



# OPEN Childhood maltreatment influences coping in youths with major depression and bipolar depression through resilience and impulsivity

Jiawei Zhou<sup>1,2</sup>, Zheng Zhang<sup>1,2</sup>, Sihong Li<sup>1</sup>, Hui Chen<sup>1</sup>, Xianliang Chen<sup>1</sup>, Huajia Tang<sup>1</sup> & Jiansong Zhou<sup>1</sup>✉

Empirical research on the link between childhood maltreatment and coping styles in youths with depression remains scarce. This study explores the relationship between childhood maltreatment and coping styles in youths with major depressive disorder (MDD) and bipolar depression (BD). We recruited 277 youths with depression and 98 healthy controls (HC) using convenience sampling. Participants completed the Childhood Trauma Questionnaire-Short Form (CTQ-SF), the Connor-Davidson Resilience Scale (CD-RISC), the adapted Chinese version of the Barratt Impulsiveness Scale-11 (BIS-11), and the Simplified Coping Style Questionnaire (SCSQ). Differences between groups were assessed using ANOVA and Chi-square tests. The mediating roles of resilience and impulsivity between childhood maltreatment and coping style were analyzed with the PROCESS macro for SPSS. Among youths with depression, resilience and impulsivity were found to mediate the relationship between childhood maltreatment and coping style, with resilience accounting for 37.75% and impulsivity 17.72% of the total effect. Additionally, childhood maltreatment indirectly influenced coping style through resilience, which subsequently affected impulsivity, explaining 7.95% of the total effect. No direct effect of childhood maltreatment on coping style was observed in the BD group, and impulsivity did not mediate this relationship in the HC group. The study highlights that childhood maltreatment is directly related to coping styles in youths with depression and indirectly affects them through resilience and impulsivity. These findings suggest that improving resilience and managing impulsivity could enhance positive coping styles in this population.

**Keywords** Childhood maltreatment, Resilience, Impulsivity, Coping styles, Depression, Mood disorders, Youth

The prevalence of mental disorders, such as major depressive disorder (MDD, also known as unipolar depression) and bipolar depression (BD), underscores a critical public health concern<sup>1</sup>. These conditions, affecting a substantial segment of the global population, highlight the pressing need for effective management strategies. The development of these disorders is driven by a complex interplay of genetic, environmental, and psychological factors, which intricately influence their pathogenesis<sup>2–4</sup>. Understanding the mechanisms of these disorders reveals the pivotal role of coping styles in psychological health.

Coping styles—the cognitive and behavioral processes individuals employ to handle, endure, and adapt to stress<sup>5</sup>—crucially affect the progression and management of these disorders<sup>6,7</sup>. Negative coping styles, such as avoidance or substance use, can exacerbate symptoms and lead to adverse outcomes, including recurrent mood episodes or even suicidal behavior<sup>8,9</sup>. The study of coping styles is essential as it not only improves therapeutic outcomes for patients with mental disorders like MDD and BD but also reduces the incidence of severe episodes, benefiting both individuals and society. This research aims to close a significant gap in mental health care by identifying and enhancing effective coping strategies for these patients.

Childhood maltreatment, which includes emotional, physical, and sexual abuse as well as emotional and physical neglect<sup>10</sup>, is linked to emotional dysregulation and increased psychiatric comorbidities, which may

<sup>1</sup>Department of Psychiatry, National Clinical Research Center for Mental Disorders, and National Center for Mental Disorders, The Second Xiangya Hospital of Central South University, No. 139 Middle Renmin Road, Changsha 410011, Hunan, China. <sup>2</sup>Jiawei Zhou and Zheng Zhang contributed equally to this work. ✉email: zhoujs2003@csu.edu.cn

exacerbate negative coping styles in mood disorders<sup>11,12</sup>. Such early adverse experiences are suspected to set a foundation for psychological difficulties later in life, potentially through lowered self-esteem, heightened anxiety, and increased psychological distress<sup>13,14</sup>. These factors may lead individuals to rely on negative coping styles, such as withdrawal, aggression, or substance use, as they attempt to manage the complex emotions and situations stemming from their past traumas<sup>15,16</sup>. For instance, Perlman et al.<sup>17</sup> demonstrated that childhood maltreatment indirectly influences coping strategies through disrupted attachment, suggesting a developmental pathway where early trauma shapes later stress responses. However, while the correlation between childhood maltreatment and negative coping styles in mood disorder patients is well-documented, the underlying mechanisms remain insufficiently explored. The exact processes through which early trauma predisposes individuals to negative coping are not fully understood, highlighting a significant gap in current research.

The stress-coping model suggests that how individuals respond to stress is not just a direct result of the stressor itself, but is also significantly influenced by intervening psychological traits<sup>18</sup>. In the study of coping mechanisms, resilience and impulsivity are identified as crucial mediators in the pathway between childhood maltreatment and subsequent coping styles. Resilience, which refers to the ability to recover from adversity<sup>19</sup>, is frequently undermined in those with a history of maltreatment<sup>20</sup>. This reduction in resilience typically leads to the predominance of negative coping styles, such as avoidance or denial, which are less effective for long-term psychological health<sup>21</sup>. Similarly, impulsivity, which involves rapid and unplanned reactions to situations without regard to the negative consequences<sup>22</sup>, is often heightened in individuals exposed to childhood maltreatment<sup>23,24</sup>. Heightened impulsivity in maltreated individuals, as evidenced by a meta-analysis<sup>25</sup>, may drive reliance on negative coping styles, a pathway we explore in this study. This trait can lead to poor stress management and exacerbate the use of negative coping styles<sup>26,27</sup>. The presence of heightened impulsivity in maltreated individuals can be understood through a cognitive emotion regulation framework, which suggests that childhood maltreatment fosters maladaptive emotion regulation strategies, increasing vulnerability to stress and impulsive reactions<sup>28</sup>. Integrating these mediators into our model allows a deeper understanding of the complex dynamics. We hypothesize that resilience predicts impulsivity, as Zinn et al.<sup>29</sup> showed that resilience in adolescents moderates the association between early adversity and externalizing behaviors, like impulsivity, by strengthening prospective self-regulation, enabling individuals to exhibit reduced impulsivity. By focusing on resilience and impulsivity, this study explores the relationship between childhood maltreatment and coping styles in youths with MDD and BD. The emphasis on these mediating variables is grounded in their potential to explain the variance in coping outcomes observed among individuals with similar histories of maltreatment. This approach aligns with established psychological theories and offers specific targets for therapeutic interventions to enhance coping strategies, thus addressing a critical gap in the existing research landscape.

