Childhood psychological maltreatment subtypes and depression among Chinese college students: the role of self-compassion and perceived negative attention bias

Yufei Xie[1†], Xin Tian[2†], Xici Wan[3], Yuting Zhang[4] and Ying Guo[4*]

Abstract

Background Research on childhood psychological maltreatment lags behind that on other forms of childhood maltreatment. While it has been identified as a significant predictor of depression, the specific underlying mechanisms linking its subtypes (emotional abuse and emotional neglect) to depression remain unclear. This study aimed to examine the association between childhood psychological maltreatment and its subtypes and depression from both emotional factors (self-compassion) and cognitive factors (perceived negative attention bias), as well as the gender differences.

Methods Using a questionnaire survey, a total of 587 college students completed the self-report questionnaires, including childhood psychological maltreatment and its subtypes, self-compassion, perceived negative attention bias, and depression. This study used structural equation models to examine the serial mediating role and gender differences by Amos 24.0.

Results Childhood psychological maltreatment and its subtypes positively predicted depression. Self-compassion played a mediating role between childhood psychological maltreatment and its subtypes and depression. Perceived negative attention bias played a mediating role between childhood psychological maltreatment and emotional abuse and depression, but not significantly between emotional neglect and depression. Self-compassion and perceived negative attention bias played a serial mediating role between childhood psychological maltreatment (including its subtypes) and depression. There were no gender differences in the mediating role.

Conclusion Self-compassion and perceived negative attention bias played distinct roles in the association between childhood psychological maltreatment, its subtypes, and depression. A serial mediating role of self-compassion and perceived negative attention bias was observed in the associations between overall psychological maltreatment, emotional abuse, and depression. In contrast, in the case of emotional neglect, only self-compassion served as a mediator. These findings enlighten us that psychological interventions enhancing self-compassion and reducing negative attention bias may help mitigate depression in college students exposed to childhood psychological

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maltreatment, particularly emotional abuse. Conversely, interventions focused on increasing self-compassion may be more effective in reducing depression in those exposed to emotional neglect.

Keywords Childhood psychological maltreatment, Emotional abuse, Emotional neglect, Depression, Self-compassion, Perceived negative attention bias

Introduction

According to the Report on National Mental Health Development, individuals in China aged 18–24 have worse mental health indices and higher depression level than other age groups [1]. College students undergo a process of role transition and social adaptation, and they also face various external pressures such as academic, employment, and interpersonal challenges. However, their physical and mental development is severely unbalanced, and the detection rate of depression has significantly increased over time [2]. The detection rate of depression among college students from 2010 to 2020 was 20.8%, higher than anxiety and suicide-related mental health problems, ranking the second among mental health issues [2]. Exploring the causes and mechanisms of depression in college students is crucial for their physical and mental health development as well as for social stability.

Childhood maltreatment experiences cannot be ignored as an antecedent factor for depression. Typically, childhood maltreatment involves sexual, physical, and psychological abuse, all of which can lead to a range of internal and external mental health problems and negatively impact an individual's mental health [3]. An increasing number of interventions have been developed to support individuals who have experienced childhood maltreatment in overcoming adverse mental health outcomes, including arts-based interventions and digital health interventions [4]. To improve these interventions, it is necessary to explore in depth the mechanisms underlying the association between different types of childhood maltreatment and depression, especially those types that have received less attention.

Among these forms of abuse, childhood psychological maltreatment (CPM) refers to the continuous and inappropriate verbal and non-physical abuse of children by primary caregivers [5]. It's more prevalent and has more severe consequences than physical and sexual abuse [6–8], yet research on childhood psychological maltreatment lags behind that on other forms. Compared with early traumas such as physical abuse and domestic violence, childhood psychological maltreatment has the strongest association with depression [6]. Various pathways can increase the risk of depression among college students, including reduced cognitive reappraisal, increased expressive suppression and

anger, and promotion of negative cognitive style and negative self-reference [6, 9].

Childhood psychological maltreatment can be further divided into two subtypes: emotional abuse (EA) and emotional neglect (EN) [10]. The difference between the two is that emotional abuse comes from the active malice of the caregiver, which is a "hostile" parenting style, such as threats, insults, and belittling. While emotional neglect, which often occurs inadvertently, is often the result of being indifferent to the child's psychological needs or lacking positive feedback [10]. Previous studies have primarily examined childhood psychological maltreatment as a whole, but findings have varied widely. For instance, the results of a meta-analysis indicated that emotional abuse (36%) is more common than emotional neglect (18%) worldwide [11]. However, Yu et al. reported the opposite pattern, with a higher percentage of children experienced emotional neglect (58.97%) than emotional abuse (19.84%) [12]. Furthermore, for the association between emotional abuse and neglect and depression, Wang et al. found a strong correlation between emotional neglect and depression [13], while Nelson et al. found that those children who experienced emotional abuse were significantly more likely to develop depression in their adulthood [14]. Accordingly, some researchers suggest that different subtypes of childhood psychological maltreatment may have distinct mechanisms and effects on depression, necessitating separate investigations of the two [14]. Researches on the subtypes of childhood psychological maltreatment has typically focused on emotional abuse, as it is more easily perceived, whereas studies on emotional neglect have lagged behind due to its more subtle manifestations. Influenced by traditional Chinese educational values, parents often have high expectations for their children's academic performance but tend to overlook their emotional expression, which has contributed to a lack of attention to emotional neglect. This has also led to an underestimation of the impact of childhood emotional neglect on depression among college students.

