



# OPEN Child psychological maltreatment, depression, psychological inflexibility and difficulty in identifying feelings, a moderated mediation model

Liyuan Yang<sup>1,5</sup>, Ying Tao<sup>2,5</sup>, Ning Wang<sup>3</sup>, Yichi Zhang<sup>1</sup> & Yang Liu<sup>4</sup>✉

Child psychological maltreatment has a strong relationship with college students' depression. However, the potential mediating and moderating variables between the two need further exploration. This study collected subjective data of college students from two universities in China through a cross-sectional survey, including variables such as child psychological maltreatment, psychological inflexibility, difficulty in identifying feelings, and depression. Through correlation analysis, a mediation model and a moderated mediation model were constructed to explore the interrelationships among the variables. The research results show that there is a significant positive correlation between child psychological maltreatment, psychological inflexibility, difficulty in identifying feelings, and college students' depression. Moreover, psychological inflexibility plays a mediating role between child psychological maltreatment and college students' depression, while difficulty in identifying feelings significantly moderates the relationship between child psychological maltreatment and college students' depression. This study reveals the significant associations among child psychological maltreatment, psychological inflexibility, difficulty in identifying feelings, and college students' depression. These findings remind us to pay attention to the potential mediating role of psychological inflexibility and the moderating role of difficulty in identifying feelings when exploring the relationship between child psychological maltreatment and college students' depression. These results provide a new perspective for understanding the psychological mechanism of depression and offer potential targets for prevention and intervention.

**Keywords** Child psychological maltreatment, Depression, Psychological inflexibility, Difficulty in identifying feelings, College students

Child psychological maltreatment, a form of child maltreatment, refers to an adverse and continuous non-physical interaction pattern between an individual and their caregivers during childhood, typically encompassing emotional neglect and emotional abuse<sup>1</sup>. Emotional neglect usually implies that caregivers fail to meet a child's developmental and emotional needs<sup>2</sup>; while emotional abuse generally includes any verbal attacks or humiliating behaviors by caregivers towards children<sup>2</sup>. A large-scale cross-sectional epidemiological survey in China found that 30–40% of adolescents have experienced child psychological maltreatment<sup>3</sup>. Child psychological maltreatment is a relatively common form of child maltreatment, yet it is also the most concealed and destructive form of abuse<sup>4,5</sup>, even having a non-negligible and destructive impact on an individual's future<sup>4</sup>. Among them, the relationship between child psychological maltreatment and depression among college students has received extensive attention<sup>6–8</sup>, but the psychological mechanism between the two still needs further exploration. Therefore, this study aims to further explore the relationship between child psychological maltreatment and depression among college students and its potential mediating and moderating factors.

<sup>1</sup>College of Physical Education of CDU, Chengdu University, Chengdu, China. <sup>2</sup>Graduate School, Adamson University, Manila, Philippines. <sup>3</sup>College of Physical Education and Health Science, Guangxi MINZU University, Nanning, China. <sup>4</sup>School of Sports Science, Jishou University, Jishou, China. <sup>5</sup>These authors have contributed equally to this work and share first authorship. ✉email: ldyedu@foxmail.com

The relationship between child psychological maltreatment and depression can be explained through attachment theory<sup>9</sup>. According to this theory<sup>10</sup>, caregivers serve as the foundation of an individual's sense of security during early childhood. When faced with difficulties or distress, children typically seek comfort and safety from their caregivers. However, when caregivers respond inadequately or inappropriately to a child's emotional and safety needs, the child may experience child psychological maltreatment, either actively or passively<sup>11</sup>. In such cases, instead of receiving care and love, the child may encounter loneliness and despair<sup>12</sup>, which are significant risk factors for depression<sup>13–15</sup>. Consequently, individuals who experience child psychological maltreatment are more likely to develop depressive tendencies. Empirical studies have consistently found a strong correlation between child psychological maltreatment and depression among college students<sup>16–18</sup>. A meta-analysis involving 184 primary studies revealed that the prevalence rates of emotional neglect and emotional abuse were 36.18% (95% CI: 28.53–44.60%) and 43.20% (95% CI: 36.2–50.46%), respectively, which are significantly higher than those of other subtypes of child maltreatment<sup>19</sup>. Moreover, the correlation coefficients (*r*) between emotional neglect and depression and between emotional abuse and depression were 0.26 (0.20–0.32) and 0.29 (0.25–0.33), respectively, both of which are higher than those observed for other child maltreatment subtypes<sup>19</sup>. Based on this evidence, this study hypothesizes that there is a significant correlation between child psychological maltreatment and depression among college students (H1).

When examining the relationship between child psychological maltreatment and depression, it is important to consider potential mediating variables. child psychological maltreatment often leads adolescents to feel unloved<sup>20</sup>, which can have profound negative psychological effects, both during adolescence and in adulthood<sup>19</sup>. According to the Family Stress Model<sup>21</sup> and the Shattered Assumptions Theory<sup>22</sup>, child psychological maltreatment undermines an adolescent's ability to obtain emotional security from caregivers, potentially causing them to question their self-worth and lovability. In this context, the psychological concept of psychological inflexibility becomes particularly relevant. psychological inflexibility refers to a state in which an individual's behavior is driven by their thoughts and internal experiences rather than by objective reality<sup>23</sup>. Although few studies have directly explored the relationship between child psychological maltreatment and psychological inflexibility, recent research has identified a significant association between child maltreatment and adolescent psychological inflexibility<sup>24</sup>. Individuals who experience child psychological maltreatment may become trapped in a cycle dominated by negative emotions, leading to higher levels of psychological inflexibility. Cross-sectional studies have demonstrated a significant positive correlation between psychological inflexibility and depression<sup>25</sup>, while longitudinal studies have shown that psychological inflexibility can predict subsequent depressive symptoms<sup>24,26</sup>. Based on this evidence, this study hypothesizes that psychological inflexibility mediates the relationship between child psychological maltreatment and depression among college students (H2).

