant profiles contrasts with many Chinese parents emphasizing academic achievement over emotional support (Mi-lan et al., 2021). Moreover, the heterogeneity of profiles in Chinese samples persists as an unresolved issue, let alone their differential effects on NSSI urges.

According to the Life History Theory (Griskevicius et al., 2011), individuals need to make trade-offs between present resource consumption and future resource availability when the total amount of resources remains relatively constant. Especially, when the living environment is harsh, individuals are more likely to discount the future to meet immediate survival needs (Feng et al., 2024). Adolescents who experienced CM may find it difficult to consider the potential long-term consequences of self-injury when confronted with intense negative emotions. Instead, they focus on the present and resort to self-injury as a means to rapidly alleviate overwhelming distress. Moreover, lots of studies have demonstrated that adolescents who experienced CM showed higher levels of NSSI urges and engagement in NSSI behavior (Serafini et al., 2017; Taillieu et al., 2016).

1.2. The potential mechanism of relative deprivation

Relative deprivation refers to a series of cognitive and affective processes, including making cognitive comparisons with oneself or one's ingroup, perceiving a disadvantaged position after cognitive appraisals (Pettigrew, 2016; Smith et al., 2012). According to the Relative Deprivation Theory, adolescents who experience CM are particularly susceptible to developing feelings of relative deprivation (Crosby, 1976; Li et al., 2023). Firstly, adolescents inherently require parental love and perceive positive parent-child relationships as feasible. Secondly, contemporary legal frameworks establish caregivers' statutory obligations to provide proper upbringing for adolescents, wherein the occurrence of maltreatment reflects caregivers' failure to fulfill their mandated duties rather than any culpability on the part of the adolescent. Thirdly, research had confirmed that maltreated adolescents are less likely to receive consistent support from their caregivers (Bowlby, 1982; Brown et al., 2018), which is critical for developing social skills and connections (Bowlby, 1982; Wills et al., 2014). Consequently, these adolescents may perceive unfair disadvantages when compared to peers with nurturing and supportive parenting. Consequently, adolescents may engage in relative deprivation after cognitive comparisons, as evidenced by recent research (Li et al., 2023).

Experiencing relative deprivation is typically accompanied by elevated aggressive affect and increased aggressive behaviors (Greitemeyer & Sagioglou, 2017). Adolescents who experienced relative deprivation may direct their aggression toward themselves, leading to mental health issues. Evidence suggested that relative deprivation could predict self-rated mental health, and was associated with elevated suicide rates (Ayton et al., 2003; Kim, 2021; Zhao et al., 2023). Moreover, such negative social comparison is associated with higher impulsivity and more risky behaviors (Mishra & Carleton, 2015; Mishra & Novakowski, 2016). When facing negative emotions, individuals may be urged to alleviate them, which can lead to a heightened propensity to engage in NSSI (Wei et al., 2017). However, direct evidence linking relative deprivation to NSSI urges is lacking, but the cumulative evidence discussed above suggests that relative deprivation may be positively associated with NSSI urges and highlights relative deprivation as a potential mechanism through which CM predicts NSSI urges.

1.3. The current study

While evidence on CM profiles in Chinese adolescents remains inconsistent, even less is known about their differential effects on NSSI urges and the mechanisms underlying these relationships. Thus, two studies were conducted: Study 1 employed a cross-sectional design to: (1) identify latent profiles of CM exposure, and (2) examine whether relative deprivation mediates the relationship between these CM profiles and NSSI urges. Building on these findings, Study 2 utilized a three-wave longitudinal design (with baseline, 5-month, and 10-month follow-ups) in a subsample of Study 1 participants to establish temporal precedence and strengthen causal inferences regarding these relationships. Specific hypotheses are as follows: Hypothesis 1: Beyond a generalized high-maltreatment profile, we expected to identify a distinct neglect-dominant profile characterized by elevated neglect; Hypothesis 2: Adolescents in higher severity CM profiles would report higher relative deprivation they perceived and the higher intensity of NSSI urges they experienced compared to those in lower severity profiles; Hypothesis 3: Relative deprivation would significantly mediate the relationship between CM profiles and NSSI urges in both studies.

2. Study 1

2.1. Methods

2.1.1. Data source and participants

Three urban regions in China (i.e., Jiaxing, Zhejiang Province, Lishui Zhejiang Province, and Jieshou, Anhui Province) were selected based on their descending gradient in household economic income. The present study recruited adolescents from three locations in China. Given that a substantial proportion of Chinese students enroll in skill-oriented vocational high schools, participants from both general middle high schools and vocational high schools were included to ensure comprehensive representation. Then, two middle high schools in Jieshou ($n = 2782$); a vocational high school in Jiaxing ($n = 1467$); and a vocational high school in Lishui ($n = 2349$) were included. A total of 6598 participants were recruited, but 5181 participants (52.21 % males, the age range is from 12 to 20, $M_{age} = 16.10$, $SD = 1.42$) were included in the final analysis. The remaining 1417 participants were excluded for failing the attention check question (i.e., please select the option of “strongly agree”). After obtaining informed consent from adolescents, teachers, and parents, students completed online questionnaires in their classrooms. Sexual abuse questions were excluded given the adolescent study population. Additionally, approximately 60 % of adolescents’ parents had educational attainment below high school level, while roughly 50 % of adolescents reported a monthly household income between ¥5000 and ¥10,000. Detailed demographic characteristics are presented in Table 1.1. The present study was approved by the Ethics Committee of Shanghai Normal University.