Prior studies have confirmed the association between of childhood psychological maltreatment and depression, but most have focused on either cognitive or emotional mechanisms in isolation. However, whether cognitive and emotional factors interact in influencing depression remains unclear. Furthermore,

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the specific mechanisms underlying the associations between emotional abuse, emotional neglect, and depression require further exploration. Based on the diathesis-stress theories, depression results from a combination of diathesis and stress [15]. Stress refers to life events that disrupt an individual's physiological, emotional, and cognitive stability, whereas diathesis encompasses the physiological and psychological traits that predispose individuals to depression and is considered a stable yet variable long-term characteristic [15]. Childhood psychological maltreatment, with its high prevalence and incidence, is undoubtedly a significant stressor for depression. Among diathesis factors, self-compassion is a key protective factor [16], whereas perceived negative attention bias is a significant risk factor [17], both of which play crucial roles depression [18, 19]. However, whether these factors interact in linking childhood psychological maltreatment to depression remains unclear. Given this, our study aims to examine the serial mediating role of self-compassion and perceived negative attention bias in the association between childhood psychological maltreatment (and its subtypes) and depression among college students, from the perspective of cognitive and emotional factors.

The mediating role of self-compassion

Self-compassion refers to the attitude in which individuals treat themselves with kindness in the face of suffering and distress [20]. As a positive emotion regulation strategy, self-compassion is seen as a protective factor between childhood psychological maltreatment and depression [21]. According to attachment theory, children seek proximity to their attachment figures in times of distress or danger. During their early life experiences, they develop internal working models of how to treat themselves and others by observing and imitating their parents' behavior, which influences subsequent development of their perception and thinking [22]. Self-compassion stems from children's early attachment experiences with their primary caregivers [21, 22]. Specifically, children who have experienced emotional abuse and neglect struggle to gain support and positive responses from their parents and lack the ability to self-care, resulting in impaired self-compassion [5]. Consequently, these children are more likely to develop insecure attachment styles that increase the risk of depression [23]. Furthermore, self-compassion has a buffering effect on depression as an adaptive emotion regulation strategy [24]. Similar to cognitive reappraisal and expression inhibition, self-compassion-based interventions are effective in alleviating depression [25].

The mediating role of perceived negative attention bias

Perceived negative attention bias refers to the tendency to selectively attend to the negative aspects of events or information [26], which also plays an important role in the association between childhood psychological maltreatment and depression. On the one hand, from the perspective of biological evolution, high sensitivity to negative stimulation helps abused individuals quickly identify negative information and gain protection [27]. Empirical studies have also provided corresponding supporting the association between the two. For example, individuals who experience psychological maltreatment often exhibit attention difficulties [28], tend to interpret negative information more negatively [29], and struggle to make cognitive adjustments in response to change [30]. In contrast, posttraumatic growth is associated with a positive attention bias [31], wherein individuals are more likely to perceive information in a positive light. Perceived negative attention bias, on the other hand, is a pathogenesis and one of the typical characteristics of depression [26]. Beck and Bredemeier [32] proposed a unified model of depression based on the integration of clinical, cognitive, biological, and evolutionary perspectives. This model emphasizes that early traumatic experiences can induce individuals' stress responses, leading to cognitive and evaluative biases toward external events or internal stimuli. These individuals then are more likely to develop negative thoughts about themselves, the future, and the world around them, and eventually become vulnerable to depression. In addition, perceived negative attention bias reflects a maladaptive cognitive strategy that contributes to depression [27]. Therefore, perceived negative attention bias plays a significant role in the generation, maintenance, and recurrence of depression.

The serial mediating role of self-compassion and perceived negative attention bias

Additionally, there is a relation between self-compassion and perceived negative attention bias. Based on integrated self-control theory [33] and theory on self-compassion [20], a self-compassionate mindset can enhance self-regulation and improve control capacity [34]. Then, the reflective system can reduce attention bias toward negative information [35]. The common denominator of clinical interventions targeting perceived negative attention bias is aim to improve psychological distress by changing the individual's relationship with the problem, where the underlying core mechanism involves developing a nonjudgmental or compassionate attitude towards oneself and others, namely self-compassion [36]. In addition, the association between self-compassion and rumination suggests that self-compassion may help

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individuals disengage from negative information. Rumination refers to the repetitive, passive thinking about past negative experiences, emotions, and problems, leading to emotional immersion [37]. A meta-analysis demonstrated that self-compassion interventions significantly reduce rumination [25], indicating that self-compassion may help prevent excessive dwelling on negative experiences. Behavioral studies have also shown that individuals with low self-compassion have an attention bias toward negative emotional pictures and have difficulty disengaging from negative stimuli [38]. However, there is a distinction between self-reported and behavioral assessments of attention bias [39], the association between self-compassion and perceived negative attention bias remains underexplored.