When an individual has certain traits or when negative cognitions and emotions are not properly regulated, the relationship between variables may be stronger. For example, difficulty in identifying feelings, which is one of the dimensions of alexithymia<sup>27</sup>, is the difficulty for an individual to identify their own or others' emotions. In terms of oneself, when there is an increasing tendency towards difficulty in identifying feelings, it may lead to a more severe depressive tendency. A previous meta-analysis study found that difficulty in identifying feelings is the dimension with the highest correlation between alexithymia and depression in individuals<sup>28</sup>. In another study discussing the moderating role of different dimensions of alexithymia in the relationship between internet addiction and depression among college students, it was found that difficulty in identifying feelings is also the strongest moderating factor among the dimensions of alexithymia<sup>8</sup>. According to the "rich get richer" model<sup>29</sup>, existing advantages tend to be further amplified. Integrating the above findings, it is hypothesized that the relationship between child psychological maltreatment and depression will be further strengthened by difficulty in identifying feelings (H3).

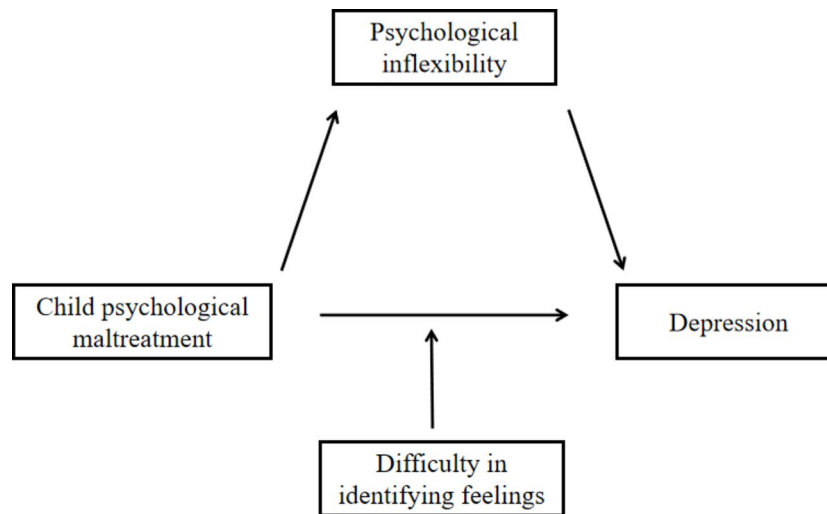
In summary, this study will discuss the relationship between child psychological maltreatment and depression among college students, while considering the mediating role of psychological inflexibility between the two and the moderating role of difficulty in identifying feelings in the relationship between child psychological maltreatment and depression among college students. Therefore, this study constructs a hypothetical model diagram (Fig. 1) to further explore the internal psychological mechanism between child psychological maltreatment and depression among college students.

## Methods

### Participants

In the fall semester of 2023, a cross-sectional survey was conducted among college students at two public universities in Hunan Province. Utilizing the Kendall formula<sup>30</sup>, and considering the number of variables in our study, the initial estimated sample size was calculated to be 5–10 times the number of study variables. To account for potential losses in online questionnaire responses, an additional 30% was added to the sample size. Consequently, the sample size formula for this study was:  $n = 10 \times \text{number of variables} / (1 - 30\%)$ . This calculation resulted in a minimum required sample size of 458. The convenience sampling method was used, and online electronic questionnaires were distributed to college students by class. Before distribution, the experimenter obtained the informed consent of students and their counselors and gave a lecture to all college students. The participants were informed of the purpose of this survey and the anonymity and final destination of the data. The questionnaire was filled out anonymously, and an online informed consent form was attached on the first page of the electronic questionnaire. Only when the participant read and clicked to confirm did it mean that their informed consent had been obtained for this survey. Participants could complete the entire electronic questionnaire within 10 min. Ethical approval was obtained from the institutional medical ethics committee before commencement. The study was conducted in accordance with the Declaration of Helsinki.

Ultimately, 851 college students completed the survey. After screening for excessively short response times and patterned responses, a total of 676 valid datasets were obtained (291 males and 385 females; 140 only children



**Fig. 1.** Hypothetical model.

and 536 non-only children; 357 first-year students, 257 second-year students, and 62 third-year students; 413 left-behind students and 263 non-left-behind students), with a mean age of 18.71 years ( $SD = 1.08$ ; range: 17–22 years).

## Measures

### *Child psychological maltreatment*

The EA and EN subscales in the abbreviated Childhood Trauma Questionnaire revised by Zhao et al. were used to measure child psychological maltreatment<sup>31</sup>. An example item is “Someone in my family said things that were insulting or hurtful to me.” Each subscale includes 5 questions and is scored on a Likert 5-point scale. The scoring range for each question is from 1 (never) to 5 (always). The total score range is 10–50. The higher the total score, the higher the degree of child psychological maltreatment in college students. In this study, the Cronbach’s  $\alpha$  of the sample is 0.88.

### *Depression*

The Chinese version of the Depression Anxiety Stress Scale (DASS-21) was used to measure depression<sup>32</sup>. An example item is “I am unable to feel enthusiastic about anything.” In this study, the depression part of the scale was used, which includes a total of 7 items and is scored on a Likert 4-point scale. The scoring range for each question is from 1 (strongly disagree) to 4 (strongly agree). The total score range is 7–28. The higher the total score, the more severe the depressive tendency. In this study, the Cronbach’s  $\alpha$  of the sample is 0.91.

### *Psychological inflexibility*

The Adolescent Avoidance and Fusion Questionnaire compiled by Chen et al. was used to measure psychological inflexibility<sup>33</sup>. An example item is “If my heart races, I feel that there is something wrong with my body or mind.” The scale includes a total of 8 items and is scored on a Likert 5-point scale. The scoring range for each question is from 1 (never) to 5 (always). The total score range is 8–40. The higher the total score, the higher the degree of psychological inflexibility. In this study, the Cronbach’s  $\alpha$  of the sample is 0.82.