Additionally, BD patients exhibit higher motor impulsivity than MDD patients, which may influence their coping strategies, although differences in overall impulsivity vary across studies<sup>30,31</sup>. Similarly, previous studies have shown inconsistent findings in comparing resilience between MDD and BD<sup>32,33</sup>. These findings underscore the need to separately investigate the mechanisms linking maltreatment to coping styles in MDD and BD.

This study examines how childhood maltreatment influences coping styles in youths with depression, proposing a chain mediation model: maltreatment reduces psychological resilience, which in turn increases impulsivity, leading to greater use of negative coping styles. Given the distinct clinical presentations and underlying mechanisms of MDD, BD, and HC, we hypothesize that the impact of childhood maltreatment on coping styles varies across these groups. In MDD, we expect childhood maltreatment to directly influence negative coping styles, potentially due to the chronic nature of depressive symptoms and prolonged stress exposure. In contrast, for BD, we anticipate that this relationship will be more strongly mediated by impulsivity and resilience, reflecting the complex interplay of mood episodes and emotional dysregulation. For HC, we propose that childhood maltreatment has a weaker or less consistent effect on coping styles, as healthy individuals may rely more on adaptive coping mechanisms, with resilience potentially buffering the impact of early adversity.

This study aims to explore the impact of childhood maltreatment on coping styles in youth with MDD and BD compared to HC. By including three groups—MDD, BD, and HC—we aim to elucidate the differential mechanisms through which childhood maltreatment influences coping styles in these populations. This study contributes to theoretical models of coping mechanisms. It provides practical guidance for clinical interventions to mitigate psychological risks associated with negative coping, ultimately enhancing overall patient recovery and quality of life.

## Participants and methods

### Participants

The study received approval from the Ethics Committee of the Second Xiangya Hospital of Central South University (Approval No. 2018-007). Participants were enrolled from the outpatient psychiatric department of the Second Xiangya Hospital, Central South University, Changsha, China, from January 1, 2018, to June 2, 2022. To be eligible for the study, participants had to meet the following criteria: (1) aged 16 to 25 years; (2) currently experiencing their first depressive episode; (3) diagnosed with a mood disorder based on DSM-5 criteria through structured interviews by two trained psychiatrists; (4) scoring  $\geq 7$  points on the Beck Depression Inventory (BDI); and (5) no prior psychiatric treatment within the past three months. Exclusion criteria included: (1) having comorbidity with neurological conditions or significant cognitive deficit (e.g., neurodegenerative diseases, intellectual disabilities, or traumatic brain injury); (2) having a severe somatic disease; and (3) having a history of substance use disorder. Participants were divided into three groups based on their diagnoses: the MDD, BD, and HC groups. This study was conducted following the ethical guidelines and regulations of the institutional review board. Informed consent was obtained from all participants and/or their legal guardians.

### Depressive symptoms

The Beck Depression Inventory (BDI) is a self-report scale with several versions, and the present study utilized the 13-item version<sup>34</sup>. Each item is scored on a 4-point Likert scale ranging from 0 to 3, with specific ratings from “0 (not at all)” to “3 (severely)”. Beck proposed that the total score can be used to distinguish the severity of depressive symptoms: 0–4 for no depressive symptoms, 5–7 for mild depressive symptoms, 8–15 points for moderate depressive symptoms, and above 16 points for severe depressive symptoms. The Chinese version of the scale has good reliability and validity for screening depression among youths<sup>35</sup>. In the present study, a BDI total score > 7 was used as the cutoff value for depression. The Cronbach’s  $\alpha$  coefficient in this study was 0.94.

### Childhood maltreatment

The Childhood Trauma Questionnaire-Short Form (CTQ-SF) was developed by Bernstein et al.<sup>36</sup> to assess childhood trauma experiences. It comprises 28 items, 25 as clinical indicators and the remaining as validity checks. Respondents rate items on a five-point Likert scale (1 = not at all to 5 = very often), yielding a score ranging from 25 to 125. The questionnaire includes five subscales: emotional abuse (EA), physical abuse (PA), sexual abuse (SA), emotional neglect (EN), and physical neglect (PN). We utilized the Chinese version of CTQ-SF, which has shown good reliability in previous research<sup>37</sup>. The Cronbach’s  $\alpha$  coefficient for the Chinese CTQ-SF in our study is 0.809.

### Resilience

The Connor-Davidson Resilience Scale (CD-RISC) is a 25-item tool assessing psychological resilience<sup>38</sup>. Respondents rate items on a five-point Likert scale (0 = almost never to 4 = almost always). Scores range from 0 to 100, with higher scores indicating greater resilience. The scale comprises three subscales: tenacity, strength, and optimism. The CD-RISC version has been validated in Chinese populations and has demonstrated good reliability and validity<sup>39</sup>. In our study, the Cronbach’s  $\alpha$  of the total scale is 0.949, indicating good reliability.

### Impulsivity

Impulsivity was assessed using the adapted Chinese version of the Barratt Impulsiveness Scale-11 (BIS-11)<sup>40</sup>. This self-reported questionnaire, comprising 30 items, measures impulsivity reliably. BIS-11 includes three dimensions: attentional impulsivity, motor impulsivity, and non-planning impulsivity<sup>41</sup>. Participants rate items on a five-point Likert scale (1 = never to 5 = almost always). A higher total score indicates greater impulsivity. The Chinese BIS-11 version exhibits good validity and reliability<sup>42</sup>. Our present study calculated the Cronbach’s  $\alpha$  coefficient for the overall BIS-11 score as 0.819.

### Coping style

Coping style was assessed using the Simplified Coping Style Questionnaire (SCSQ)<sup>43</sup>. This 20-item questionnaire includes two dimensions: positive coping style (PCS) and negative coping style (NCS). PCS comprises 12 items, while NCS consists of eight items. Participants rated items on a four-point scale (1 = never to 4 = always). The total SCSQ score is calculated as the PCS standard score minus the NCS standard score. A higher score indicates a stronger inclination towards positive coping. Cronbach’s  $\alpha$  for PCS and NCS were 0.89 and 0.78, respectively<sup>44</sup>. In our study, Cronbach’s  $\alpha$  for the overall SCSQ score was 0.753.