2.1.2. Measures

2.1.2.1. Childhood maltreatment. Childhood maltreatment was measured with four subscales (i.e., emotional abuse, physical abuse, emotional neglect, and physical neglect) according to Taillieu et al. (2016). The emotional abuse subscale consists of 3 items (e.g., “As a child, how often did a parent, stepparent, or adult living in your home swear at you or insult you”). The physical abuse subscale consists of 2 items (e.g., “As a child, how often were you ever pushed, grabbed, shoved, slapped, or hit by your parents or any adult living in your house?”). The emotional neglect subscale includes 5 items (e.g., “As a child, my family was a source of strength or support”). The physical neglect includes 4 items (e.g., “I have been made to go hungry or did not have regular meals prepared”) (Taillieu et al., 2016). Participants who are over the age of 18 were instructed to retrospectively report experiences of childhood maltreatment prior to their 18th birthday, while participants under the age of 18 were asked to report any instances of childhood maltreatment they had experienced in their lives up to that point. All the items were measured on a 5-point scale (never, almost never, sometimes, fairly often, and very often). The scale demonstrated acceptable internal consistency across its four dimensions (emotional abuse: $\alpha = 0.86$; physical abuse: $\alpha = 0.76$; emotional neglect: $\alpha = 0.86$; physical neglect: $\alpha = 0.86$) and good construct validity as evidenced by confirmatory factor analysis results (RMSEA = 0.06, CFI = 0.99, TLI = 0.98) in this sample.

2.1.2.2. Relative deprivation. Relative deprivation was measured by the adolescents’ relative deprivation scale, which was specifically developed for Chinese adolescents (Tian et al., 2021). The scale contains two subscales (cognitive and emotional relative deprivation),

Table 1.1
Detailed demographic characteristics ($N = 5181$).

Variables	n%
FEL _(L1-L4)	63.96/ 26.67 / 8.43/ 0.93
MEL _(L1-L4)	68.67/ 23.18/ 7.43/ 0.71
Income _(L1-L4)	23.62/ 50.18/ 20.38/5.81

Note: FEL: Fathers’ Education level; MEL: Mothers’ Education level; Education level: L1: Below high school, L2: High school diploma, L3: Associate degree/ Bachelor’s degree, L4: Graduate degree (Masters or PhD); Income: L1: Less than ¥5000, L2: ¥5000 - ¥10,000, L3: ¥10,000 - ¥20,000, L4: More than ¥20,000.

which showed adequate reliability and validity among Chinese adolescents (Tian et al., 2021; Tian et al., 2025). Each subscale consists of 5 items, corresponding to relative deprivation caused by adolescents' unfavorable status in five aspects: peer relationship, family economic, academic performance, interest development opportunities, and pocket money. Adolescents reported the cognitive (e.g., "Compared to my peers, they achieve significantly better academic performance than I do") and emotional (e.g., "Compared to my peers, I am frustrated that they achieve significantly better academic performance than I do") relative deprivation experienced. All 10 items were measured on a 5-point scale from 1 (strongly disagree) to 5 (strongly agree), and a higher total score means feeling more relative deprivation. The scale showed good internal consistency ($\alpha = 0.87$) and construct validity (RMSEA = 0.06, CFI = 0.99, TLI = 0.99) in this sample.

2.1.2.3. Non-suicidal self-injury urges. Non-suicidal self-injury urges were measured using the Alexian Brothers Urge to Self-Injure Scale (ABUSI, Washburn et al., 2010). The frequency, intensity, and duration of the urge to self-injury, the difficulty of resisting self-injury urges, and the overall urge to engage in self-injury in a prior week (e.g., "at the most severe point, how strong was your urge to self-injure in the last week?") were measured by 5 items. All items were measured on a 7-point scale, with higher overall scores indicating greater intensity and frequency of self-injury. The scale showed excellent internal consistency ($\alpha = 0.92$) and construct validity (RMSEA = 0.04, CFI = 0.99, TLI = 0.99) in the present study.

2.1.3. Data analysis

Harman's one-factor test was used to examine common method bias (Podsakoff et al., 2003). The results showed that there were seven common factors with eigenvalues higher than 1, and that the first factor only explained 26.41 % of the variance, less than the threshold of 40 %. Hence, there is no significant common method bias in this study.

To explore the specific profiles of CM (Hypothesis 1), latent profile analysis (LPA) was carried out using Mplus 8.0 to identify potential subgroups based on the scores of emotional and physical abuses, emotional and physical neglect. Maximum likelihood estimation was used to estimate the optimal number of profiles. The model fit indices included the Akaike information criterion (AIC), the Bayesian information criterion (BIC), and the adjusted BIC (aBIC), with a lower value indicating a better model fit (Nylund et al., 2007). The Vuong-Lo-Mendell-Rubin likelihood ratio test (VLMR) and the parametric bootstrapped likelihood ratio test (BLRT) were used to evaluate whether an N-profile model fits better than an (N-1)-profile model (McLachlan, 1987). The entropy was used to assess the accuracy of classification, with the value greater than 0.80 indicating the classification accuracy with more than 90 % (Lubke & Muthén, 2007).