### *Difficulty identifying feelings*

The DIF subscale of the Chinese version of the Toronto Alexithymia Scale (TAS) was used to assess the degree of difficulty in identifying feelings<sup>34</sup>. An example item is “I have feelings that I cannot identify.” This subscale includes 7 items and is scored on a 5-point Likert scale. The scoring range for each question is from 1 (strongly disagree) to 5 (strongly agree). The total score range is 7–35. The higher the score, the higher the degree of difficulty in identifying feelings. The Cronbach’s  $\alpha$  coefficient of the sample in this study is 0.87.

## Statistical analyses

All statistical analyses were conducted using SPSS (26.0) [[https://www.ibm.com/software/passportadvantage/pa\\_o\\_customer.html](https://www.ibm.com/software/passportadvantage/pa_o_customer.html)] software. Firstly, potential biases resulting from self-report questionnaires were evaluated by checking for methodological biases<sup>35</sup>. Then, the data of the main variables were standardized before conducting the analyses. Finally, to test our hypotheses, the PROCESS (4.10) [<https://www.processmacro.org/download.html>] macro (Mode 4 and Model 5) in SPSS was used to analyze the relationships between variables<sup>36</sup>. The PROCESS macro is based on a bootstrapping method with 5000 resamples to estimate the model testing and 95% confidence intervals (95% CI). A relationship is considered significant when the 95% CI does not include 0. Demographic variables were included as covariates in the analyses, and the significance level was set at  $\alpha = 0.05$ .

Variables		Child psychological maltreatment		Psychological inflexibility		Depression		Difficulty in identifying feelings	
		Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
Gender	Male	20.44	7.21	19.80	6.37	12.69	4.86	17.10	6.19
	Female	19.57	7.64	18.64	5.50	12.25	4.16	17.64	5.49
	t	1.505		2.488*		1.240		-1.182	
Only-child status	Yes	18.24	7.42	18.59	5.83	11.96	4.55	16.74	5.86
	No	20.39	7.42	19.28	5.94	12.56	4.45	17.58	5.78
	t	-3.051**		-1.244		-1.424		-1.541	
Left-behind status	Yes	20.86	7.53	19.65	5.98	12.75	4.49	18.00	5.56
	No	18.51	7.16	18.33	5.73	11.95	4.41	16.48	6.06
	t	4.028***		2.850**		2.258*		3.332**	
Grade	Freshman	18.55	7.09	18.46	5.56	11.77	4.13	17.40	5.81
	Sophomore Year	21.25	7.47	19.71	6.04	13.16	4.71	17.56	5.85
	Junior	22.63	7.94	20.71	6.86	13.26	4.86	16.82	5.67
	F	14.742***		5.834**		5.850***		0.399	

**Table 1.** Descriptive analysis. \*:  $p<0.05$ ; \*\*:  $p<0.01$ ; \*\*\*:  $p<0.001$ .

	Child psychological maltreatment	Psychological inflexibility	Depression
Child psychological maltreatment	-		
Psychological inflexibility	0.332***	-	
Depression	0.478***	0.448***	-
Difficulty in identifying feelings	0.319***	0.474***	0.529***

**Table 2.** Correlational analyses. \*  $p<0.05$ ; \*\*  $p<0.01$ ; \*\*\* $p<0.001$ .

Results  
Harman’s single factor test

Harman’s single factor test was used to examine the impact of common method variance. The analysis results showed that there were two factors with eigenvalues greater than 1. Without rotating the principal component factors, the explanatory rate of the first factor was 32.041%, which was lower than the recommended threshold of 40%. Therefore, this study did not encounter serious common method bias.

Descriptive analysis

Significant differences were observed in psychological inflexibility between genders, child psychological maltreatment between only-child and non-only-child statuses, and child psychological maltreatment, psychological inflexibility, depression, and difficulty in identifying feelings between left-behind and non-left-behind statuses. Additionally, significant differences were found in child psychological maltreatment, psychological inflexibility, and depression across different grades. Specific details are presented in Table 1.

Correlational analyses

As shown in Table 2, the results indicated that there were significant positive correlations between child psychological maltreatment and college students’ psychological inflexibility ( $r=0.332, p<0.001$ ), depression ( $r=0.478, p<0.001$ ) and difficulty in identifying feelings ( $r=0.319, p<0.001$ ). There were also significant positive correlations between psychological inflexibility and college students’ depression ( $r=0.448, p<0.001$ ) as well as between psychological inflexibility and difficulty in identifying feelings ( $r=0.474, p<0.001$ ). Difficulty in identifying feelings was significantly positively correlated with college students’ depression ( $r=0.529, p<0.001$ ).

Mediation model testing

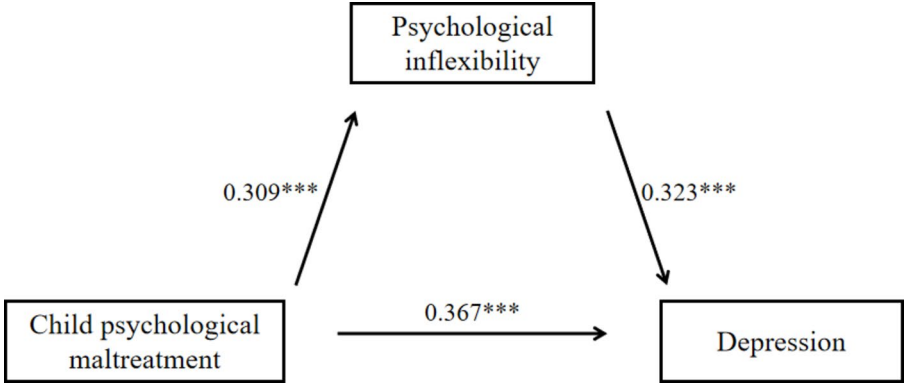
After controlling for the demographic variables mentioned in the methods section, the mediation test results are shown in Table 3; Fig. 2. child psychological maltreatment had a significant predictive effect on college students’ depression ( $\beta=0.467, p<0.001$ ). After adding the mediating variable, the predictive effect of child psychological maltreatment on college students’ depression was still significant ( $\beta=0.367, p<0.001$ ). In addition, child psychological maltreatment had a significant predictive effect on college students’ psychological inflexibility ( $\beta=0.309, p<0.001$ ), and psychological inflexibility had a significant predictive effect on college students’ depression ( $\beta=0.323, p<0.001$ ). The proportion of mediating effects is shown in Table 4.