### Statistical analysis

The statistical software SPSS 26.0 was utilized to perform various analyses, including reliability analysis, descriptive statistics, and correlation analysis among the study variables. The ANOVA Test and Chi-square analyzed demographic and clinical characteristics across the groups. The SPSS PROCESS macro was employed to assess the serial mediation effects of the research hypotheses. The analysis proceeded in several steps. Firstly, descriptive analyses were conducted to examine the characteristics of all study variables. Secondly, Pearson correlation analysis was performed to explore the relationships between these variables. Thirdly, to investigate the complex relationships between childhood maltreatment, resilience, impulsivity, and coping styles, we utilized structural equation modeling (SEM). This approach is well-suited for analyzing multiple interrelated variables and their mediating effects. Theoretically, SEM operationalizes the stress-coping model, which suggests that individual differences in resilience and impulsivity mediate the impact of stressors, such as childhood maltreatment, on coping styles. These mediators were selected based on their established roles in stress responses and mood disorders. Model 6 of the PROCESS macro by Hayes<sup>45</sup> was employed to investigate the indirect effects of childhood maltreatment on coping styles mediated through resilience and impulsivity. To determine the significance of the mediating effects, the procedure utilized bootstrapping with 5000 iterations, and a 95% confidence interval (CI) was computed. Additionally, the mediation models were adjusted for gender and age. Separate mediation analyses were conducted for the three groups to explore diagnostic differences. This approach allowed us to examine how the relationships between childhood maltreatment, resilience, impulsivity, and coping styles vary across diagnostic categories.

## Results

### Descriptive statistics

Participants ranged in age from 16 to 25 years, with no significant age differences between the MDD and BD groups. The sample consisted of both males and females, with a higher proportion of females across all groups. Compared to the HC group, the MDD and BD groups exhibited significantly higher scores on the CTQ-SF and BIS-11 and lower scores on the CD-RISC and SCSQ. The BD group showed higher CTQ-SF and BIS-11 scores than the MDD group, while no notable differences were observed between MDD and BD on the BDI, CD-RISC, and SCSQ scores. Detailed sample characteristics are presented in Table 1.

Variables	MDD ( <i>n</i> = 196)	BD ( <i>n</i> = 81)	HC ( <i>n</i> = 98)	$F/\chi^2$	<i>p</i>	Bonferroni post hoc
Gender (female) (%)	68.37%	80.25%	55.10%	12.93	< 0.001	HC < MDD*, HC < BD***, MDD < BD**
Age (years)	19.4 ± 2.3	19.1 ± 2.2	21.1 ± 2.1	24.06	< 0.001	MDD < HC***, BD < HC***
BDI	19.4 ± 6.3	20.8 ± 6.8	3.6 ± 4.2	264.13	< 0.001	HC < MDD***, HC < BD***,
CTQ-SF	49.90 ± 12.28	54.09 ± 16.34	34.12 ± 9.14	69.32	< 0.001	HC < MDD***, HC < BD***, MDD < BD*
CD-RISC	34.64 ± 12.61	35.74 ± 14.45	65.37 ± 13.08	193.72	< 0.001	MDD < HC***, BD < HC***
BIS-11	71.07 ± 9.14	75.37 ± 10.13***	61.04 ± 9.36	57.93	< 0.001	HC < MDD***, HC < BD***, MDD < BD***
SCSQ	2.45 ± 6.81	2.63 ± 6.97	16.57 ± 6.58	155.54	< 0.001	MDD < HC***, BD < HC***

**Table 1.** Demographic and clinical features across the MDD, BD, and HC groups. *BDI* the Beck Depression Inventory, *CTQ-SF* the Childhood Trauma Questionnaire-Short Form, *CD-RISC* the Connor–Davidson Resilience, *BIS-11* the adapted Chinese version of the Barratt Impulsiveness Scale-11, *SCSQ* the Simplified Coping Style Questionnaire, *MDD* major depressive disorder group, *BD* bipolar depression group, *HC* healthy control group. Post-hoc analysis significance is reported as follows: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

Variables	1	2	3	4	5	6
Mood disorder group						
1. Gender (Female = 1, Male = 2)	1					
2. Age	0.02	1				
3. Childhood maltreatment	− 0.12**	− 0.03	1			
4. Resilience	0.17**	0.13*	− 0.28***	1		
5. Impulsivity	− 0.15*	− 0.10	0.29***	− 0.40***	1	
6. Coping style	0.07	0.10	− 0.31***	0.57***	− 0.47***	1
MDD group						
1. Gender (Female = 1, Male = 2)	1					
2. Age	0.05	1				
3. Childhood maltreatment	− 0.10	− 0.11	1			
4. Resilience	0.21**	0.17*	− 0.33***	1		
5. Impulsivity	− 0.16*	− 0.15*	0.25***	− 0.35***	1	
6. Coping style	0.03	0.12	− 0.35***	0.58***	− 0.44***	1
BD group						
1. Gender (Female = 1, Male = 2)	1					
2. Age	− 0.11	1				
3. Childhood maltreatment	− 0.14	0.14	1			
4. Resilience	0.10	0.04	− 0.23*	1		
5. Impulsivity	− 0.06	0.03	0.32**	− 0.53***	1	
6. Coping style	0.21	0.06	− 0.26*	0.55***	− 0.60***	1
HC group						
1. Gender (Female = 1, Male = 2)	1					
2. Age	0.01	1				
3. Childhood maltreatment	0.12	− 0.19	1			
4. Resilience	0.13	0.24*	− 0.33**	1		
5. Impulsivity	− 0.04	− 0.23*	0.39***	− 0.48***	1	
6. Coping style	0.00	0.28**	− 0.28**	0.61***	− 0.34**	1

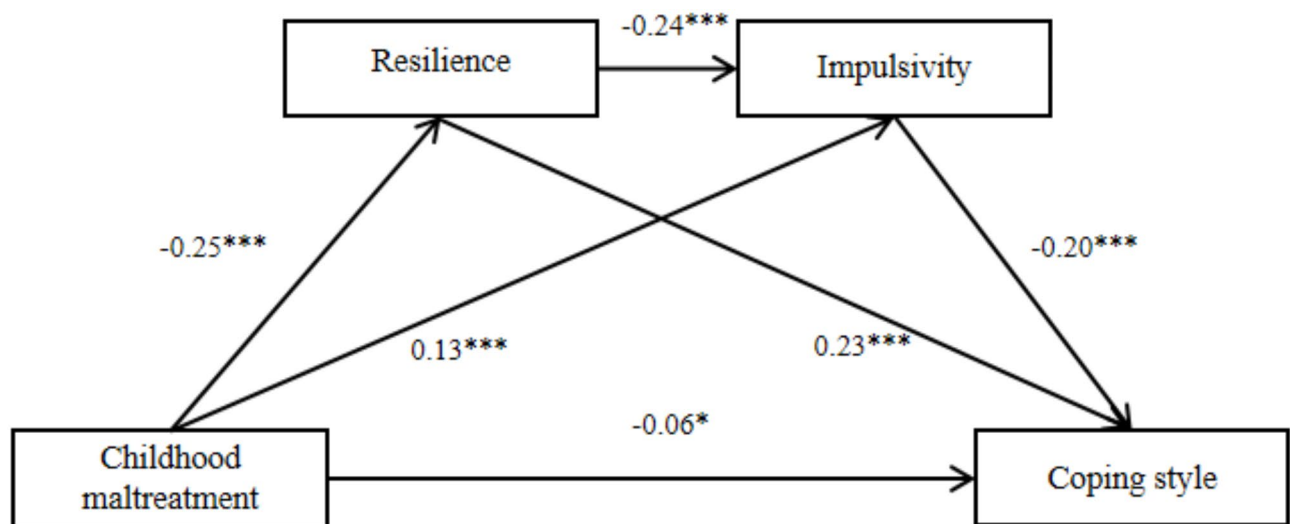
**Table 2.** Pearson's correlations among the research variables ( $N = 375$ ). \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

