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The relationship between childhood trauma and social anxiety in college students: the mediating role of evaluation fear

Huoyin Zhang[1,2†], Xinyi Zhu[3†], Hao Zhang[4], Xin Xie[5], Erzhan Wei[6] and Wei Huang[7*]

Abstract

Background Social anxiety has become a common psychological problem that seriously affects the mental health of contemporary youth. Although numerous studies have shown that childhood trauma is closely related to social anxiety in adulthood, the mediating role of evaluation of fear in this relationship remains unclear. This study aims to explore the relationships among childhood trauma, evaluation fear, and social anxiety among college students and their internal pathways.

Methods In September 2023, a sample of 559 Chinese university students aged 18–22 years (mean age = 20.20, *SD* = 1.211; 229 males and 330 females) completed the Childhood Trauma Questionnaire, Liebowitz Social Anxiety Scale, Fear of Positive Evaluation Scale, and Brief Fear of Negative Evaluation Scale. Correlation analyses were conducted to explore the initial relationships among the main variables. Structural equation modeling was performed to examine the parallel mediating effects of fear of positive and negative evaluation on the relationship between childhood trauma and social anxiety.

Results Significant correlations were found among childhood trauma, social anxiety, fear of negative evaluation, and fear of positive evaluation. Childhood trauma significantly and positively predicted both fear of positive evaluation ($\beta = 0.40$, $p < 0.001$) and fear of negative evaluation ($\beta = 0.31$, $p < 0.001$). Fear of positive and negative evaluation also positively predicted social anxiety ($\beta = 0.45$, $p < 0.001$; $\beta = 0.43$, $p < 0.001$, respectively). The parallel mediation effects of fear of positive and negative evaluation on the relationship between childhood trauma and social anxiety were significant (effect size: 0.309, *95% CI* = [0.240, 0.380]), with the mediation effects accounting for 60.78% of the total effect.

Conclusion Fear of positive and negative evaluation plays a mediating role in the impact of childhood trauma on social anxiety. This finding provides a new perspective for understanding the formation mechanism of social anxiety and offers a scientific basis for developing effective intervention strategies.

Keywords Childhood trauma, Social anxiety, Fear of positive evaluation, Fear of negative evaluation, Mediating effect

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Introduction

The issue of "social anxiety" is highly prevalent among college students. This term generally refers to an individual's intense fear or unease regarding social interactions. Specifically, it encompasses negative emotional and cognitive responses triggered by being evaluated—or the possibility of being evaluated—by others in real or perceived social contexts [1]. When social anxiety reaches a certain threshold, it can disrupt social functioning and may progress into social anxiety disorder (SAD) [2]. This disorder can exert substantial influence on an individual's psychological well-being, social abilities, and professional performance, ultimately leading to a diminished quality of life [3]. Studies indicate that the global prevalence rates of SAD over a 30-day period, one year, and a lifetime are approximately 1.3%, 2.4%, and 4.0%, respectively [4]. Additionally, some experts suggest that this condition tends to affect younger individuals more severely [5]. Consequently, examining social anxiety in the youth population is of significant importance.

Why do many college students struggle with fear and anxiety in social situations? One potential explanation lies in the traumatic experiences they encountered during childhood. Childhood trauma can be defined as physical or psychological harm inflicted on an individual before the age of 18, often resulting from factors such as abuse, neglect, witnessing violence, or various forms of exploitation [6–8]. It encompasses five key dimensions: physical abuse, emotional abuse, sexual abuse, somatic neglect, and emotional neglect [9]. According to UNICEF, over 28 million children worldwide have been displaced due to conflicts, creating a widespread issue of childhood trauma with long-lasting effects that can persist for decades [10]. These traumatic experiences can disrupt essential physiological, emotional, and social development, increasing vulnerability to mental health conditions such as mood disorders, personality disorders, substance use disorders, and even psychosis [10]. Early life adversities, especially childhood trauma, are suggested by research to play a critical role in shaping mental health and significantly facilitate the progression of social anxiety. For instance, schema theory proposed by Young et al. points out that trauma in childhood serves as the root cause of maladaptive schemas, which can predispose individuals to emotional disorders later in life [11]. Recent findings further indicate a robust positive correlation between childhood trauma and social anxiety in adulthood [12]. Among these traumatic experiences, emotional neglect and somatic neglect are frequently identified as major risk factors for anxiety. Additionally, altered cardiovascular responses may act as a physiological mechanism linking childhood trauma to social anxiety in adolescents [12–14].

Distortions and biases in processing evaluative information during social interactions are also significant contributors to heightened anxiety in social settings [15]. The cognitive-behavioral model of social anxiety highlights that excessive fear and misinterpretation of negative social evaluation are major factors driving social anxiety, and these patterns may be reinforced by childhood traumatic experiences [16]. Fear of evaluation includes both negative and positive aspects. Fear of negative evaluation refers to the discomfort or distress individuals feel when they worry about receiving negative judgments or anticipate potential criticism from others [15]. Studies have shown that fear of negative evaluation serves as a crucial precursor to social anxiety [17], emphasizing its critical role in the onset and progression of the condition. While much of the existing research has traditionally focused on how fear of negative evaluation underlies the manifestation of social anxiety symptoms, it has also been included as a diagnostic criterion for social anxiety disorder [18]. However, more recent studies have uncovered that some individuals experience fear of positive evaluation, where they feel anxious or distressed in response to favorable feedback or approval from others [19]. A strong positive correlation has been observed between fear of positive evaluation and social anxiety [20], and it has also been shown that fear of positive evaluation positively predicts social anxiety [21]. The evolutionary model of social anxiety sheds light on the mechanisms through which social anxiety is impacted by fear of positive evaluation. One explanation is that positive evaluations often lead to heightened expectations and standards from others, especially in group contexts. When individuals receive praise or approval, they may feel overwhelmed by the pressure to meet these increased expectations, causing anxiety [20]. Another perspective, rooted in Gilbert's evolutionary psychological model, suggests that social hierarchy and competition drive the fear of positive evaluation. Receiving approval or attention may elevate an individual's status within the group, exposing them to heightened competition and potential threats, which can intensify social anxiety [22]. Despite its significance, limited research has explored the specific pathways through which fear of positive evaluation induces social anxiety [23]. Therefore, this study attempts to further scrutinize the impact of fear of positive evaluation on social anxiety.