The gender difference of serial mediating role

Gender is a non-negligible factor in studies related to childhood psychological maltreatment and its subtypes, self-compassion, perceived negative attention bias, and depression. Generally, parents place much higher expectations on boys' success and competence. They prefer to use physical rather than psychological punishments as a form of discipline, while girls are more likely to experience emotional abuse and neglect [40]. In terms of self-compassion, female's gender role norms emphasize self-sacrifice, and they tend to be stricter with themselves and evaluate themselves negatively, resulting in female being less self-compassionate than male. This tendency is also associated with a higher rate of depression among female [41]. Furthermore, female who suffer from depression are more sensitive to negative stimuli than male [42]. However, previous studies have tended to examine gender differences in each of the above variables separately [41, 42], rather than investigating the gender differences in the mediating role of self-compassion and perceived negative attention bias in the association between childhood psychological maltreatment (and its subtypes) and depression. Based on existing research, it can be hypothesized that self-compassion and perceived negative attention bias play a stronger mediating role in female than in male.

The present study

In summary, research on childhood psychological maltreatment lags behind that of other forms of childhood maltreatment, and the emotional and cognitive mechanisms underlying the association between its subtypes and depression warrant further investigation. Therefore, this study constructed a serial mediating model to further clarify the association between childhood psychological maltreatment (and its subtypes) and depression from both emotional factors (self-compassion) and cognitive factors (perceived negative attention bias). Based on existing theoretical and empirical studies, this study hypothesized that: (1) Childhood psychological maltreatment (and its subtypes) significantly positively predict depression. (2) Self-compassion mediates the association between childhood psychological maltreatment (and its subtypes) and depression. (3) Perceived negative attention bias mediates the association between childhood psychological maltreatment (and its subtypes) and depression. (4) Self-compassion and perceived negative attention bias play a serial mediating role in the association between childhood psychological maltreatment (and its subtypes) and depression. (5) Gender differences exist in the serial mediating model. Specifically, the mediating role of self-compassion and perceived negative attention bias is stronger in female than in male.

Materials and methods
Participants

In the study, convenience sampling was employed. The researcher distributed questionnaires via a link to the Questionnaire Star website through Tencent WeChat and QQ, both of which are widely used by Chinese university students. Before filling out the questionnaires, the participants provided informed consent. Participation was voluntary, with no compensation offered, and all participants completed the questionnaire in full. A total of 614 questionnaires were distributed. To ensure data quality and prevent careless responses, any submissions where more than two-thirds of the items were answered consecutively with the same option were excluded. As a result, 587 valid questionnaires were returned, representing an effective rate of 95.60%. The sample included participants from various provinces, such as Sichuan, Chongqing, and Guangxi. The mean age of the subjects was 22.04 ± 1.93 years. Among them, 228 (38.84%) were male and 359 (61.16%) were female; 236 (40.20%) were only children and 351 (59.80%) were non-only children; 426 (72.57%) were undergraduates and 161 (27.43%) were postgraduate students.

Measures
Childhood psychological maltreatment

The Childhood Trauma Questionnaires (CTQ-SF) developed by Bernstein [43] was used. The CTQ-SF is one of the most widely used instruments in research on childhood maltreatment, comprising five subscales: physical abuse, physical neglect, sexual abuse, emotional abuse, and emotional neglect [44]. The scale, along with its subscales exhibits strong reliability [44], and has shown good validity among Chinese university students [45]. In this study, we selected two subscales—emotional abuse and emotional neglect—each consisting of 5 items, for a total

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of 10 items. A five-point scale was used, with a higher score representing more severe maltreatment. The Cronbach's alpha coefficient for the scale was 0.82, for emotional abuse it was 0.81, and for emotional neglect it was 0.75.

Self-compassion

The Self-Compassion Scale Short Form (SCS-SF) developed by Raes et al. [46] was used, which includes 6 dimensions, viz., self-kindness, self-judgment, common humanity, mindfulness, isolation, and over-identification. SCS-SF is shorter compared to Self-Compassion Scale, and its reliability and validity among Chinese college students meets psychometric standards [47]. A total of 12 items are scored on a 5-point scale (1 = never, 5 = always). Cronbach's alpha coefficient for the scale was 0.83.

Perceived negative attention bias

The Attention to Positive and Negative Information Scale (APNIS) developed by Noguchi et al. [48] was used. APNIS provides a convenient and reliable tool for assessing cognitive bias, and its Chinese version demonstrates good validity and reliability among Chinese college students [49]. In this study, we selected the negative attention bias scale. A total of 11 items were scored on a 5-point Likert scale (from 1 = strongly disagree to 5 = strongly agree). Cronbach's alpha coefficient for the scale was 0.88.