To characterize the identified profile and examine Hypothesis 2, the descriptive statistics and bivariate Spearman correlations for the variables were conducted with SPSS 23.0. Because the variable distributions violated the normality assumption, we conducted bootstrap based one-way ANOVA with 5000 resamples in SPSS 23.0. All reported *M* and *SD* for continuous variables were derived from bootstrap-adjusted estimates in both studies. Post hoc comparisons were conducted using bias-corrected and accelerated (BCa) 95 % confidence intervals (CIs) with Bonferroni adjustment for multiple comparisons. This approach was selected due to its demonstrated robustness to violations of distributional assumptions (Berge et al., 2023; Krishnamoorthy et al., 2007).

To examine the hypothesis 3, the mediation effect of relative deprivation between latent profiles which was operationalized as a categorical variable through dummy coding and NSSI urges was analyzed with Model 4 (i.e., the basic mediation model, CM profiles → relative deprivation → NSSI urges) of the PROCESS macro (Hayes, 2012) in SPSS 23.0. Given that relative deprivation is influenced by individuals' socioeconomic status, the present study treats sex assigned at birth, age, parental education level and monthly household income (ordinal variable) as control variables in the mediation analyses. Additionally, since the present study did not focus on the effect of school type, school type was also treated as a covariate in the mediation analyses. The present study calculated 95 % CIs for all mediation effects using 5000 bootstrap resamples, an approach that is robust to violations of distributional assumptions.

2.2. Results

2.2.1. Latent profiles identified by LPA

As shown in Table 1.2, a three-profile solution demonstrated relatively lower fit indices (i.e., AIC, BIC, and aBIC values) and a higher entropy, indicating a better model fit. Fig. 1 shows the mean values of four CM subscales across the three latent profile groups. Profile 1 ($n = 4116$) was labeled as the low CM group and represented 79.44 % of the present sample, with the lowest score across all dimensions. Profile 2 ($n = 851$) was labeled as the high emotional neglect group and represented 16.43 % of the present sample, with elevated scores in the emotional neglect dimension. Profile 3 ($n = 214$) was labeled as the high CM group and represented 4.13 % of the present sample, with the highest score across all dimensions.

Table 1.2
Potential profile model fit indices of childhood maltreatment ($N = 5181$).

Cluster	AIC	BIC	aBIC	Entropy	LMR _(p)	BLR _(p)	Proportion. Min
1-cluster	1,101,269.30	1,101,321.72	1,101,296.30				
2-cluster	940,726.60	994,157.79	94,116.48	0.96	<0.001	<0.001	0.88/0.12
3-cluster	91,196.42	91,314.37	91,257.17	0.98	<0.001	<0.001	0.7944/0.1643/0.0413
4-cluster	88,291.39	88,442.11	88,369.02	0.99	<0.001	<0.001	0.79/0.12/0.06/0.03

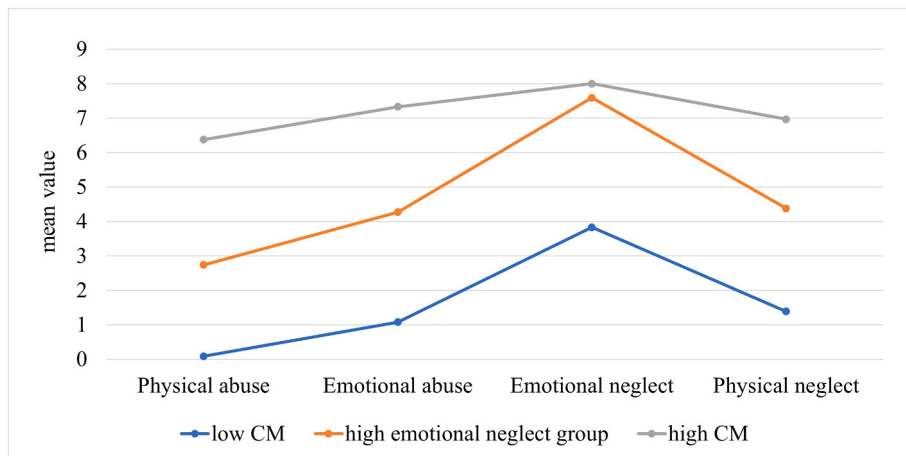


Fig. 1. The three-latent-profile model based on responses to CM items in Study 1.

2.2.2. Sample characteristics

Differences in demographics, CM, relative deprivation, and NSSI urges across the latent subgroups are presented in Table 1.3. Both high emotional neglect and high CM groups showed higher level of emotional neglect. Regarding emotional and physical abuse, physical neglect, relative deprivation, and NSSI urges, the high CM group exhibited the highest levels, followed by the high emotional neglect group, and the low CM group demonstrated the lowest levels.

2.2.3. Profiles of CM and NSSI urges: the mediating role of relative deprivation

The descriptive statistics are shown in Table 1.4. The results of mediation analysis were presented in Fig. 2 (statistical details summarized in Supplementary Table 1), with the low CM as the reference group. The results showed that the high emotional neglect group and the high CM group had a 3.23-point and 7.05-point increases in NSSI urges (95 % CIs [2.89, 3.58], [6.42, 7.69], respectively) compared to the low CM group. After including relative deprivation, the association between NSSI urges and (a) the high emotional neglect group and (b) the high CM group decreased from 3.23 to 2.79 (95 % CI [2.45, 3.13]) and 7.05 to 6.04 (95 % CI [5.40, 6.67]), respectively. The effect size for the relative deprivation-NSSI urges pathway was 1.47 (95 % CI [1.24, 1.69]). The high emotional neglect group and the high CM group had a 0.30-point and 0.69-point increases in relative deprivation compared to the low CM group (95 % CIs [0.25, 0.35], [0.58, 0.80], respectively). The indirect effects of (a) high emotional neglect and (b) high CM on NSSI urges through relative deprivation were 0.44 (95 % CI [0.35, 0.55]) and 1.01 (95 % CI [0.79, 1.27]), respectively.