### Mean, standard deviation, and correlation matrix of the variables

Among youths with depression, childhood maltreatment was positively correlated with impulsivity and negatively correlated with both resilience and coping style. Resilience showed a positive correlation with coping style and a negative correlation with impulsivity, while impulsivity was negatively correlated with coping style. All correlations were statistically significant. Furthermore, all research variables were significantly correlated across all groups, with consistent directions of association, though varying in strength. The correlation matrices for the MDD, BD, and HC groups are summarized in Table 2.

### Analysis of direct and indirect pathways between childhood maltreatment and impulsivity

Figure 1; Table 3 present the results of a chain mediation model analysis examining the pathways linking childhood maltreatment and coping style among youths with depression, with gender and age included as covariates. The



**Fig. 1.** Chain mediation model testing the direct and indirect pathways between childhood maltreatment and coping style. Estimates are standardized, \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

Path	Effect	BootSE	BootLLCI	BootULCI	Relative effect (%)
Total effect	− 0.151	0.029	− 0.208	− 0.095	
Direct effect	− 0.056	0.025	− 0.105	− 0.007	
Total indirect effect	− 0.095	0.019	− 0.135	− 0.060	
Indirect effect 1	− 0.057	0.015	− 0.088	− 0.031	37.75
Indirect effect 2	− 0.026	0.010	− 0.046	− 0.010	17.22
Indirect effect 3	− 0.012	0.004	− 0.021	− 0.005	7.95

**Table 3.** Chain mediating model pathways of childhood maltreatment on coping style (through resilience and impulsivity). Indirect effect 1 = Childhood maltreatment-resilience-coping style; Indirect effect 2 = Childhood maltreatment-impulsivity-coping style; Indirect effect 3 = Childhood maltreatment-resilience-impulsivity-coping style.

results confirmed a significantly negative relationship between childhood maltreatment and coping style ( $\beta = -0.06$ ,  $p < 0.05$ ). Additionally, resilience and impulsivity were found to mediate this association. Specifically, childhood maltreatment was negatively associated with resilience ( $\beta = -0.25$ ,  $p < 0.001$ ) and positively associated with impulsivity ( $\beta = 0.13$ ,  $p < 0.001$ ). In turn, resilience was positively associated with coping style ( $\beta = 0.23$ ,  $p < 0.001$ ), while impulsivity was negatively associated with coping style ( $\beta = -0.20$ ,  $p < 0.001$ ).

As shown in Table 3, the total indirect effect of childhood maltreatment on coping style was significant [ $\beta = -0.095$ , 95% CI = (− 0.135, − 0.060)], with resilience and impulsivity each contributing to this effect. The indirect effect through resilience was substantial [ $\beta = -0.057$ , 95% CI = (− 0.088, − 0.031)], while the indirect effect through impulsivity was also significant [ $\beta = -0.026$ , 95% CI = (− 0.046, − 0.010)]. Furthermore, the chain-mediated effect via resilience and impulsivity was significant [ $\beta = -0.012$ , 95% CI = (− 0.021, − 0.005)], indicating a sequential mediation pathway.