Depression

The Chinese version of the Center for Epidemiologic Studies Depression Scale (CES-D) translated by Yang and Xiong [50] was used. It is a useful tool for assessing depression in Chinese college students and demonstrates strong reliability and validity within this Chinese college students [51]. The scale contains four dimensions of depression, positive emotion, somatic symptoms, and interpersonal difficulties, has been used in previous studies to measure depressed mood in the past two weeks with good reliability and validity. A total of 20 items are scored on a four-point scale (1 = occasionally, 4 = most of the time). Cronbach's alpha coefficient for the scale was 0.91.

Statistical analysis

Descriptive statistics and correlational analysis were performed using SPSS 24, and the cut-off values of Yu et al. [12] were used to calculate the prevalence of childhood psychological maltreatment (emotional abuse ≥ 9, emotional neglect ≥ 10). The serial mediating effect and gender differences were examined by Amos 24.0 using structural equation modeling (SEM).

Results

Common method biases test

Harman's one-factor test was used to perform the common method bias test. The results of the unrotated exploratory factor analysis extracted a total of nine factors with eigenvalue greater than one, and the first factor explained a 14.04% variation, which confirmed that there was free from common method bias.

Descriptive statistics and correlational analysis

The results showed that of the 587 participants, 41.10% experienced emotional abuse, 55.90% experienced emotional neglect, and 38.84% experienced both emotional abuse and neglect. Table 1 presents descriptive statistics (e.g., means and standard deviations) and Pearson correlation analysis for each variable. Childhood psychological maltreatment and emotional abuse were moderately negatively correlated with self-compassion, and moderately positively correlated with negative attention bias and depression. Emotional neglect showed a small negative correlation with self-compassion and a small positive

Table 1 Means, standard deviations and correlation coefficient

	1	2	3	4	5	6	7	8
1. Age	1							
2. Only child or not	.03	1						
3. Childhood psychological maltreatment	-.03	.01	1					
4. Emotional abuse	-.04	-.09*	.85**	1				
5. Emotional neglect	-.00	.10*	.85**	.45**	1			
6. Self-compassion	.04	.02	-.39**	-.37**	-.29**	1		
7. Perceived negative attention bias	-.01	-.06	.32**	.39**	.15**	-.57**	1	
8. Depression	-.05	-.01	.42**	.46**	.26**	-.60**	.60**	1
M	22.05	1.60	19.22	8.73	10.48	40.30	33.00	38.70
SD	1.91	0.49	6.43	3.78	3.78	7.00	8.11	10.23

Notes: only children = 1, not only children = 2; *M* = mean, *SD* = standard deviation; *p < .05, **p < .01, ***p < .001

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correlation with both negative attention bias and depression. Self-compassion exhibited a strong negative correlation with both negative attention bias and depression. Additionally, negative attention bias and depression were strongly positively correlated. All correlations were statistically significant at the $p = 0.01$ level. The detailed correlation coefficients are presented in Table 1.

Mediation effect test

All variables had variance inflation factors less than 1.6, so there was no multicollinearity. Firstly, the results of the total effect of childhood psychological maltreatment on depression showed that the path coefficient was significant ($\beta = 0.42$, $t = 11.21$, $SE = 0.03$, $p < 0.001$). Secondly, self-compassion and perceived negative attention bias were included into the model, and both path coefficients were significant (Fig. 1), and the model was well fitted ($\chi^2/\text{df} = 4.77$, CFI = 0.98, TLI = 0.94, RMSEA = 0.08, SRMR = 0.02). These results suggested that the mediating model consisted of the separate mediating role of self-compassion and perceived negative attention bias, and the serial mediating role of self-compassion and perceived negative attention bias. The mediating effect was further examined by using the nonparametric Bootstrap method with 2000 replicate samples. The results are showed in Table 2, self-compassion and perceived negative attention bias mediated the relationship between childhood psychological maltreatment and depression separately, and self-compassion and perceived negative attention bias had a serial mediating effect.

The roles of subtypes of childhood psychological maltreatment in the serial mediation effect was further examined. As the results showed (Table 3, Figs. 2, and 3), self-compassion mediated the relationship between emotional abuse/neglect and depression separately, and perceived negative attention bias mediated the relationship between emotional abuse and depression, but not between emotional neglect and depression. And self-compassion and perceived negative attention bias played a serial mediating role of the relationship between emotional abuse/neglect and depression.