2.3. Discussion

Three CM profiles of adolescents were identified with LPA: the high CM group (4.13 %) showing the highest levels across four dimensions (i.e., emotional and physical abuse, and emotional and physical neglect), and the high emotional neglect group (16.43 %) and the low CM group (79.44 %) followed. In addition, the present study also found that with the severer CM adolescents experienced, the higher relative deprivation they felt and the higher intensity of NSSI urges they experienced. Moreover, utilizing cross-sectional

Table 1.3

Sample characteristics ($M \pm SD$ or $n\%$) of three latent groups in Study 1.

	Low CM (n = 4116, 79.44 %)	High emotional neglect (n = 851, 16.43 %)	High CM (n = 214, 4.13 %)	F/ χ^2	Post hoc analysis
Sex (F/M)	2120/ 1996	459/ 392	126/ 88	4.28	
Age	16.10 $\pm$ 1.39	16.27 $\pm$ 1.33	15.44 $\pm$ 2.02	29.13***	2 > 1 > 3
School types _(V/M) #	0.49/ 0.51	0.26/ 0.74	0.55/ 0.45		
Income _(L1-L4)	0.23/ 0.50/ 0.21/ 0.06	0.26/ 0.51/ 0.17/ 0.05	0.21/ 0.51/ 0.18/ 0.10	1.67	1, 2, 3
FEL _(L1-L4)	0.64/ 0.27/ 0.08/ 0.01	0.63/ 0.26/ 0.10/ 0.01	0.61/ 0.25/ 0.09/ 0.05	19.35**	14: 3 > 2 & 1
MEL _(L1-L4)	0.69/ 0.23/ 0.07/ <0.01	0.69/ 0.23/ 0.08/ 0.01	0.62/ 0.22/ 0.11/ 0.05	23.47***	14: 3 > 2 & 1
relative deprivation	2.67 $\pm$ 0.70	3.03 $\pm$ 0.63	3.33 $\pm$ 0.89	157.25***	3 > 2 > 1
Physical abuse	0.09 $\pm$ 0.29	2.74 $\pm$ 0.90	6.38 $\pm$ 1.21	23,213.07***	3 > 2 > 1
Emotional abuse	1.08 $\pm$ 1.83	4.27 $\pm$ 2.77	7.33 $\pm$ 3.98	1494.80***	3 > 2 > 1
Emotional neglect	3.83 $\pm$ 4.29	7.59 $\pm$ 4.61	8.00 $\pm$ 5.29	318.63***	3 & 2 > 1
Physical neglect	1.39 $\pm$ 2.21	4.38 $\pm$ 3.19	6.97 $\pm$ 5.08	852.44***	3 > 2 > 1
NSSI urges	2.26 $\pm$ 3.94	5.48 $\pm$ 5.93	9.35 $\pm$ 9.32	365.71***	3 > 2 > 1

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. #V = vocational high school, M = middle high school.

Table 1.4

Spearman correlations, means, and standard deviations for main variables in Study 1.

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
Sex	0.52	0.50	1											
Age	16.10	1.42	−0.02	1										
School type	0.55	0.49	<0.01	0.41***	1									
FEL	1.46	0.69	0.03*	−0.01	0.08***	1								
MEL	1.40	0.66	0.04*	−0.01	0.12***	0.53***	1							
Income	2.08	0.82	−0.10***	−0.04**	0.01	0.17***	0.17***	1						
Physical abuse	0.79	1.60	−0.02	<0.01	0.14***	0.01	0.03	−0.02	1					
Emotional abuse	1.86	2.70	−0.03*	−0.02	0.08***	−0.01	> −0.01	−0.03*	0.56***	1				
Emotional neglect	4.29	4.62	0.09***	0.04**	0.18***	−0.03*	−0.03*	−0.08***	0.34***	0.38***	1			
Physical neglect	2.11	2.98	0.03*	0.06***	0.17***	−0.01	0.02	−0.06***	0.45***	0.38***	0.35***	1		
Relative deprivation	2.76	0.72	0.02	0.07***	0.18***	−0.04**	−0.04**	−0.12***	0.26***	0.28***	0.28***	0.31***	1	
NSSI urges	3.07	4.98	−0.19***	−0.07***	−0.05***	−0.02	−0.01	−0.04**	0.31***	0.39***	0.23***	0.25***	0.24***	1

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Gender was dummy coded such that 0 = female (47.79 %) and 1 = male (52.21 %).

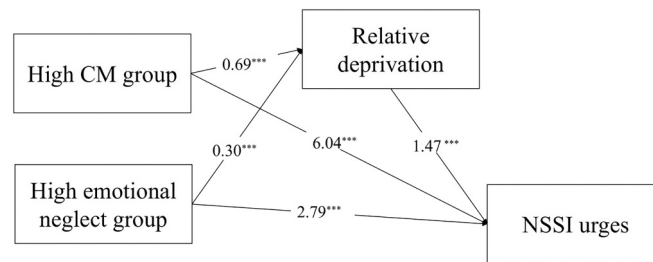


Fig. 2. The mediation model pathways, with the low CM group as the reference group in Study 1. Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

data, the present study provides initial evidence that relative deprivation is a mechanism underlying the relationship between CM and NSSI urges. In Study 2, a three-wave longitudinal design (with five-month intervals) was implemented to strengthen causal inferences among variables.