Moderating mediation testing

After controlling for the demographic variables mentioned in the methods section, the mediation moderation test results are shown in Table 5; Fig. 3, and Fig. 4. The predictive effect of child psychological maltreatment on

Variables	Depression				Psychological inflexibility				Depression			
	$\beta$	SE	t	Bootstrap 95% CI	$\beta$	SE	t	Bootstrap 95% CI	$\beta$	SE	t	Bootstrap 95% CI
Child psychological maltreatment	0.467	0.035	13.217***	0.397, 0.536	0.309	0.038	8.191***	0.235, 0.383	0.367	0.035	10.545***	0.299, 0.435
Psychological inflexibility									0.323	0.034	9.510***	0.257, 0.390
R <sup>2</sup>	0.232				0.124				0.324			
F	33.720***				15.810***				45.685***			

**Table 3.** Mediation model testing. \*\*\*:  $p<0.001$



**Fig. 2.** Test of the mediation model.

Mediation model paths	Effect	SE	Bootstrap 95% CI	Proportion of mediating effect
Total effect	0.467	0.035	0.397, 0.536	
Direct effect	0.367	0.035	0.299, 0.435	
Indirect effect	0.100	0.018	0.067, 0.138	21.413%

**Table 4.** Path analysis of mediation model.

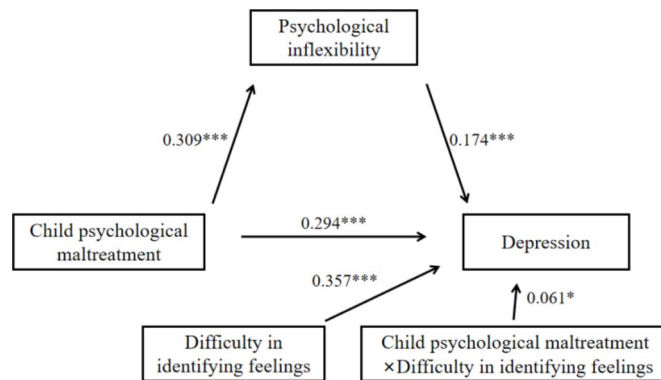
	Psychological inflexibility				Depression			
	$\beta$	SE	t	Bootstrap 95% CI	$\beta$	SE	t	Bootstrap 95% CI
Child psychological maltreatment (A)	0.309	0.038	8.191***	0.235, 0.383	0.294	0.033	8.917***	0.229, 0.359
Psychological inflexibility					0.174	0.035	4.998***	0.105, 0.242
Difficulty in identifying feelings (B)					0.357	0.035	10.288***	0.289, 0.425
A × B					0.061	0.028	2.176*	0.006, 0.117
R <sup>2</sup>	0.124				0.420			
F	15.810***				53.691***			

**Table 5.** Moderating mediation testing. \*  $p<0.05$ ; \*\*\* $p<0.001$ .

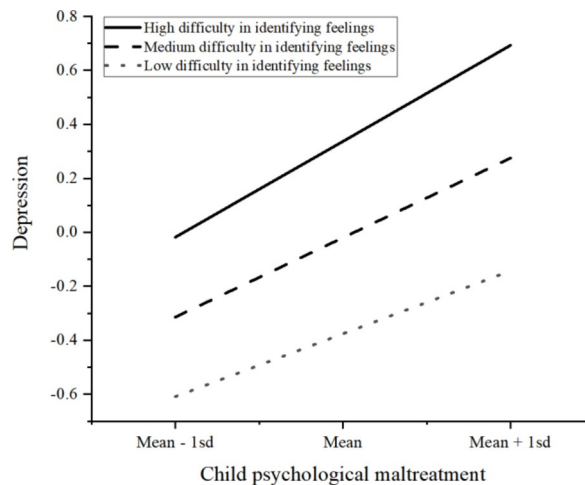
college students’ depression was still significant after adding the moderating variable difficulty in identifying feelings ( $\beta=0.294, p<0.001$ ). In addition, difficulty in identifying feelings had a significant predictive effect on college students’ depression ( $\beta=0.357, p<0.001$ ). At the same time, the interaction term of child psychological maltreatment and difficulty in identifying feelings ( $\beta=0.061, p<0.05$ ) had a significant predictive effect on college students’ depression.

**Discussion**

This study explored the interrelationships among child psychological maltreatment, psychological inflexibility, difficulty in identifying feelings, and depression among college students and constructed the internal connections between them. The current study found significant pairwise correlations between child psychological maltreatment, psychological inflexibility, difficulty in identifying feelings, and depression among college students. In addition, psychological inflexibility played a mediating role between child psychological maltreatment and depression among college students. At the same time, difficulty in identifying feelings significantly moderated



**Fig. 3.** Moderating mediation model.



**Fig. 4.** Simple slope diagram.

the relationship between child psychological maltreatment and depression among college students. These findings further enrich the internal psychological mechanism between child psychological maltreatment and depression among college students.

This study found significant gender differences in psychological inflexibility, with males exhibiting higher levels of psychological inflexibility than females. This finding contrasts with previous research, which reported that females scored significantly higher on psychological inflexibility than males<sup>37</sup>. Researchers have suggested that this discrepancy may be attributed to females' greater tendency to engage in rumination compared to males<sup>38</sup>. Although rumination and psychological inflexibility are not identical constructs, they share substantial similarities in both structure and function<sup>39</sup>. The opposite result observed in this study may be related to cultural context or sample characteristics, necessitating further investigation to validate these findings. Additionally, significant differences were observed in child psychological maltreatment between only children and those with siblings, with the latter group reporting higher levels of child psychological maltreatment. This result is plausible, as parents with multiple children may distribute their attention and emotional resources unevenly, particularly toward older siblings, who are more likely to experience emotional neglect. Finally, among participants with left-behind experiences, scores for all 4 variables (child psychological maltreatment, psychological inflexibility, difficulty in identifying feelings, and depression) were significantly higher than in other groups. This outcome is unsurprising, as individuals with left-behind experiences are often exposed to greater childhood adversity, which may impair brain development<sup>40</sup> and subsequently elevate scores on the key variables examined in this study.