Gender differences in the mediation model

This study first tested the mediating effect models separately for male and female. The results showed that fit indices of male/female model were $\chi^2/\text{df} = 1.58/3.18$, CFI = 0.99/0.99, TLI = 0.97/0.95, RMSEA = 0.05/0.08, SRMR = 0.02/0.02. Overall, the fit indices were within the acceptable range for multiple group comparisons. Then the method of multiple group comparisons in the structural equation model was used to set the equivalence
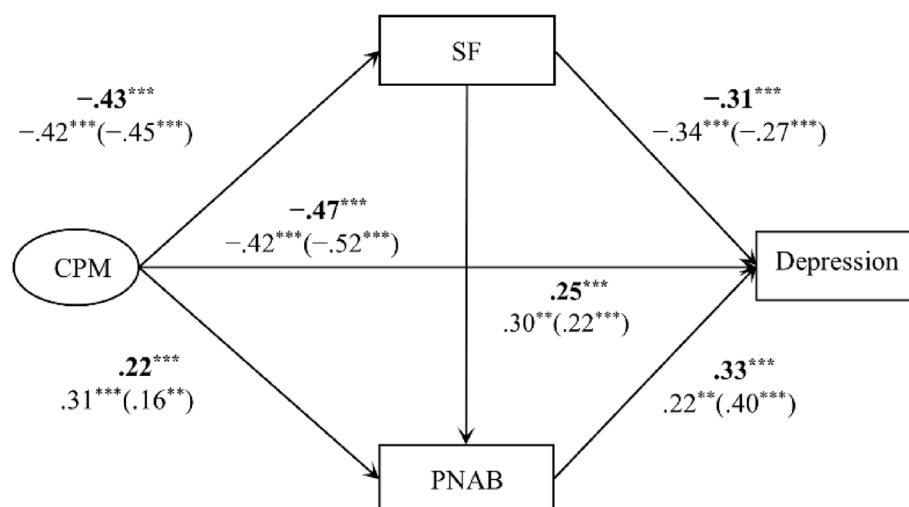
Table 2 The effects after bootstrapping from childhood psychological maltreatment to depression

Path	Standardized effect value	Boot SE	Bootstrap 95% CI
CPM > SF > Depression	0.13	0.02	[0.10, 0.17]
CPM > PNAB > Depression	0.07	0.02	[0.04, 0.11]
CPM > SF > PNAB > Depression	0.07	0.01	[0.05, 0.10]
Total indirect effect	0.27	0.02	[0.24, 0.33]

CPM Childhood psychological maltreatment, *SF* Self-compassion, *PNAB* Perceived negative attention bias

Fig. 1 The serial mediating model of childhood psychological maltreatment and depression. Notes: standardized data; solid lines represent significant paths; in the path coefficients, the bolded values at the top indicate the overall results, the values outside the brackets at the bottom represent males, and the values inside the brackets at the bottom represent females

Table 3 The effects after bootstrapping from emotional abuse/neglect to depression

	Path	Standardized effect value	Boot SE	Bootstrap 95% CI
EA	EA > SF > Depression	0.12	0.02	[0.09, 0.16]
	EA > PNAB > Depression	0.07	0.02	[0.04, 0.10]
	EA > SF > PNAB > Depression	0.06	0.01	[0.04, 0.09]
	Total indirect effect	0.25	0.02	[0.22, 0.29]
EN	EN > SF > Depression	0.10	0.02	[0.07, 0.14]
	EN > PNAB > Depression	−0.01	0.02	[−0.04, 0.02]
	EN > SF > PNAB > Depression	0.07	0.01	[0.05, 0.09]
	Total indirect effect	0.16	0.02	[0.12, 0.21]

EA Emotional abuse, *EN* Emotional neglect
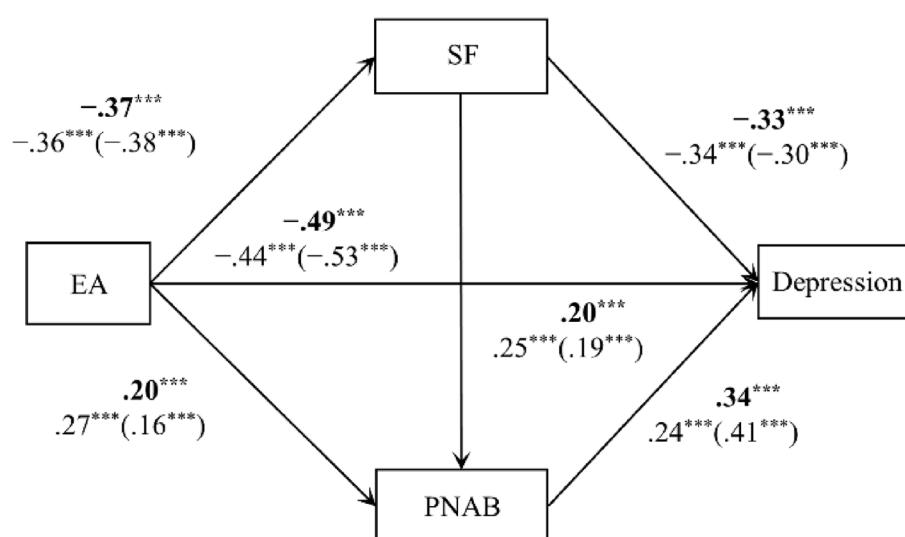
Fig. 2 The serial mediating model of emotional abuse and depression
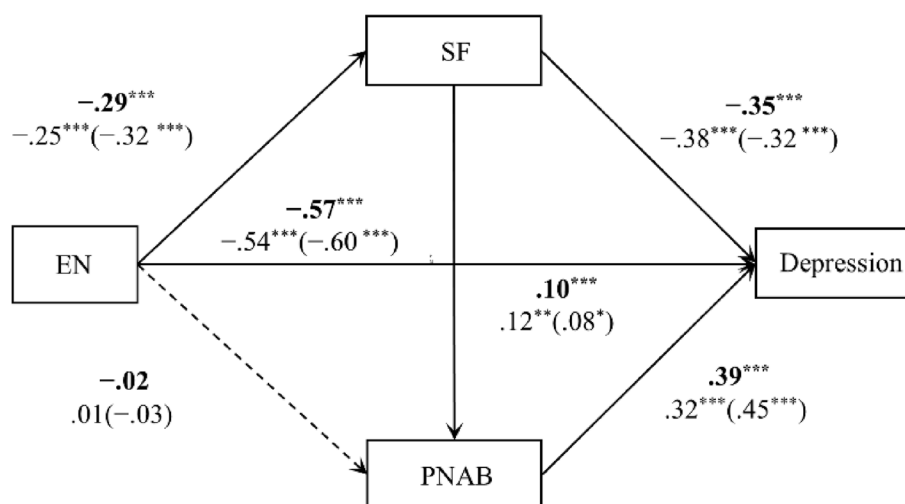
Fig. 3 The serial mediating model of between emotional neglect and depression. Notes: dashed lines represent non-significant paths