3. Study 2

3.1. Methods

3.1.1. Data source and participants

Building upon the mediation model in Study 1, a subset of students selected for feasibility from Study 1 were longitudinally tracked at three time points with 5-month intervals to further explore the causal relationships among variables. The procedure of data collection procedure was similar to that of Study 1. The longitudinal sample comprised 1564 participants recruited from two middle high schools in Jieshou, China (52.17 % male; the age range was from 13 to 19, $M_{age} = 15.80$ years, $SD = 1.44$). The CM, relative deprivation and NSSI urges were collected in June 2023 (T1), 140 participants was excluded because of failing the attention check question (i.e., please select the option of “strongly agree”). Given that the longitudinal sample comprised adolescents from only one region, LPA analysis was conducted using the data of T1 (52.03 % male; the age range was from 13 to 19, $M_{age} = 15.79$ years, $SD = 1.46$) to ensure representativeness of the sample. The subgroups identified by LPA, the data of relative deprivation collected in November 2023 (T2), and the data of NSSI urges collected in April 2024 (T3) were used in mediation analysis. And 53 participants and 180 participants were excluded because of failing the attention check at T2 and T3 respectively. Finally, 1191 participants (49.74 % male; the age range was from 13 to 19, $M_{age} = 16.00$ years, $SD = 1.47$) were used in mediation analysis.

3.1.2. Measure

3.1.2.1. Childhood maltreatment. The CM was assessed as in Study 1. The Cronbach’s alphas of the subscales (i.e., emotional abuse, physical abuse, emotional neglect, physical neglect) were 0.82, 0.79, 0.80, 0.61 at T1.

3.1.2.2. Relative deprivation. Relative deprivation was assessed as in Study 1. The Cronbach’s alphas of the subscales (i.e., cognitive and emotional relative deprivation) were 0.69 (T1) and 0.79 (T2).

3.1.2.3. Non-suicidal self-injury urges. The intensity of NSSI urges was assessed as in Study 1. The Cronbach’s alpha of the scale was 0.80 (T1) and 0.93 (T3).

3.1.3. Data analysis

The data analysis procedure was the same as that of Study 1.

3.2. Results

3.2.1. Latent profiles identified by LPA

As shown in Table 2.1, a three-profile solution demonstrated relatively lower fit indices (i.e., AIC, BIC, and aBIC values) and a

Table 2.1
Potential profile model fit indices of childhood maltreatment ($N = 1424$).

Cluster	AIC	BIC	aBIC	Entropy	LMR _(p)	BLR _(p)	Proportion. Min
1-cluster	26,905.94	26,948.04	26,922.63				
2-cluster	24,622.62	24,691.03	24,649.73	0.99	<0.001	<0.001	0.91/0.93
3-cluster	23,697.53	23,792.25	23,735.07	0.99	<0.001	<0.001	0.8654/0.0870/0.0476
4-cluster	23,083.45	23,204.48	23,131.41	<1.00	<0.001	<0.001	0.86/0.06/0.05/0.02

higher entropy, indicating a better model fit. Fig. 3 shows the mean values of four CM subscales across the three latent profile groups. The low CM group ($n = 1232$) comprised 86.54 % of the present sample, with the lowest score across all dimensions. The high emotional neglect group ($n = 124$) comprised 8.70 % of the present sample, with elevated scores in the emotional neglect dimension. The high CM group ($n = 68$) represented 4.76 % of the present sample, with the highest score across all dimensions.

3.2.2. Sample characteristics

Differences in demographics, relative deprivation, and NSSI urges across the latent subgroups are presented in Table 2.2. Both high emotional neglect and high CM groups showed higher level of emotional neglect, relative deprivation, and NSSI urges. Regarding emotional abuse, physical abuse, and physical neglect, the high CM group exhibited the highest levels, followed by the high emotional neglect group, and the low CM group demonstrated the lowest levels.

3.2.3. Profiles of CM and NSSI urges: the mediating role of relative deprivation

The descriptive statistics are shown in Table 2.3, and results of mediation analysis are presented in Fig. 4 (statistical details summarized in Supplementary Table 2), with the low CM group as reference group. The results showed that the high emotional neglect group and the high CM group had a 2.03-point and 3.18-point increases in NSSI urges (95 % CIs [1.17, 2.88], [2.03, 4.32], respectively) compared to the low CM group. After including relative deprivation, the association between the high emotional neglect group and the high CM group and NSSI urges decreased from 2.03 to 1.64 (95 % CI [0.79, 2.49]) and 3.18 to 2.69 (95 % CI [1.56, 3.82]), respectively. The effect size for the relative deprivation-NSSI urges pathway was 1.14 (95 % CI [0.77, 1.55]). The high emotional neglect and high CM groups had a 0.34-point and 0.43-point increases in relative deprivation compared to the low CM group (95 % CIs [0.19, 0.50], [0.19, 0.67], respectively). The indirect effects of (a) high emotional neglect and (b) high CM on NSSI urges through relative deprivation were 0.39 (95 % CI [0.20, 0.62]) and 0.49 (95 % CI [0.20, 0.83]).