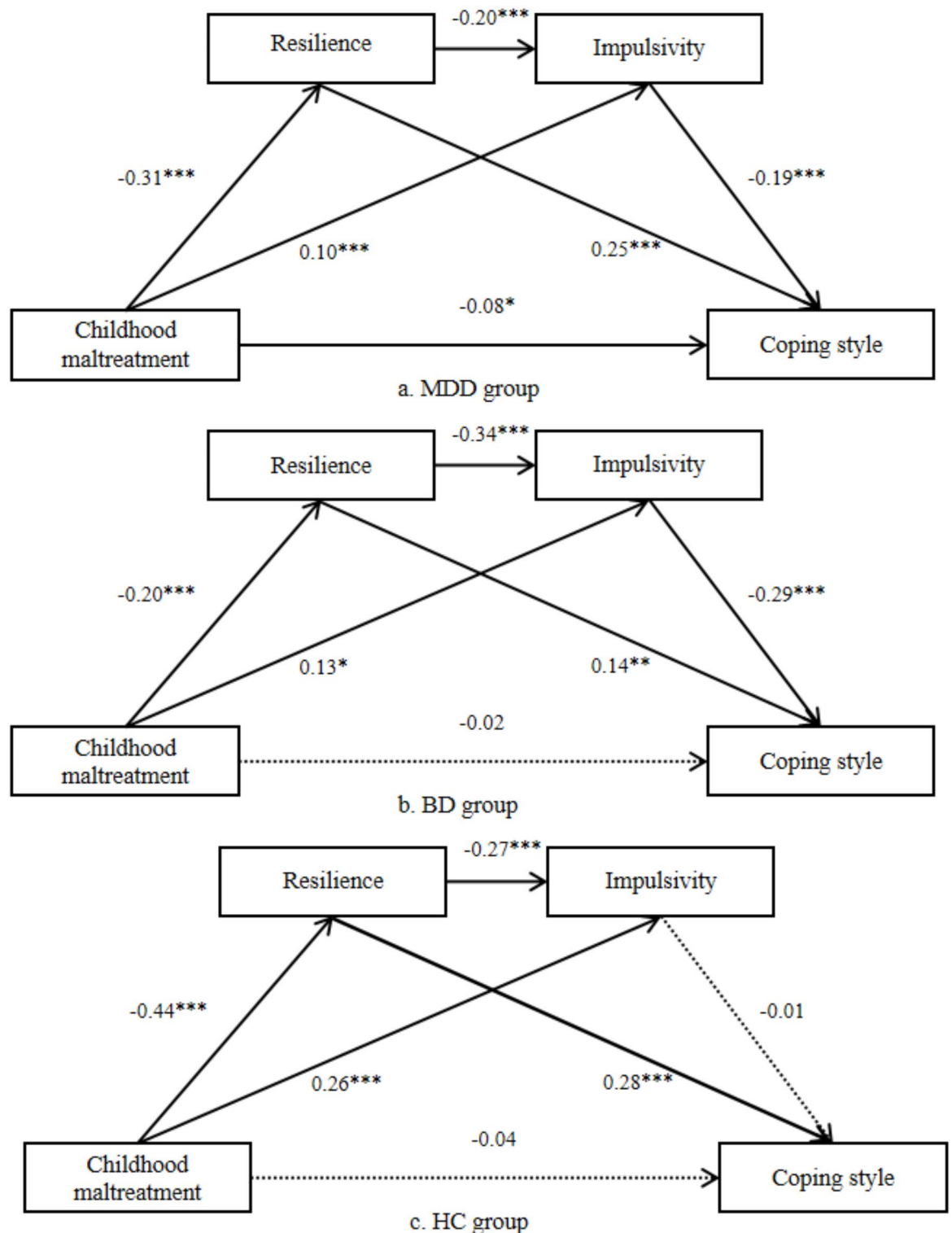
### Comparison among three groups

Separate mediation analyses across the MDD, BD, and HC groups revealed distinct patterns (see Fig. 2). In the MDD group, childhood maltreatment had a direct negative effect on coping style, alongside indirect effects through resilience and impulsivity, including a significant chain mediation path (resilience → impulsivity). In the BD group, childhood maltreatment indirectly influenced coping style via resilience and impulsivity, with no significant direct effect. In the HC group, childhood maltreatment showed no direct effect on coping style, and only the indirect effect through resilience was significant. Details are presented in Fig. 2; Table 4.

### Discussion

This study explores the relationship between childhood maltreatment and coping styles in youths with depression, with a particular emphasis on the mediating roles of resilience and impulsivity. Our findings indicate that childhood maltreatment is significantly related to the coping style of youths with depression, where resilience and impulsivity play crucial mediating roles. This understanding is vital for enhancing resilience and managing impulsivity to improve the coping style of youths with depression.





**Fig. 2.** Chain mediation model in different diagnostic groups.  $^*p < 0.05$ ,  $^{**}p < 0.01$ ,  $^{***}p < 0.001$ .

The results showed that BD patients displayed more severe childhood maltreatment than MDD patients, which is consistent with previous work<sup>46</sup>. Similarly, Serafini et al.<sup>47</sup> found that compared to MDD patients, emotional neglect, physical neglect, and emotional abuse are enhanced in BD patients, which demonstrated more complex childhood maltreatment in BD patients. Daruy-Filho et al.<sup>48</sup> further support this, noting that childhood maltreatment in BD is linked to maladaptive coping, such as avoidance, which may contribute to mood swings. Besides, BD patients have demonstrated elevated impulsivity compared to MDD patients. However, further research is required to elucidate the differences in impulsivity among MDD and BD patients.

Path	Effect	BootSE	BootLLCI	BootULCI	Relative effect (%)
MDD group					
Total effect	– 0.188	0.038	– 0.263	– 0.114	
Direct effect	– 0.078	0.033	– 0.143	– 0.014	
Total indirect effect	– 0.110	0.025	– 0.162	– 0.062	
Indirect effect 1	– 0.079	0.020	– 0.121	– 0.042	42.02
Indirect effect 2	– 0.020	0.011	– 0.044	– 0.001	10.64
Indirect effect 3	– 0.012	0.005	– 0.024	– 0.004	6.38
BD group					
Total effect	– 0.108	0.047	– 0.201	– 0.015	
Direct effect	– 0.022	0.039	– 0.100	0.055	
Total indirect effect	– 0.085	0.033	– 0.150	– 0.017	
Indirect effect 1	– 0.028	0.019	– 0.071	– 0.003	25.93
Indirect effect 2	– 0.038	0.020	– 0.079	– 0.001	35.19
Indirect effect 3	– 0.019	0.012	– 0.046	0.002	17.60
HC group					
Total effect	– 0.173	0.071	– 0.314	– 0.032	
Direct effect	– 0.045	0.065	– 0.175	0.085	
Total indirect effect	– 0.128	0.058	– 0.260	– 0.030	
Indirect effect 1	– 0.124	0.055	– 0.251	– 0.037	71.68
Indirect effect 2	– 0.003	0.017	– 0.036	0.032	1.73
Indirect effect 3	– 0.001	0.008	– 0.020	0.015	0.58

**Table 4.** Chain mediating model pathways of childhood maltreatment on coping style (through resilience and impulsivity) in separate groups. Indirect effect 1 = Childhood maltreatment-resilience-coping style; Indirect effect 2 = Childhood maltreatment-impulsivity-coping style; Indirect effect 3 = Childhood maltreatment-resilience-impulsivity-coping style.

In youths with depression, there is a direct relationship between childhood maltreatment and coping style, which was consistent with previous studies<sup>49,50</sup>. This suggests that these patients may develop negative coping strategies, such as avoidance and aggressive behaviors, directly as a result of their early adverse experiences<sup>51</sup>. This direct response to psychological stress is more pronounced in MDD patients. In contrast, the situation is more complex for BD patients. Despite also commonly experiencing childhood maltreatment, there is no significant direct relationship between childhood maltreatment and their coping style in this group. This may be due to the pathophysiological characteristics of BD, where other psychological and biological factors, such as genetic predispositions and neurochemical changes, may significantly influence the formation and choice of coping strategies<sup>52</sup>. The lack of a direct effect of childhood maltreatment on coping style in the BD group may reflect broader impairments in social functioning and emotional regulation, as noted in affective disorders<sup>53</sup>, potentially mediated by neurobiological factors unique to bipolar depression. For instance, patients with BD might have inherent difficulties with emotional regulation and impulse control, potentially caused by neurotransmitter activity abnormalities or other changes in brain function, which could overshadow the direct effects of psychosocial factors like childhood maltreatment on coping style<sup>54–56</sup>. Thus, this disparity highlights the heterogeneity of mood disorders and the complexity of factors to consider when treating different types of mood disorders.

In the mediation analysis model, the impact of impulsivity on coping style is particularly pronounced in youths with depression, whereas this impact is not significant in the HC group. This suggests that impulsivity may be a psychological trait unique to mood disorder patients, playing a vital role in the selection and implementation of coping styles<sup>57</sup>. The pronounced role of impulsivity in shaping coping styles among youths with depression aligns with longitudinal evidence that maltreated youths exhibit diverse coping trajectories, often favoring directed action coping<sup>58</sup>. Youths with depression often face more significant psychological stress and emotional regulation challenges, which may lead them to adopt more impulsive coping strategies<sup>59</sup>. For example, these patients might tend to seek immediate gratification to alleviate short-term discomforts, such as through impulsive shopping, overeating, or substance abuse, behaviors that can negatively affect their health and well-being in the long run<sup>60–62</sup>. The sequential impact of resilience on impulsivity varies across groups: in MDD, resilience reduces impulsivity, supporting adaptive coping, while in BD, this link is weaker, with impulsivity acting more independently; in HC, resilience directly enhances coping without strongly affecting impulsivity. The increased impulsivity is not commonly seen in the healthy population, who may be more inclined to use more rational and predictive coping strategies, such as seeking social support or problem-solving<sup>63,64</sup>. Fares-Otero et al.<sup>65</sup> suggest that resilience could mitigate these tendencies in adulthood, but its reduction following childhood maltreatment in adolescence may exacerbate reliance on maladaptive coping. Beyond youths with MDD and BD, these findings may extend to other clinical patient groups, such as young adults with trauma-related conditions like PTSD, where childhood maltreatment similarly disrupts resilience and heightens impulsivity, suggesting broader relevance for understanding coping mechanisms across diverse populations<sup>66</sup>.