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model (M1: the baseline model which defined that the male and female groups have the same structural model, and the path coefficient was estimated freely; M2: based on model 1, limiting the path coefficients corresponding to the male and female groups are equal). As the results showed that the models fit well for each indicator and the chi-square difference was significant ($\Delta \chi^2 = 12.44$, $p > 0.05$), indicating that the mediating effects of self-compassion and perceived negative attention bias were consistent across gender.

Based on above findings, the mediating effects of self-compassion and perceived negative attention bias in the relationship between childhood psychological maltreatment and depression and its gender differences were investigated. For male, self-compassion (95% CI: [0.07, 0.20]) and perceived negative attention bias (95% CI: [0.02, 0.11]) mediated the relationship between childhood psychological maltreatment and depression separately, and self-compassion and perceived negative attention bias (95% CI: [0.01, 0.07]) played a serial mediating effect in the above relationship. For female, these mediating effects were also significant, with 95% CI of [0.07, 0.18], [0.01, 0.11], and [0.06, 0.15] in the same order. Comparing the results of the SEM between male and female, it was revealed that there was no significant gender difference in the mediating effects of self-compassion and perceived negative attention bias (Fig. 1).

To further investigate the gender differences in mediating effects, the same analysis method was used to test the mediating role of self-compassion and perceived negative attention bias in the subtypes of childhood psychological maltreatment (dimension 1: emotional abuse; dimension 2: emotional neglect) and depression in male and female. The results are showed in Table 4, and it is indicated that the model's indicators fit well in both male and female models. Then, the mediating effect test showed that for male, in the dimension 1 model, self-compassion (95% CI: [0.09, 0.19]) and perceived negative attention bias (95% CI: [0.03, 0.12]) played a separate mediating role, and self-compassion and perceived negative attention

bias (95% CI: [0.02, 0.07]) played a serial mediating role. In the dimension 2 model, self-compassion (95% CI: [0.05, 0.15]) played a separate mediating role, while perceived negative attention bias (95% CI: [>−0.04, 0.04]) played an insignificant mediating role, and self-compassion and perceived negative attention bias (95% CI: [0.02, 0.08]) mediated the serial model. For female, in the dimension 1 model, self-compassion (95% CI: [0.08, 0.16]) and perceived negative attention bias (95% CI: [0.03, 0.11]) mediated separately, and self-compassion and perceived negative attention bias (95% CI: [0.05, 0.12]) played a serial mediating role. In the dimension 2 model, self-compassion (95% CI: [0.07, 0.14]) mediated alone, perceived negative attention bias (95% CI: [−0.05, 0.03]) mediated insignificantly, and self-compassion and perceived negative attention bias (95% CI: [0.05, 0.13]) mediated the serial model. Based on the results of the SEM between male and female, there was no significant gender difference in the serial mediation model (Figs. 2 and 3).

Discussion

Childhood psychological maltreatment and its subtypes and depression among Chinese college students

First, consistent with existing findings, the proportion of Chinese college students had experienced emotional neglect during childhood was higher than that of those who had experienced emotional abuse [12]. This result contrasts with findings from studies conducted in Western cultural contexts, such as North America and Europe, where the prevalence of emotional abuse tends to be higher than that of emotional neglect [11]. This difference is closely related to the emotional expression and educational philosophy of Chinese parents, which are characteristic of Eastern cultures. Parental emotional expression in China is generally more implicit. Chinese culture places a strong emphasis on responsibilities and duties within the family, with parents often prioritizing material and academic achievements over emotional support or closeness [12]. In this context, emotional neglect is more prevalent, as parents may concentrate excessively on their children's external performance (e.g., academic success, behavioral norms) while overlooking their emotional needs. Moreover, influenced by Confucianism, Chinese parenting typically focuses on a child's responsibility to the family and adherence to social norms, with parental expectations often aligned with collectivist values and family honor [52]. As a result, less attention is given to the individual's emotional needs and mental health of children. All of these factors may result in children growing up without sufficient emotional support, increasing the likelihood of emotional neglect. Therefore,