3.3. Discussion

The results of Study demonstrated that experienced CM contributes to higher levels of perceived relative deprivation in adolescents, which in turn increases their susceptibility to NSSI urges from a longitudinal perspective. This mediating pathway suggests that the psychological impact of CM on NSSI urges may operate partly through social comparison processes, wherein feelings of injustice or inferiority amplify emotional distress and maladaptive coping behaviors. In addition, the results of LPA are also similar to Study 1, which further confirming the stability and reproducibility of the identified latent profiles.

4. General discussion

The present study explored the profiles of CM in a sample of Chinese adolescents using LPA. In both studies, three distinct subgroups were identified, including the high CM group, the high emotional neglect group, and the low CM group. In addition, the present study found that adolescents who experienced more severe CM felt higher relative deprivation and reported higher intensity of NSSI urges. Moreover, relative deprivation was found to play a mediating role between CM and NSSI urges using cross-sectional and longitudinal data. These findings enhanced the knowledge of the adverse effects of CM and suggested that reducing perceived relative deprivation serves as a protective factor against the development of NSSI urges in maltreated adolescents.

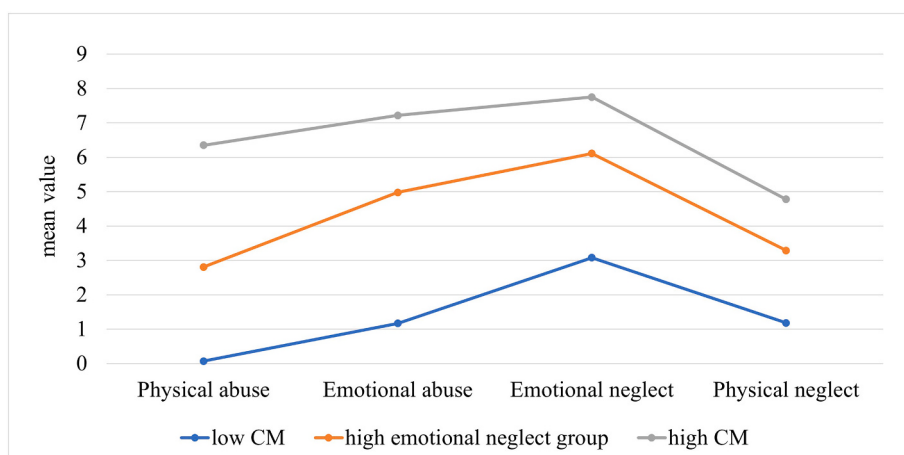


Fig. 3. The three-latent-profile model based on responses to CM items in Study 2.

Table 2.2Sample characteristics ($M \pm SD$ or $n\%$) of three latent groups in study 2.

	Low CM ($n = 1232$, 86.54 %)	High emotional neglect group ($n = 124$, 8.70 %)	High CM ($n = 68$, 4.76 %)	F/χ^2	Post hoc analysis
Sex (F/M)	634/598	66/56	41/27	1.39	
Age	15.98 $\pm$ 1.47	15.15 $\pm$ 1.26	15.02 $\pm$ 1.10	20.41***	2 > 1 > 3
Income _(L1-L4)	0.22/ 0.52/ 0.22/ 0.04	0.21/ 0.55/ 0.20/ 0.04	0.21/ 0.54/ 0.16/ 0.09	1.67	
FEL _(L1-L4)	0.70/ 0.22/ 0.07/ <0.01	0.69/ 0.23/ 0.08/ 0.00	0.62/ 0.26/ 0.09/ 0.03	3.64 [#]	
MEL _(L1-L4)	0.77/ 0.16/ 0.06/ <0.01	0.73/ 0.16/ 0.10/ 0.00	0.60/ 0.26/ 0.12/ 0.01	3.64 [#]	
relative deprivation	2.59 $\pm$ 0.62	2.89 $\pm$ 0.64	3.00 $\pm$ 0.76	24.51***	3 & 2 > 1
Physical abuse	0.07 $\pm$ 0.26	2.81 $\pm$ 0.81	6.35 $\pm$ 1.19	8643.92***	3 > 2 > 1
Emotional abuse	1.17 $\pm$ 2.10	4.98 $\pm$ 3.25	7.22 $\pm$ 4.25	332.37***	3 > 2 > 1
Emotional neglect	3.08 $\pm$ 3.41	6.11 $\pm$ 4.80	7.75 $\pm$ 5.06	83.24***	3 & 2 > 1
Physical neglect	1.18 $\pm$ 1.95	3.29 $\pm$ 3.52	4.78 $\pm$ 4.40	117.08***	3 > 2 > 1
NSSI urges	2.37 $\pm$ 3.53	5.52 $\pm$ 5.84	7.79 $\pm$ 8.06	29.04***	3 & 2 > 1

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. [#]In χ^2 tests: the Associate's/Bachelor's and Graduate degree categories were combined because the expected cell frequency was below 5.