This study found a significant relationship between child psychological maltreatment and depression among college students, so hypothesis H1 was established. This is consistent with previous research results<sup>7,8,41</sup>. Child psychological maltreatment is related to strong and lasting negative emotional experiences of individuals, including shame, guilt, and a sense of worthlessness<sup>42</sup>, which are usually related to depression<sup>43,44</sup>. A large-scale meta-study found that the relationship between individuals with child psychological maltreatment experience and depression is more than three times that of those without child psychological maltreatment experience<sup>45</sup>. Moreover, among different types of abuse, child psychological maltreatment is most relevant to depression in adult individuals<sup>45</sup>. From a physiological and anatomical perspective, child psychological maltreatment damages



the structures of the hippocampus, amygdala, and medial prefrontal cortex of individuals, causing dysfunction of the hypothalamic–pituitary–adrenal (HPA) axis<sup>46,47</sup>, leading to limited emotional regulation ability and consequently causing depression.

In addition, this study also found that psychological inflexibility mediates the relationship between child psychological maltreatment and depression among college students. Although there is currently no further research fully discussing the relationship between child psychological maltreatment and psychological inflexibility, it is not difficult to find that there should be a relatively strong positive correlation between the two through the definitions of child psychological maltreatment and psychological inflexibility. First, child psychological maltreatment includes neglecting an individual's emotional needs, negative affirmation, and disapproval<sup>20</sup>, which echoes with “all bad things about oneself are true” and “tachycardia is because there is a problem with one's body or psychology” in psychological inflexibility<sup>31</sup>. Due to the “repetitive” and “long-term” characteristics of child psychological maltreatment, it seems to have produced a strong negative cognitive bias about one's own situation and behavior, believing that one should be like this. Worse still, psychological inflexibility is highly correlated with depression<sup>48</sup>. Individuals with a high level of psychological inflexibility have difficulty in cognitive transformation, making them have a higher level of negative cognitive tendency, which may be related to a higher level of depression<sup>49</sup>. Therefore, the prediction of child psychological maltreatment on college students' depression may be transmitted through psychological inflexibility.

Finally, this study found that difficulty in identifying feelings strengthened the relationship between child psychological maltreatment and depression among college students, a finding consistent with previous research<sup>8</sup>. Although studies specifically examining the relationship between difficulty in identifying feelings and depression remain limited, existing evidence suggests a clear connection between the two. For instance, a meta-analysis revealed that depression is strongly associated with difficulties in recognizing facial expressions<sup>50,51</sup>. This association can be explained by the fact that individuals with high levels of difficulty in identifying feelings struggle to identify their own emotions as well as those of others. More specifically, they face challenges in effectively regulating their emotions and understanding the emotional states of others, which can lead to emotional instability and difficulties in establishing healthy interpersonal relationships<sup>52,53</sup>. Given that emotional regulation and interpersonal relationships are closely linked to an individual's level of depression<sup>54–57</sup>, these findings further underscore the significance of difficulty in identifying feelings in the context of depression. Additionally, previous research has demonstrated a strong correlation between psychological inflexibility and rumination<sup>39</sup>, a well-established predictor of depression<sup>58,59</sup>. Therefore, when individuals exhibit high levels of difficulty in identifying feelings, the relationship between child psychological maltreatment and depression may be further amplified.

This study deeply explored the complex relationships among child psychological maltreatment, psychological inflexibility, difficulty in identifying feelings, and depression among college students, revealing the internal connections and interactions between them, which has important theoretical significance and practical value. The research results show that there are significant positive correlations among child psychological maltreatment, psychological inflexibility, difficulty in identifying feelings, and depression among college students. psychological inflexibility plays a mediating role between child psychological maltreatment and depression among college students, and difficulty in identifying feelings significantly moderates the relationship between child psychological maltreatment and depression among college students. These findings not only enrich the theoretical framework of the psychological and behavioral mechanisms between child psychological maltreatment and depression among college students but also provide a new perspective and strategy for clinical intervention. At the theoretical level, this study verified the close relationship between child psychological maltreatment and depression through empirical research, further confirming the long-term negative impact of child psychological maltreatment on individual mental health and providing new evidence for understanding the psychological pathological mechanism of depression. At the practical level, the research results suggest that for college student groups, especially those with child psychological maltreatment experience, attention should be paid to the assessment and intervention of psychological inflexibility and difficulty in identifying feelings to reduce the risk of depression. In terms of clinical significance, this study provides a scientific basis for developing prevention and intervention measures for child psychological maltreatment victims and emphasizes the importance of considering the child psychological maltreatment background when treating depression. In addition, this study also suggests that future research should further explore the causal relationship between child psychological maltreatment and psychological inflexibility, difficulty in identifying feelings, and the relationship between these variables in different cultural backgrounds. At the same time, research should also pay attention to other potential variables related to depression, such as physical exercise. Previous studies have found that physical exercise is negatively correlated with depression among college students and reduces the relationship between addictive behaviors and depression<sup>60</sup>. In addition, physical exercise can also reduce an individual's negative emotions<sup>61–65</sup>, create friendly interpersonal relationships for individuals<sup>66</sup>, and then alleviate addictive behaviors<sup>61,67–72</sup>, psychological inflexibility, and insomnia<sup>73</sup>, improve self-control<sup>67,74</sup>, providing a guarantee for ultimately preventing and alleviating depression symptoms among college students and providing more innovative intervention strategies for the field of mental health. In summary, this study not only enhances the understanding of the relationship between child psychological maltreatment and depression among college students but also provides valuable theoretical and practical guidance for the maintenance and promotion of mental health.