Table 4 Fit indices of mediated models of male and female childhood psychological maltreatment subtypes

Model	χ^2/df	CFI	TLI	RMSEA	SRMR
Male					
EA (dimension 1)	0.52	1.00	1.02	0.00	0.02
EN (dimension 2)	0.64	1.00	1.02	0.00	0.02
Female					
EA (dimension 1)	1.64	1.00	0.99	0.04	0.04
EN (dimension 2)	2.65	0.99	0.94	0.07	0.04

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in the Chinese context, childhood emotional neglect requires urgent attention.

Second, the results of this study showed that childhood psychological maltreatment and its subtypes could positively predict depression, which aligns with attachment theory. Children who have experienced emotional abuse often have strong feelings of rejection and unworthiness. To avoid being abandoned by their parents, they may choose to suppress their negative emotions [9]. Besides, individuals tend to attribute childhood psychological maltreatment to external unstable factors when they experience it occasionally. However, when maltreatment occurs repeatedly, they may attribute it to their own psychological, moral, or physical deficiencies [53]. Therefore, they tend to develop negative cognitive styles, such as global negative attributions and negative inferences about the consequences of events. This leads to the development of a sense of hopelessness and reduces their ability to perceive pleasure [54], which in turn increases the risk of depression [6, 53].

It's obvious that childhood psychological maltreatment and its subtypes are significant early psychological traumas that lead to depression. But the association between different types of childhood psychological maltreatment and depression varies, and emotional abuse is more strongly correlated with depression, which may be due to its differing effects on emotion regulation strategies. It has been shown that emotional abuse can induce adverse emotion regulation strategies (e.g., expression suppression) [9], but whether individuals have experienced of emotional neglect does not affect their use of expression suppression strategies [55], which is a significant predictor of depression.

The mediating role of self-compassion and perceived negative attention bias

Self-compassion mediated the association between childhood psychological maltreatment (and its subtypes) and depression in college students, with childhood psychological maltreatment (both emotional abuse and neglect) negatively predicting self-compassion and self-compassion negatively predicting depression. This result supports the introject theories, which suggest that depression tends to develop after someone who has experienced abuse absorbs the way they are treated by the abusers and integrates it into themselves [21]. For those who have suffered from childhood psychological maltreatment, the constant criticism, contempt, rejection, and neglect that cause feelings of injustice saturate the early memories of individuals who learn the abusive ways of their caregivers and project them into their inner world [5]. The result is that a large amount of guilt and negative beliefs become repressed in their subconscious,

and they tend to develop feelings of helplessness and self-denial rather than self-compassion [56]. Self-compassion, as a positive emotion regulation strategy, can alleviate negative emotions and beliefs, weaken the negative effects of stressful events, and enable individuals to face adversity with a positive attitude to reduce the risk of depression [16].

This study also found that perceived negative attention bias mediated the association between emotional abuse and depression, but not between emotional neglect and depression. This is primarily reflected in the insignificant predictive path from emotional neglect to negative attention bias. This may be due to the different in threat perception systems and attachment patterns associated with various types of psychological maltreatment. Compared to emotional neglect, emotional abuse involves direct negative emotional interactions, such as name-calling, shaming, and criticizing, which are negatively correlated with the resting-state functional connectivity of the left amygdala and insula circuit [57]. This suggests that individuals who have experienced emotional abuse exhibit altered threat perception and monitoring, which may lead them to focus more on the negative aspects of events than those who have experienced emotional neglect [58]. In addition, in contrast to emotional abuse, emotional neglect is primarily characterized by long-term emotional deprivation. Individuals who experience emotional neglect are more likely to develop an avoidant attachment, characterized by a tendency to fear and avoid external emotional cues, which may prevent the development of a negative attention bias [59, 60].

The serial mediating role of self-compassion and perceived negative attention bias between childhood psychological maltreatment and its subtypes and depression was also validated in this study. Childhood psychological maltreatment was negatively predicted by self-compassion, which in turn activates attention bias to negative stimuli and leads to depression. These findings support the diathesis-stress theories in which depression is affected by a combination of personal diathesis and stress [15]. Existing studies have confirmed that traumatic experiences such as sexual abuse, domestic violence, and natural disasters are negative stressful events that lead to depression [61]. In addition, diathesis such as attribution style, personality, and coping style are also associated with depression [16]. For the variables investigated in the study, McDermott and Dozois [17] regarded attention bias as a diathesis and found that perceived negative attention bias and stressors together led to a decrease in self-esteem, which is a typical cognitive feature of depression. According to study of Zhang et al. [16], self-compassion can be viewed as a diathesis and emotional abuse negatively predicted self-compassion, which then activates negative automatic