4.1. Childhood maltreatment profiles

Three CM profiles of adolescents were found by using LPA: high CM group (4.13 %) showing the highest levels across four dimensions (i.e., emotional and physical abuse, and emotional and physical neglect), with the high emotional neglect group (16.43 %) and the low CM group (79.44 %) following. Different from the binary classification ('No Maltreatment' vs. 'Multiple Maltreatment') proposed by Zhang et al. (2022), this study identified a distinct subgroup characterized by high emotional neglect. While partially aligning with the 'Moderately High Neglect and Low Abuse' profile in early adolescents proposed by Shen et al. (2024), the findings of the present study demonstrate that emotional neglect may be independent from other abuse types. This likely reflects a culturally specific pattern in China where emotional neglect is often misperceived as normative parenting and thus socially legitimized. Notably, our study did not identify distinct subgroups characterized primarily by physical neglect or combined physical-emotional neglect. The absence of these patterns may reflect intergenerational compensatory mechanisms in Chinese families (Bäckman & Dixon, 1992). While living standards have improved dramatically, many parents who experienced childhood material deprivation may over-compensate by hypervigilance toward their adolescents' physical necessities, remaining emotionally disengaged.

The present study found that approximately 80 % of the adolescents belonged to low CM group, which was consistent with previous studies (Shen et al., 2024). In addition, the present study suggested that 16.43 % of the adolescents belonged to high emotional neglect group. As one of the most prevalent and most rapidly increasing forms of CM, emotional neglect affects many adolescents, with 18.4 % reporting exposure at a young age (Stoltenborgh et al., 2013). Moreover, Cohen et al. (2017) also suggested a neglect group (accounting for 17.4 %) who experienced relatively high emotional neglect using LPA. The remarkably close number of youths categorized within the high emotional neglect group (16.43 %) provides validity to present study. In addition, the proportion of the high CM group was consistent with previous studies, the proportion of adolescents exposed to high abuse and high neglect is typically smaller than 5 % (Davis et al., 2018; Ye et al., 2024). Notably, elevated levels of emotional neglect were observed in both the high CM and the high emotional neglect groups. It is imperative for policymakers to address this concern through the implementation of targeted legal frameworks to reduce adolescent maltreatment.

4.2. Sample characteristics differences in profiles

The results showed that with the increase of CM severity, adolescents showed higher relative deprivation, which is generally consistent with relative deprivation theory (Crosby, 1976; Li et al., 2023). Despite ongoing economic disparities in China, improvements in living conditions have largely met adolescents' material needs, shifting attention to their growing need for emotional support (Baumeister & Leary, 2017). As a form of developmental trauma, exposure to childhood maltreatment is associated with elevated negative emotion and impaired self-esteem development in adolescents (Liu et al., 2024). These cognitive and emotional deficits impair their ability to effectively cope with life challenges. Compounded by the lack of parental support, this may further exacerbate negative emotional states and lower self-esteem, creating a self-perpetuating cycle of distress. Additionally, when engaging in social comparisons, these individuals are prone to developing a sense of injustice, which in turn triggers feelings of relative deprivation (Smith et al., 2012). While previous studies focused on absolute deprivation induced by socioeconomic status, the present study provided preliminary evidence that relative deprivation can also be induced by experiencing CM.

Consistent with Hypothesis 2, the experience of CM has a significant negative effect on the mental health of adolescents. Among the identified subgroups, the high CM group experienced the highest intensity of NSSI urges, followed by the high emotional neglect group. Although self-injury may provide rapid emotional relief, its long-term negative consequences are well-documented (Brown et al., 2018). According to the Life History Theory, exposure to adverse parenting environments fosters the development of an uncertain future orientation in adolescents, thereby exhibiting a stronger preference for fast life history strategies (Figueredo et al., 2006; Schlomer & Sun, 2022). Specifically, when experiencing emotional distress, adolescents with childhood maltreatment histories demonstrate a stronger preference for rapid emotion regulation strategies while exhibiting diminished capacity to consider the

Table 2.3

Spearman correlations, means, and standard deviations for main variables in Study 2.

	M	SD	1	2	3	4	5	6	7	8	9	10	11
Sex	0.52	0.50	1										
Age	15.80	1.44	−0.05	1									
Income	1.39	0.65	−0.05*	−0.06*	1								
FEL	1.39	0.65	−0.01	−0.11***	0.10**	1							
MEL	1.31	0.60	−0.01	−0.08**	0.13***	0.48***	1						
Physical abuse T1	0.59	1.51	−0.02	−0.16***	−0.01	−0.01	0.05	1					
Emotional abuse T1	1.75	2.83	0.01	−0.16***	−0.06*	−0.01	0.05	0.52***	1				
Emotional neglect T1	3.59	3.87	0.10	−0.03	−0.05	−0.03	0.01	0.29***	0.40***	1			
Physical neglect T1	1.46	2.44	<0.01	<0.01	−0.08**	−0.07*	−0.01	0.27***	0.30***	0.32***	1		
Relative deprivation T2	2.64	0.77	0.02	0.09**	−0.10**	−0.13***	−0.10**	0.17***	0.24***	0.16***	0.16***	1	
NSSI urges T3	2.32	4.29	0.20***	> −0.01	−0.10**	−0.03	−0.04	0.17***	0.28***	0.21***	0.15***	0.27***	1

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

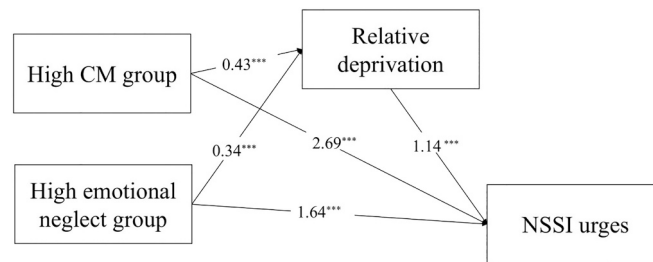


Fig. 4. The mediation model pathways, with the low CM group as the reference group in Study 2. Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

potential long-term consequences of such behaviors. Notably, limited research has explored the relationship between CM and NSSI urges, particularly from a person-centered perspective. The current findings demonstrated that cumulative childhood maltreatment increases vulnerability to maladaptive coping patterns, underscoring the need to assess maltreatment complexity in NSSI risk evaluation.