Although this study revealed the internal connections between child psychological maltreatment, psychological inflexibility, difficulty in identifying feelings, and depression among college students, there are also some limitations. First, this study mainly relies on subjective survey data, which may lead to the objectivity of the data being affected by subjective biases. Second, the study uses a cross-sectional design, which limits the interpretation of the causal relationship between variables. Finally, this study did not conduct cross-regional

research, and the relationship between these variables may be different in different cultural backgrounds. In response to these limitations, future research should adopt more objective data collection methods, such as combining physiological indicators and third-party reports, to enhance the objectivity of the data; adopt a longitudinal research design to better explore the causal relationship between variables; and conduct cross-cultural research to explore the relationship between these variables in different cultural backgrounds.

## Conclusion

This study reveals the significant associations among child psychological maltreatment, psychological inflexibility, difficulty in identifying feelings, and depression among college students. The study found that child psychological maltreatment, psychological inflexibility, difficulty in identifying feelings, and depression are significantly correlated pairwise. psychological inflexibility plays a mediating role between child psychological maltreatment and depression, and difficulty in identifying feelings moderates the relationship between child psychological maltreatment and depression. Therefore, this study contributes to the growing body of literature on the psychological mechanisms underlying depression among college students. By identifying psychological inflexibility and difficulty in identifying feelings as key factors in the relationship between child psychological maltreatment and depression, it offers new directions for targeted interventions. Future research should build on these findings to further elucidate the complex interplay among these variables and explore their implications for mental health promotion and depression prevention.

Finally, future research should consider exploring other potential mediating or moderating factors that may influence the relationship between child psychological maltreatment and depression. For instance, studies have shown that physical exercise can have a protective effect against depression by improving emotional regulation and reducing stress. Investigating the role of such factors could provide a more comprehensive understanding of the underlying mechanisms and inform the development of more effective prevention and intervention strategies.

## Data availability

The datasets generated and/or analysed during the current study are not publicly available due [our experimental team's policy] but are available from the corresponding author on reasonable request.

Received: 6 December 2024; Accepted: 3 March 2025

Published online: 12 March 2025

## References

- Glaser, D. How to deal with emotional abuse and Neglect—Further development of a conceptual framework (Framea). *Child Abuse Negl.* **35**, 866–875 (2011).
- Bernstein, D. P. et al. Development and validation of a brief screening version of the childhood trauma questionnaire. *Child Abuse Negl.* **27**, 169–190 (2003).
- Lin, C. et al. Prevalence and associated factors of adolescent psychological abuse, neglect in Western China a Multi-Center Cross-Sectional study. *Eur. J. Psychotraumatol.* **15**, 2382651 (2024).
- Gama, C.M.F., Portugal, L.C.L., Gonçalves, R.M., et al. The invisible scars of emotional abuse: a common and highly harmful form of childhood maltreatment. *BMC Psychiatry* **21**(1), 156 (2021).
- Barnett, O., Miller-Perrin, C. L. & Perrin, R. D. *Family Violence Across the Lifespan: An Introduction*, 2Nd Ed., Sage Publications, IncThousand Oaks, CA, US, (2005).
- Li, Q. et al. The relationship between childhood emotional abuse and depressive symptoms among Chinese college students: the multiple mediating effects of emotional and behavioral problems. *J. Affect. Disord.* **288**, 129–135 (2021).
- Liu, Y. et al. The relationship between childhood psychological abuse and depression in college students: A moderated mediation model. *Bmc Psychiatry.* **24**, 410 (2024).
- Liu, Y., Duan, L., Shen, Q., Xu, L. & Zhang, T. The relationship between childhood psychological abuse and depression in college students: internet addiction as mediator, different dimensions of alexithymia as moderator. *Bmc Public. Health.* **24**, 2744 (2024).
- Crittenden, P. M. & Ainsworth, M. D. S. *Child Maltreatment and Attachment Theory*432–463 (Cambridge University Press, 1989).
- Simpson, J. A., Rholes, W. S., Eller, J. & Paetzold, R. L. *Major Principles of Attachment Theory: Overview, Hypotheses, and Research Ideas*222–239 (The Guilford Press, 2021).
- Cohen, J. R. & Thakur, H. Developmental consequences of emotional abuse and neglect in vulnerable adolescents: A Multi-Informant, Multi-Wave study. *Child Abuse Negl.* **111**, 104811 (2021).
- Yan, J., Feng, X. & Schoppe-Sullivan, S. J. Longitudinal associations between Parent-Child relationships in middle childhood and Child-Perceived loneliness. *J. Fam Psychol.* **32**, 841–847 (2018).
- Achterbergh, L. et al. The experience of loneliness among young people with depression: A qualitative Meta-Synthesis of the literature. *Bmc Psychiatry.* **20**, 415 (2020).
- Fu, C. et al. Relationship between personality and adolescent depression: the mediating role of loneliness and problematic internet use. *Bmc Psychiatry.* **24**, 683 (2024).
- Thapar, A., Eyre, O., Patel, V. & Brent, D. Depression in young people. *Lancet* **400**, 617–631 (2022).
- Chang, J.J., Ji, Y., Li, Y.H., Yuan, M.Y., Su, P.Y., Childhood trauma and depression in college students: Mediating and moderating effects of psychological resilience. *Asian J Psychiatr.* **65**, 102824 (2021).
- Wright, M. O., Crawford, E. & Del, C. D. Childhood emotional maltreatment and later psychological distress among college students: the mediating role of maladaptive schemas. *Child Abuse Negl.* **33**, 59–68 (2009).
- Liu Y, Wang P, Duan L, Shen Q, Xu L, Zhang T. The mediating effect of social network sites addiction on the relationship between childhood psychological abuse and depression in college students and the moderating effect of psychological flexibility. *Psychol Psychother.* Published online February 10, 2025.
- Nelson, J., Klumparendt, A., Doebler, P. & Ehring, T. Childhood maltreatment and characteristics of adult depression: Meta-Analysis. *Br. J. Psychiatry.* **210**, 96–104 (2017).
- Hornor, G. & Emotional Maltreatment *J. Pediatr. Health Care* **26**, 436–442 (2012).
- Masarik, A. S. & Conger, R. D. Stress and child development: A review of the family stress model. *Curr. Opin. Psychol.* **13**, 85–90 (2017).
- Janoff-Bulman, R. *Shattered Assumptions: Towards a New Psychology of Trauma* (Free, 1992).