thinking and leads to depression. In addition, previous research has shown that self-compassion encourages people to acknowledge their shortcomings rather than attribute mistakes to others or the situations, and people can disengage from negative stimuli and freeing themselves from negative emotions relatively quickly as a result [38]. People experiencing childhood psychological maltreatment can benefit from self-compassion by acknowledging shortcomings, embracing the common humanity, reducing the negative effects of rumination, and separating themselves from past negative experiences. Thus, they could transfer the attention of negative emotions, promote the acceptance of negative emotions, view the abuse experience from a broader perspective, and ultimately avoid depression [38]. Overall, we provide empirical evidence for the diathesis-stress theories, which means stress (childhood psychological maltreatment) and diathesis (self-compassion and perceived negative attention bias) can interact to influence depression of college students.

Gender differences in the mediation model
In contrast to the hypothesis, there were no gender differences in the serial mediation model, which is consistent with some previous studies. From the perspective of self-compassion, the meta-analysis of Neff et al. [62] found that gender differences were observed only in the United States, not in Asian places such as Thailand and Taiwan. Despite female gender roles emphasizing the needs of others, the emotionally restrained and ascetic social patterns exhibited by male may also contribute to lower levels of self-compassion among male [63]. Furthermore, both male and female become increasingly aware of their shared humanity with age [64]. In college, students tend to stabilize their worldview, values, and outlook on life, and thus they may share the same level of self-compassion. As for perceived negative attention bias, Campbell and Muncer found no gender differences in attention bias [65]. Although evolutionary psychologists generally agree that females' attention to negative stimuli contributes to early survival, the costs of unnecessary physical, psychological, and behavioral hypersensitivity to negative stimuli far outweigh the benefits. Therefore, there was no gender difference in the mediating model of self-compassion and perceived negative attention bias.

Contributions and limitations
From the perspectives of self-compassion and perceived negative attention bias, this study provides insights for reducing the negative effects of childhood psychological maltreatment and preventing or intervening in depression among college students. The findings suggest that psychological workers need to address both emotional and cognitive problems when working with college students who have experienced overall childhood psychological maltreatment, particularly those with a history of emotional abuse. Psychological interventions aimed at enhancing self-compassion and reducing negative attention bias may help alleviate depressive symptoms in these individuals. Conversely, interventions focused on enhancing self-compassion may be more effective at reducing depression among those who experience emotional neglect. Specifically, self-compassion interventions could include psychoeducation on self-compassion and its components, mindfulness practice, and self-compassionate letter writing [18]. Additionally, attention control training and attention bias modification have shown promise in effectively reducing negative attention bias [19].

There are some limitations to this study: (1) Only the questionnaire method was used in this cross-sectional study, which limits the ability to clarify the causal relationships among variables. Subsequent studies could conduct longitudinal study or employ the experimental methods, such as self-compassion mind state induction [66]and dot probe task [31] to further clarify the relation between the variables (2) Some individuals may experience a combination of multiple maltreatment during childhood, which could have a more complex impact on their mental health in adulthood. However, this study did not control for the influence of other forms of maltreatment. Future studies should control for the influence of other forms of maltreatment or explore the differences between childhood psychological maltreatment and other forms of maltreatment, to make the related research more comprehensive and convincing.

Conclusion
This study explored the emotional and cognitive mechanisms linking psychological maltreatment and its subtypes to depression. The findings underscore the differences in the mechanisms underlying the associations between emotional abuse and emotional neglect and depression. Overall, self-compassion played a mediating role in the association between whole psychological maltreatment (and its subtypes) and depression. Perceived negative attention bias only played a mediating role between psychological maltreatment and emotional abuse and depression. Self-compassion and perceived negative attention bias played a serial mediating role between psychological maltreatment (including its subtypes) and depression. There were no gender differences. These noteworthy results suggest that interventions aimed at enhancing self-compassion and reducing perceived negative attention bias may help mitigate the association between psychological maltreatment and depression.

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Abbreviations

CPM	Childhood Psychological Maltreatment
EA	Emotional Abuse
EN	Emotional Neglect
CTQ-SF	Childhood Trauma Questionnaires
SCS-SF	Self-Compassion Scale Short Form
APNIS	Attention to Positive and Negative Information Scale
CES-D	Center for Epidemiologic Studies Depression Scale
SF	Self-compassion
PNAB	Perceived Negative Attention Bias

Informed consent
Informed consent was obtained from all individual participants included in the study.

Authors' contributions
XT and YFX conceived and designed this research; YTZ recruited the participants of this research; XT,YFX,YTZ, and XCW conducted the analyses and drafted the manuscript; YG supervised the entire study process. All authors read and approved the final manuscript.

Data availability
The study related data can be obtained from OSF (https://osf.io/xvdzs/).

Declarations

Ethics approval and consent to participate
Approval was obtained from the ethics committee of Sichuan Normal University. The procedures used in this study adhere to the tenets of the Declaration of Helsinki.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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