Additionally, youths with depression and high impulsivity might consider the long-term consequences less when under stress, opting instead for quick relief methods that are detrimental to long-term health and stability<sup>67,68</sup>. Thus, this difference underscores the unique role of impulsivity in the choice of coping style among youths with depression, posing challenges for the formulation of treatment strategies.

Our study underscores the differential impact of childhood maltreatment on coping styles across youth with MDD, BD, and HC, suggesting the need for tailored intervention strategies.

For youths with MDD, the direct negative effect of childhood maltreatment on negative coping styles indicates that interventions should prioritize mitigating trauma's immediate impact. Cognitive-behavioral therapy (CBT) and trauma-focused therapies can address maladaptive coping patterns<sup>12</sup>, while resilience-building interventions—like mindfulness-based stress reduction (MBSR)—may enhance adaptive responses<sup>69</sup>. Given impulsivity's mediating role, impulse control training (e.g., behavioral inhibition exercises) could further reduce negative coping tendencies<sup>22</sup>. In contrast, for BD, childhood maltreatment influences coping styles indirectly through resilience and impulsivity, with no direct effect. This suggests a focus on emotional regulation and impulse management. Dialectical Behavior Therapy (DBT) may be particularly effective, emphasizing mindfulness, distress tolerance, and emotion regulation<sup>70</sup>. For HC, childhood maltreatment affects coping styles primarily through resilience, with minimal impulsivity mediation. General mental health promotion programs, such as school-based resilience training or stress management workshops, could prevent negative coping development<sup>71,72</sup>. Early screening and psychoeducation for at-risk youth with maltreatment histories may further mitigate long-term effects<sup>73</sup>.

Early intervention and support are critical across all groups. Clinicians should be vigilant in identifying signs of childhood maltreatment and provide appropriate referrals for specialized treatment. Additionally, integrating family and community support into intervention strategies could enhance effectiveness. Future research should further explore the long-term outcomes of these tailored interventions to validate their efficacy in diverse populations.

Although this study provides new insights into the relationships between childhood maltreatment, resilience, impulsivity, and coping style, it has some limitations. Firstly, using a cross-sectional study design limits our ability to infer causality. Future research could employ longitudinal designs to more accurately track changes over time in coping style, resilience, and impulsivity among mood disorder patients. Secondly, while our sample reflects a diverse outpatient population from a major psychiatric center, it is restricted to a single urban site—the Second Xiangya Hospital in Changsha, China—potentially limiting generalizability to rural or non-clinical youth populations. Furthermore, while diagnoses were established through structured interviews based on DSM-5 criteria by trained psychiatrists, standardized depression assessment tools (e.g., Hamilton Depression Rating Scale) were not used, potentially limiting the precision in evaluating depression severity. Additionally, relying on self-reported questionnaires for data collection might introduce reporting biases. Future studies should consider using more objective measurement tools and multi-source data validation.

## Conclusion

In summary, this study has clarified the relationship between childhood maltreatment and coping styles in youths with depression, revealing the mediating roles of resilience and impulsivity. These findings not only enrich our understanding of the mechanisms underlying depression but also provide a scientific basis for the formulation of targeted treatment strategies. Although this study has limitations, its implications are valuable for future clinical practice and research. Future research should continue to explore the roles of these variables in different types of depression and how comprehensive treatment can effectively improve patients' coping styles and overall well-being.

## Data availability

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

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## References

- Arias, D., Saxena, S. & Verguet, S. Quantifying the global burden of mental disorders and their economic value. *EClinicalMedicine* **54**, 101675 (2022).
- Koskinen, M. K. & Hovatta, I. Genetic insights into the neurobiology of anxiety. *Trends Neurosci.* **46**, 318–331 (2023).
- Marx, W. et al. Major depressive disorder. *Nat. Rev. Dis. Primer* **9**, 44 (2023).
- McIntyre, R. S. et al. Bipolar disorders. *Lancet Lond. Engl.* **396**, 1841–1856 (2020).
- Skinner, E. A., Edge, K., Altman, J. & Sherwood, H. Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychol. Bull.* **129**, 216–269 (2003).
- Alexander, L. F., Oliver, A., Burdine, L. K., Tang, Y. & Dunlop, B. W. Reported maladaptive decision-making in unipolar and bipolar depression and its change with treatment. *Psychiatry Res.* **257**, 386–392 (2017).
- Thomas, J., Knowles, R., Tai, S. & Bentall, R. P. Response styles to depressed mood in bipolar affective disorder. *J. Affect. Disord.* **100**, 249–252 (2007).
- Choi, H. Y. et al. Psychological and genetic risk factors associated with suicidal behavior in Korean patients with mood disorders. *J. Affect. Disord.* **235**, 489–498 (2018).
- Kemner, S. M., Mesman, E., Nolen, W. A., Eijckmans, M. J. C. & Hillegers, M. H. J. The role of life events and psychological factors in the onset of first and recurrent mood episodes in bipolar offspring: results from the Dutch bipolar offspring study. *Psychol. Med.* **45**, 2571–2581 (2015).
- Hengartner, M. P. et al. Association between childhood maltreatment and normal adult personality traits: exploration of an understudied field. *J. Personal Disord.* **29**, 1–14 (2015).