23. Paul, H. A., Process-Based & Cbt The science and core clinical competencies of cognitive behavior therapy. *Child. Fam Behav. Ther.* **40**, 320–326 (2018).
24. Taşören, A. B. Childhood maltreatment and emotional distress: the role of beliefs about emotion and psychological inflexibility. *Curr. Psychol.* **42**, 13276–13287 (2023).
25. Bardeen, J. R. & Fergus, T. A. The interactive effect of cognitive fusion and experiential avoidance on anxiety, depression, stress and posttraumatic stress symptoms. *J. Contextual Behav. Sci.* **5**, 1–6 (2016).
26. Liu, Y., Wang, P., Duan, L., Shen, Q., Xu, L., Zhang, T. The mediating effect of social network sites addiction on the relationship between childhood psychological abuse and depression in college students and the moderating effect of psychological flexibility. *Psychology and Psychotherapy: Theory, Research and Practice*, 1–15. <https://doi.org/10.1111/papt.12580> (2025).
27. Preece, D. A. et al. What is alexithymia?? Using factor analysis to Establish its latent structure and relationship with fantasizing and emotional reactivity. *J. Pers.* **88**, 1162–1176 (2020).
28. Li, S. W., Zhang, B., Guo, Y. F. & Zhang, J. P. 6 The association between alexithymia as assessed by The 20-Item Toronto alexithymia scale and depression: A Meta-Analysis. *Psychiatry Res.* **227**, 1–9 (2015).
29. Lee, C. J. & Sang, H. Why the Rich Get Richer? On the Balancedness of Random Partition Models. *International Conference on Machine Learning*: PMLR, :12521–12541. (2022).
30. Wang, J. Clinical epidemiology. *Natl. Med. J. China-Beijing*. **77**, 930–932 (1997).
31. Zhang, Y. L., L. F. Li. Reliability and validity of the Chinese version of childhood trauma questionnaire. *Chin J Clin Rehabil* **20**, 105–107 (2005).
32. Gong, X., Xie, X., Xu, R. & Luo, J. Psychometric properties of the Chinese versions of Dass-21 in Chinese college students. *Chin. J. Clin. Psychol.* **18**, 443–446 (2010).
33. Chen, Y. et al. Validity and reliability of the Chinese version of the avoidance and fusion questionnaire for Youth (Afq-Y8). *Chin. J. Clin. Psychol.* **27**, 1192–1195 (2019).
34. Cerutti, R., Calabrese, M. & Valastro, C. Alexithymia and Personality Disorders in the Adolescent Non-Suicidal Self Injury: Preliminary Results. In: Bozkurt T, Demirok M, eds. *4TH WORLD CONFERENCE ON PSYCHOLOGY, COUNSELING AND GUIDANCE (WCPCG-2013)*. 4th World Conference on Psychology, Counseling and Guidance (WCPCG), :372–376. (2014).
35. Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y. & Podsakoff, N. P. Common method biases in behavioral research: A critical review of the literature and recommended remedies. *J. Appl. Psychol.* **88**, 879–903 (2003).
36. Hayes, A. F. *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*, Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach, (2013).
37. Romero-Moreno, R., Márquez-González, M., Losada, A. & Gillanders, D. Fernández-Fernández, V. cognitive fusion in dementia caregiving: psychometric properties of the Spanish version of the cognitive fusion questionnaire. *Behav. Psychol.* **22**, 117–132 (2014).
38. Simonson, J., Mezulis, A. & Davis, K. Socialized to ruminate?? Gender role mediates the sex difference in rumination for interpersonal events. *J. Soc. Clin. Psychol.* **30**, 937–959 (2011).
39. Gillanders, D. T. et al. The development and initial validation of the cognitive fusion questionnaire. *Behav. Ther.* **45**, 83–101 (2014).
40. Eaton, S., Cornwell, H., Hamilton-Giachritsis, C. & Fairchild, G. Resilience and young People's brain structure, function and connectivity: A systematic review. *Neurosci. Biobehavioral Reviews*. **132**, 936–956 (2022).
41. Peng, J. et al. Physical and emotional abuse with internet addiction and anxiety as a mediator and physical activity as a moderator. *Sci. Rep.* **15**, 2305 (2025).
42. Webb, M. et al. Guilt, symptoms of depression, and reported history of psychological maltreatment. *Child. Abuse Negl.* **31**, 1143–1153 (2007).
43. Kim, S., Thibodeau, R., Jorgensen, R. S. & Shame Guilt, and depressive symptoms: A Meta-Analytic review. *Psychol. Bull.* **137**, 68–96 (2011).
44. Tilghman-Osborne, C., Cole, D. A., Felton, J. W. & Ciesla, J. A. Relation of guilt, shame, behavioral and characterological Self-Blame to depressive symptoms in adolescents over time. *J. Soc. Clin. Psychol.* **27**, 809–842 (2008).
45. Norman, R. E. et al. The Long-Term health consequences of child physical abuse, emotional abuse, and neglect: A systematic review and Meta-Analysis. *Plos Med.* **9**, e1001349 (2012).
46. Murphy, F. et al. Childhood trauma, the Hpa Axis and psychiatric illnesses: A targeted literature synthesis. *Front. Psychiatry*. **13**, 748372 (2022).
47. Kuhlman, K. R., Geiss, E. G. & Vargas, I. Lopez-Duran, N. Hpa-Axis activation as a key moderator of childhood trauma exposure and adolescent mental health. *J. Abnorm. Child. Psychol.* **46**, 149–157 (2018).
48. Yao, X. et al. Associations between psychological inflexibility and mental health problems during the Covid-19 pandemic: A Three-Level Meta-Analytic review. *J. Affect. Disord.* **320**, 148–160 (2023).
49. Kato, T. Impact of psychological inflexibility on depressive symptoms and sleep difficulty in a Japanese sample. *Springerplus* **5**, 712 (2016).
50. Krause, F. C., Linardatos, E., Fresco, D. M. & Moore, M. T. Facial emotion recognition in major depressive disorder: A Meta-Analytic review. *J. Affect. Disord.* **293**, 320–328 (2021).
51. Monferrer, M. et al. Facial emotion recognition in patients with depression compared to healthy controls when using human avatars. *Sci. Rep.* **13**, 6007 (2023).
52. Lazarus, R. S. Emotions and interpersonal relationships: toward a Person-Centered conceptualization of emotions and coping. *J. Pers.* **74**, 9–46 (2006).
53. Fischer, A. H., Pauw, L. S. & Manstead, A. S. R. Emotion recognition as a social act: the role of the Expresser-Observer relationship in recognizing emotions. In: (eds Hess, U. & Hareli, S.) *The Social Nature of Emotion Expression: What Emotions Can Tell Us about the World*. Cham: Springer International Publishing, :7–24. (2019).
54. Folia, K., Eastwood, O., Herniman, S. & Badcock, P. Facilitating improvements in young People's social relationships to prevent or treat depression: A review of empirically supported interventions. *Transl Psychiatry*. **11**, 305 (2021).
55. Joormann, J. & Stanton, C. H. Examining emotion regulation in depression: A review and future directions. *Behav. Res. Ther.* **86**, 35–49 (2016).
56. Whisman, M. A. *Interpersonal Perspectives on Depression* 167–178 (Oxford University Press, 2017).
57. Wu, C. et al. Emotion regulation difficulties in depression and anxiety: evidence from the dynamics of strategy use and daily affect. *J. Contextual Behav. Sci.* **33**, 100781 (2024).
58. Nolen-Hoeksema, S. The Response Styles Theory., :105–123. (2003).
59. Watkins, E. R. Constructive and unconstructive repetitive thought. *Psychol. Bull.* **134**, 163–206 (2008).
60. Liu, Y. et al. The mediating effect of internet addiction and the moderating effect of physical activity on the relationship between alexithymia and depression. *Sci. Rep.* **14**, 9781 (2024).
61. Liu, Y., Xiao, T., Zhang, W., Xu, L. & Zhang, T. The relationship between physical activity and internet addiction among adolescents in Western China: A chain mediating model of anxiety and inhibitory control. *Psychol. Health Med.* **29**, 1602–1618 (2024).
62. Liu, Y. et al. Anxiety, inhibitory control, physical activity, and internet addiction in Chinese adolescents: A moderated mediation model. *Bmc Pediatr.* **24**, 663 (2024).
63. Xiao, T., Pan, M., Xiao, X. & Liu, Y. The relationship between physical activity and sleep disorders in adolescents: A Chain-Mediated model of anxiety and mobile phone dependence. *Bmc Psychol.* **12**, 751 (2024).