4.3. The mechanism underlying the association between CM and NSSI urges

In line with Hypothesis 3, experiencing CM (when comparing the high CM group and the high emotional neglect group with the low CM group) exerts an indirect effect through relative deprivation on NSSI urges after controlling socioeconomic indicators. Maltreated experiences may not only evoke relative deprivation of adolescents, but also frequently develop maladaptive schemas (Flynn et al., 2014; Li et al., 2023). These negative cognitive frameworks may further heighten sensitivity to perceived inequalities, transforming ordinary social comparisons into experiences of profound injustice. Moreover, the intense anger, hopelessness, and frustration resulting from perceived disadvantage could lead to vulnerability to NSSI urges, particularly when individuals lack adaptive emotion regulation strategies (Gong et al., 2019; Smith & Huo, 2014). The introduction of the relative deprivation theory into CM research represents an important theoretical integration, highlighting how perceived structural inequality operates as a key mechanism in the development of psychopathology. This perspective suggests that clinical interventions might benefit from addressing not only the direct consequences of maltreatment, but also the ways in which these experiences shape subsequent perceptions of social standing and fairness.

4.4. Implications and limitations

The results of present study revealed the existence of three distinct subgroups and both cross-sectional and longitudinal studies demonstrated the mediating role of relative deprivation in the association between high emotional neglect and high CM groups and NSSI urges, even after controlling for socioeconomic factors. Consequently, future experimental intervention studies targeting relative deprivation reduction may effectively decrease NSSI urges in adolescents who experienced CM, regardless of subgroup classification.

Since the present study was conducted in China, the cultural generalizability of the findings should be considered. It might be considered acceptable in Chinese contexts to use high-pressure and controlling parenting strategies to improve adolescents' academic performance (Mi-lan et al., 2021). However, such parenting styles are often viewed as unacceptable in Western cultures, which could result in different outcomes. Additionally, as China is a highly collectivistic society, individuals may respond to perceived disadvantages less intensely than those in individualistic cultures (Smith et al., 2018). Furthermore, collectivistic culture also attenuates the relationship between relative deprivation and negative outcomes (e.g., reduced life satisfaction, Smith et al., 2018). On the other hand, the reported rate of NSSI urges might be underestimated due to the stigma associated with self-injury, particularly in collectivistic cultures (Papadopoulos et al., 2013). Thus, future study may examine these associations across diverse cultural contexts to establish cross-cultural validity and use multi-method assessments to overcome potential underreporting biases.

Despite the strengths of the current study, such as its large sample size to explore CM profiles and examining the mediation model using cross-sectional and longitudinal studies, there are limitations to consider. First, CM was assessed via adolescent retrospective self-reports rather than objective measures—an approach with known limitations in recall accuracy. Although prior studies reveal limited overlap between subjective and objective CM reports (Baldwin et al., 2019), emerging evidence highlights the clinical relevance of subjective CM perceptions in predicting psychopathology outcomes (Francis et al., 2023), supporting the use of retrospective self-reports in examining associations between CM and NSSI urges. Second, although the present study controlled for key covariates, unmeasured confounding may limit causal inferences. While pre-existing NSSI urge continuity could theoretically account for group differences, the mediation analyses demonstrated that the high emotional neglect and the high CM groups showed higher direct and indirect effects compared to the low CM group. This pattern suggests that the differences in subsequent NSSI urges among groups reflect more than just baseline differences in urge levels. Third, although both studies employed large sample sizes, the relatively low proportion of the high CM group in the samples may limit the generalizability of findings. Notably, the mediating role of relative deprivation remained significant in the high CM group despite the small sample size, which warrants careful consideration. Future research may develop targeted interventions focusing on relative deprivation for individuals with CM exposure to further verify its mediating role between CM and NSSI urges.

5. Conclusions

The present study makes a valuable contribution to the existing literature by adopting a person-centered approach to examine the variations in NSSI urges among subgroups based on CM. Results highlight a series of negative effects induced by experiencing multiple CM and suggest that relative deprivation and NSSI urges increase among adolescents with the increase of multiple CM. Furthermore, the study reveals that experiencing multiple CM not only induces NSSI urges directly, but also exerts an indirect effect on NSSI urges through inducing relative deprivation. In general, experiencing multiple CM has a significant detrimental effect on adolescents, and it is vital to consider the potential subtypes based on the specific combinations of CM experiences. Future research could further explore effective interventions aimed at preventing NSSI among adolescents who have experienced multiple CM by targeting the reduction of relative deprivation.

CRedit authorship contribution statement

Wenyuan Wang: Writing – original draft, Investigation, Formal analysis, Data curation. **ZhenXue Wang:** Resources. **Jie Liu:** Investigation, Data curation. **Tianyi Hu:** Writing – review & editing. **Wen He:** Writing – review & editing, Resources, Conceptualization.

Declaration of competing interest

There is no conflict of interest.

Data availability

The datasets used and analyzed in the study are available from the corresponding author on reasonable request.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.chiabu.2025.107749>.

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