11. Dvir, Y., Ford, J. D., Hill, M. & Frazier, J. A. Childhood maltreatment, emotional dysregulation, and psychiatric comorbidities. *Harv. Rev. Psychiatry* **22**, 149–161 (2014).
12. Lippard, E. T. C. & Nemeroff, C. B. The devastating clinical consequences of child abuse and neglect: increased disease vulnerability and poor treatment response in mood disorders. *Am. J. Psychiatry* **177**, 20–36 (2020).
13. McCrory, E., Foulkes, L. & Viding, E. Social thinning and stress generation after childhood maltreatment: a neurocognitive social transactional model of psychiatric vulnerability. *Lancet Psychiatry* **9**, 828–837 (2022).
14. Melamed, D. M., Botting, J., Lofthouse, K., Pass, L. & Meiser-Stedman, R. The relationship between negative self-concept, trauma, and maltreatment in children and adolescents: A meta-analysis. *Clin. Child Fam. Psychol. Rev.* **27**, 220–234 (2024).
15. Kuzminskaite, E. et al. Childhood trauma in adult depressive and anxiety disorders: an integrated review on psychological and biological mechanisms in the NESDA cohort. *J. Affect. Disord.* **283**, 179–191 (2021).
16. Milojevic, H. M., Levine, L. J., Cathcart, E. J. & Quas, J. A. The role of maltreatment in the development of coping strategies. *J. Appl. Dev. Psychol.* **54**, 23–32 (2018).
17. Perlman, M. R., Dawson, A. E., Dardis, C. M., Egan, T. & Anderson, T. The association between childhood maltreatment and coping strategies: the indirect effect through attachment. *J. Genet. Psychol. Res. Theory Hum. Dev.* **177**, 156–171 (2016).
18. Folkman, S. Personal control and stress and coping processes: a theoretical analysis. *J. Pers. Soc. Psychol.* **46**, 839–852 (1984).
19. Vella, S. L. & Pai, N. A theoretical review of psychological resilience: defining resilience and resilience research over the decades. *Arch. Med. Health Sci.* **7**, 233 (2019).
20. Ungar, M. et al. The study of youth resilience across cultures: lessons from a pilot study of measurement development. *Res. Hum. Dev.* **5**, 166–180 (2008).
21. Ong, A. D., Bergeman, C. S., Bisconti, T. L. & Wallace, K. A. Psychological resilience, positive emotions, and successful adaptation to stress in later life. *J. Pers. Soc. Psychol.* **91**, 730–749 (2006).
22. Moeller, F. G., Barratt, E. S., Dougherty, D. M., Schmitz, J. M. & Swann, A. C. Psychiatric aspects of impulsivity. *Am. J. Psychiatry* **158**, 1783–1793 (2001).
23. Jin, M., Wang, Z., Zhou, Y. & Zhong, J. Exploring the impact of childhood maltreatment and BPD on impulsivity in crimes of passion. *Front. Psychiatry* **14**, 1159678 (2023).
24. Song, H. et al. Cortical volumetric correlates of childhood trauma, anxiety, and impulsivity in bipolar disorder. *Psychiatry Investig.* **17**, 627–635 (2020).
25. Liu, R. T. Childhood maltreatment and impulsivity: Meta-analysis and recommendations for future study. *J. Abnorm. Child. Psychol.* **47**, 221–243 (2019).
26. Farmer, R. & Golden, J. The forms and functions of impulsive actions: implications for behavioral assessment and therapy. *Int. J. Behav. Consult Ther.* **5**, 12–30 (2009).
27. Li, J. et al. The mediating role of resilience and self-esteem between life events and coping styles among rural left-behind adolescents in China: A cross-sectional study. *Front. Psychiatry* **11**, 560556 (2020).
28. Qian, H. et al. Childhood maltreatment, stressful life events, cognitive emotion regulation strategies, and non-suicidal self-injury in adolescents and young adults with first-episode depressive disorder: direct and indirect pathways. *Front. Psychiatry* **13**, 838693 (2022).
29. Zinn, M. E., Huntley, E. D. & Keating, D. P. Resilience in adolescence: prospective self moderates the association of early life adversity with externalizing problems. *J. Adolesc.* **81**, 61–72 (2020).
30. Ozten, M. & Erol, A. Impulsivity differences between bipolar and unipolar depression. *Indian J. Psychiatry* **61**, 156–160 (2019).
31. Ramirez-Martin, A., Ramos-Martin, J., Mayoral-Cleries, E., Moreno-Küstner, B. & Guzman-Parra, J. Impulsivity, decision-making and risk-taking behaviour in bipolar disorder: a systematic review and meta-analysis. *Psychol. Med.* **50**, 2141–2153 (2020).
32. Favale, D. et al. Hope and resilience among patients affected by unipolar and bipolar depression. *Int. J. Soc. Psychiatry* **69**, 967–975 (2023).
33. Seo, J. Y. et al. More resilience in males with probable bipolar depression than probable unipolar depression among Korean conscripts. *Psychiatry Investig.* **14**, 603–608 (2017).
34. Beck, A. T., Rial, W. Y. & Rickels, K. Short form of depression inventory: Cross-validation. *Psychol. Rep.* **34**, 1184–1186 (1974).
35. Yang, W. & Xiong, G. Screening for adolescent depression: validity and cut-off scores for depression scales. *Chin. J. Clin. Psychol.* **24**, 1010–1015 (2016).
36. Bernstein, D. P., Ahluvalia, T., Pogge, D. & Handelsman, L. Validity of the childhood trauma questionnaire in an adolescent psychiatric population. *J. Am. Acad. Child. Adolesc. Psychiatry* **36**, 340–348 (1997).
37. Zheng, K. et al. Psychological resilience and daily stress mediate the effect of childhood trauma on depression. *Child. Abuse Negl.* **125**, 105485 (2022).
38. Connor, K. M. & Davidson, J. R. T. Development of a new resilience scale: the Connor-Davidson resilience scale (CD-RISC). *Depress. Anxiety* **18**, 76–82 (2003).
39. Yu, X. & Zhang, J. Factor analysis and psychometric evaluation of the Connor-Davidson resilience scale (CD-RISC) with Chinese people. *Soc. Behav. Pers. Int. J.* **35**, 19–30 (2007).
40. Li, X. et al. Reliability and validity of an adapted Chinese version of Barratt impulsiveness scale. *Chin. Ment. Health J.* **1**, 1 (2011).
41. Patton, J. H., Stanford, M. S. & Barratt, E. S. Factor structure of the Barratt impulsiveness scale. *J. Clin. Psychol.* **51**, 768–774 (1995).
42. Wan, Y., Zhang, M., Jin, F. & Cheng, Z. The Chinese version of the Barratt impulsiveness Scale-11: reassessment of its psychometric properties in three adolescent samples. *J. Psychiatry Brain Sci.* **1** (2016).
43. Xie, Y. A preliminary study on the reliability and validity of the simple coping style scale. *Chin. J. Clin. Psychol.* **6**, 114–115 (1998).
44. Xie, Y. Reliability and validity of the simplified coping style questionnaire. *Chin. J. Clin. Psychol.* (1998).
45. Hayes, A. F. *Introduction To Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach* (Guilford Publications, 2017).
46. Liu, J. et al. Anticipating unipolar depression and bipolar depression in young adult with first episode of depression using childhood trauma and personality. *Front. Public Health* **10**, 1061894 (2022).
47. Serafini, G. et al. The relationship between sensory processing patterns, alexithymia, traumatic childhood experiences, and quality of life among patients with unipolar and bipolar disorders. *Child. Abuse Negl.* **62**, 39–50 (2016).
48. Daruy-Filho, L., Brietzke, E., Kluwe-Schiavon, B., da S. Fabres, C. & Grassi-Oliveira, R. Childhood maltreatment and coping in bipolar disorder. *Psychol. Neurosci.* **6**, 271–277 (2013).
49. Li, M. et al. To what extent do social support and coping strategies mediate the relation between childhood maltreatment and major depressive disorder: A longitudinal community-based cohort. *Dev. Psychopathol.* **36**, 50–61 (2024).
50. Wang, X. et al. Effect of childhood maltreatment on cognitive function and its relationship with personality development and social coping style in major depression disorder patients: A latent class model and network analysis. *Front. Psychiatry* **14**, 748857 (2023).
51. Zhou, J. et al. Associations among depressive symptoms, childhood abuse, neuroticism, social support, and coping style in the population covering general adults, depressed patients, bipolar disorder patients, and high risk population for depression. *Front. Psychol.* **10**, 1321 (2019).
52. Etain, B. & Aas, M. Childhood maltreatment in bipolar disorders. *Curr. Top. Behav. Neurosci.* **48**, 277–301 (2021).
53. Fares-Otero, N. E. et al. Association between childhood maltreatment and social functioning in individuals with affective disorders: A systematic review and meta-analysis. *Acta Psychiatr. Scand.* **148**, 142–164 (2023).