64. Liu, Yang et al. "The Chain Mediating Effect of Anxiety and Inhibitory Control and the Moderating Effect of Physical Activity Between Bullying Victimization and Internet Addiction in Chinese Adolescents." *The Journal of genetic psychology*, 1-16. 8 Feb. 2025
65. Wang, J., Wang, N., Liu, P. et al. Social network site addiction, sleep quality, depression and adolescent difficulty describing feelings: a moderated mediation model. *BMC Psychol.* **13**, 57. <https://doi.org/10.1186/s40359-025-02372-1> (2025).
66. Liu, Y., Chen, Z., Wang, P. & Xu, L. Relationship between bullying behaviors and physical activity in children and adolescents: A systematic review and Meta-Analysis. *Aggress. Violent Behav.* **78**, 101976 (2024).
67. Liu, Y. et al. Physical activity moderated the mediating effect of Self-Control between bullying victimization and mobile phone addiction among college students. *Sci. Rep.* **14**, 20855 (2024).
68. Liu, Y. et al. The chain mediating effect of anxiety and inhibitory control between bullying victimization and internet addiction in adolescents. *Sci. Rep.* **14**, 23350 (2024).
69. Liu, Y. et al. The mediating role of inhibitory control and the moderating role of family support between anxiety and internet addiction in Chinese adolescents. *Arch. Psychiatr Nurs.* **53**, 165–170 (2024).
70. Liu, Y. et al. Anxiety mediated the relationship between bullying victimization and internet addiction in adolescents, and family support moderated the relationship. *Bmc Pediatr.* **25**, 8 (2025).
71. Yi, Zhenxiu et al. "The Relationship Between Empirical Avoidance, Anxiety, Difficulty Describing Feelings and Internet Addiction Among College Students: A Moderated Mediation Model." *The Journal of genetic psychology*, 1-17. 21 Jan. 2025
72. Wang, Jiale, et al. "Experiential avoidance, depression, and difficulty identifying emotions in social network site addiction among Chinese university students: a moderated mediation model." *Behaviour & Information Technology* (2025): 1-14.
73. Shen, Q. et al. The chain mediating effect of psychological inflexibility and stress between physical exercise and adolescent insomnia. *Sci. Rep.* **14**, 24348 (2024).
74. Wang, A., Guo, S., Chen, Z. et al. The chain mediating effect of self-respect and self-control on the relationship between parent-child relationship and mobile phone dependence among middle school students. *Sci. Rep.* **14**, 30224. <https://doi.org/10.1038/s41598-024-80866-5> (2024).

## Author contributions

Liyuan Yang<sup>12456</sup>, Ying Tao<sup>12456</sup>, Ning Wang<sup>1256</sup>, Yichi Zhang<sup>1256</sup>, Yang Liu<sup>12345.1</sup> Conceptualization; 2 Methodology; 3 Data curation; 4 Writing - Original Draft; 5 Writing - Review & Editing; 6 Funding acquisition.

## Funding

Not applicable.

## Declarations

## Ethics approval and consent to participate

The study was approved by the Biomedicine Ethics Committee of Jishou University before the initiation of the project (Grant number: JSDX-2024-0086). And informed consent was obtained from the participants before starting the program. We confirm that all the experiment is in accordance with the relevant guidelines and regulations such as the declaration of Helsinki.

## Competing interests

The authors declare no competing interests.

## Additional information

**Correspondence** and requests for materials should be addressed to Y.L.

**Reprints and permissions information** is available at [www.nature.com/reprints](http://www.nature.com/reprints).

**Publisher's note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

**Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

© The Author(s) 2025