54. Gruhn, M. A. & Compas, B. E. Effects of maltreatment on coping and emotion regulation in childhood and adolescence: A meta-analytic review. *Child. Abuse Negl.* **103**, 104446 (2020).
55. Hallowell, E. S. et al. The mediating role of neural activity on the relationship between childhood maltreatment and impulsivity. *Child. Maltreat.* **24**, 389–399 (2019).
56. McLaughlin, K. A., Peverill, M., Gold, A. L., Alves, S. & Sheridan, M. A. Child maltreatment and neural systems underlying emotion regulation. *J. Am. Acad. Child. Adolesc. Psychiatry* **54**, 753–762 (2015).
57. Oh, M. et al. Differences in personality, defense styles, and coping strategies in individuals with depressive disorder according to age groups across the lifespan. *Psychiatry Investig.* **16**, 911–918 (2019).
58. Jackson, Y., Huffhines, L., Stone, K. J., Fleming, K. & Gabrielli, J. Coping styles in youth exposed to maltreatment: longitudinal patterns reported by youth in foster care. *Child. Abuse Negl.* **70**, 65–74 (2017).
59. Compas, B. E. et al. Coping, emotion regulation, and psychopathology in childhood and adolescence: A meta-analysis and narrative review. *Psychol. Bull.* **143**, 939–991 (2017).
60. Bernstein, E. E., Nierenberg, A. A., Deckersbach, T. & Sylvia, L. G. Eating behavior and obesity in bipolar disorder. *Aust. N. Z. J. Psychiatry* **49**, 566–572 (2015).
61. Conway, K. P., Swendsen, J., Husky, M. M., He, J. P. & Merikangas, K. R. Association of lifetime mental disorders and subsequent alcohol and illicit drug use: results from the National comorbidity survey-adolescent supplement. *J. Am. Acad. Child. Adolesc. Psychiatry* **55**, 280–288 (2016).
62. Di Nicola, M. et al. Behavioural addictions in bipolar disorder patients: role of impulsivity and personality dimensions. *J. Affect. Disord.* **125**, 82–88 (2010).
63. Budimir, S., Probst, T. & Pieh, C. Coping strategies and mental health during COVID-19 lockdown. *J. Ment. Health Abingd. Engl.* **30**, 156–163 (2021).
64. Meng, X. H., Tao, F. B., Wan, Y. H., Hu, Y. & Wang, R. X. Coping as a mechanism linking stressful life events and mental health problems in adolescents. *Biomed. Environ. Sci.* **24**, 649–655 (2011).
65. Fares-Otero, N. E. et al. Child maltreatment and resilience in adulthood: a protocol for a systematic review and meta-analysis. *Eur. J. Psychotraumatology* **14**, 2282826 (2023).
66. McLaughlin, K. A., Weissman, D. & Bitrán, D. Childhood adversity and neural development: A systematic review. *Annu. Rev. Dev. Psychol.* **1**, 277–312 (2019).
67. Ögüt, Ç., Başar, K. & Karahan, S. Impulsivity in depression: its relation to suicidality. *J. Psychiatr. Pract.* **29**, 189–201 (2023).
68. Santana, R. P., Kerr-Gaffney, J., Ancane, A. & Young, A. H. Impulsivity in bipolar disorder: state or trait? *Brain Sci.* **12**, 1351 (2022).
69. Joyce, S. et al. Road to resilience: A systematic review and meta-analysis of resilience training programmes and interventions. *BMJ Open* **8**, e017858 (2018).
70. Smith, L. et al. Parent and carer skills groups in dialectical behaviour therapy for high-risk adolescents with severe emotion dysregulation: A mixed-methods evaluation of participants' outcomes and experiences. *Int. J. Environ. Res. Public Health* **20**, 6334 (2023).
71. Lai, K. Y. C., Hung, S. F., Lee, H. W. S. & Leung, P. W. L. School-based mental health initiative: potentials and challenges for child and adolescent mental health. *Front. Psychiatry* **13**, 866323 (2022).
72. Yang, Y., Fu, L., Cheng, S. Y. & Fowler, P. Youth mental health prevention and promotion programs in Chinese societies: A systematic review and meta-analysis. *Adolesc. Res. Rev.* **1**, 1. <https://doi.org/10.1007/s40894-024-00254-y> (2025).
73. Tognin, S. et al. Association between adverse childhood experiences and long-term outcomes in people at clinical high-risk for psychosis. *Schizophr. Heidelb. Ger.* **11**, 23 (2025).

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## Author contributions

Jiawei Zhou and Zheng Zhang conceptualized the study and drafted the manuscript. Jiawei Zhou, Zheng Zhang, Sihong Li, Xianliang Chen, and Hui Chen completed the data collection work. Jiawei Zhou and Zheng Zhang undertook the statistical analysis. Huajia Tang and Jiansong Zhou revised the manuscript. Each author has thoroughly reviewed the draft and given their approval for the final version of the manuscript. All authors accepted responsibility for the entirety of the research presented.

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## Declarations

## Competing interests

The authors declare no competing interests.

## Additional information

**Correspondence** and requests for materials should be addressed to J.Z.

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