While a substantial body of research has confirmed the relationship between childhood trauma and social anxiety, the mechanisms underlying this connection remain inadequately understood. Previous studies have primarily focused on factors such as attachment disruptions, social skill deficiencies, and negative self-perceptions in explaining how childhood trauma influences social anxiety [24–26]. However, the role of fear of evaluation in this process has received relatively little attention.

For instance, a study examining Chinese males with drug addiction found that childhood trauma is not only directly linked to social anxiety but also indirectly related through the mediating role of fear of negative evaluation [27]. Nevertheless, the potential place of fear of positive evaluation in this pathway was not considered in this study. As a result, the current research is intended to tackle this gap, placing particular emphasis on the role of fear of positive evaluation in the childhood trauma–social anxiety relationship. Studies have shown that the internalized relational schemas formed through early parent-child interactions significantly shape an individual's interpersonal adaptation throughout life. For those who have experienced childhood trauma, these models often become negative, influencing how they perceive themselves and others [27]. Such individuals may focus excessively on negative interpersonal cues, undervalue their own self-worth [28], and magnify the perceived risks from others in social settings [29]. These patterns may result in the development of a fear of negative evaluation, which can ultimately contribute to social anxiety. Nevertheless, most prior studies have focused on specific groups, making it unclear whether fear of negative evaluation acts as a mediator between childhood trauma and social anxiety in broader populations. Furthermore, the possible weight of fear of positive evaluation within this framework remains largely unexamined, as existing research has not yet addressed this issue.

To address these unanswered questions, the present study examines the mediating effects of fear of both positive and negative evaluation on the relationship between childhood trauma and social anxiety, focusing on college students. The objective is to evaluate whether this psychological mechanism applies to a broader population and to provide evidence-based strategies for reducing social anxiety among young individuals.

Building on previous findings and the central research questions, the study proposes the following hypotheses: [1] correlations exist between childhood trauma, fear of positive evaluation, fear of negative evaluation, and social anxiety in college students; [2] childhood trauma, fear of positive evaluation, and fear of negative evaluation positively predict social anxiety in this population; and [3] fear of positive and negative evaluation act as mediators in the link between childhood trauma and social anxiety in college students (hypotheses are shown in Fig. 1).

Methods

Cultural background and research design

Investigations reveal that 76% of individuals with mental health issues encounter moderate to high levels of perceived stigma [30]. Additionally, the fear of being labeled as "having a problem" may influence Chinese students' willingness to seek mental health services [31]. People's perceptions and evaluation criteria for mental health problems vary significantly across different sociocultural contexts. Studies suggest that stigmatization of mental disorders is more prevalent in Eastern cultures compared to Western cultures [30, 32, 33]. In collectivistic societies like those in Eastern countries, mental health issues are often tied to family reputation and societal expectations [34]. In China, the cultural belief that "family scandals should not be exposed" may further intensify the tendency to hide or deny mental health challenges.

This research is set in the Chinese sociocultural context, where collectivistic values may encourage individuals to minimize or conceal the effects of trauma or social anxiety, while mental health stigma may amplify this behavior. To address these challenges, the study employed an anonymous online questionnaire to reduce the psychological pressure participants might feel due to stigmatization, thereby ensuring the authenticity and

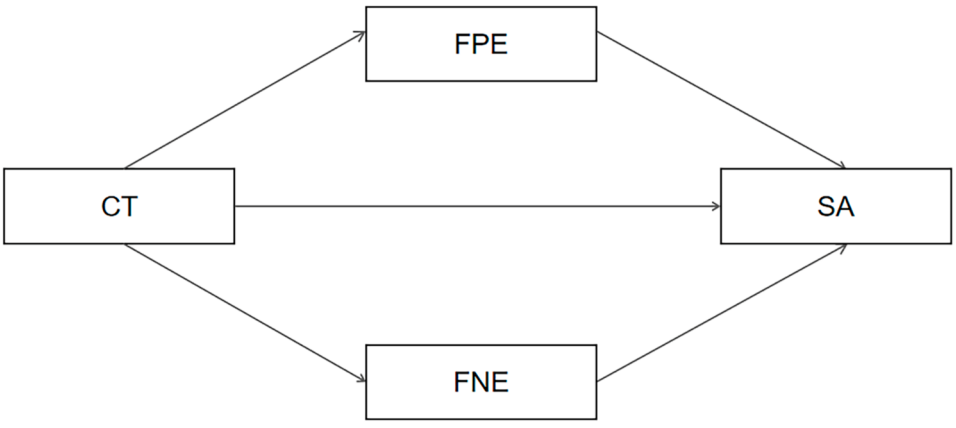

Fig. 1 Hypothesized model of the mediating role of fear of positive and negative evaluation between childhood trauma and social anxiety. *Note*: CT, Childhood Trauma; FPE, Fear of Positive Evaluation; SA, Social Anxiety; FNE, Fear of Negative Evaluation

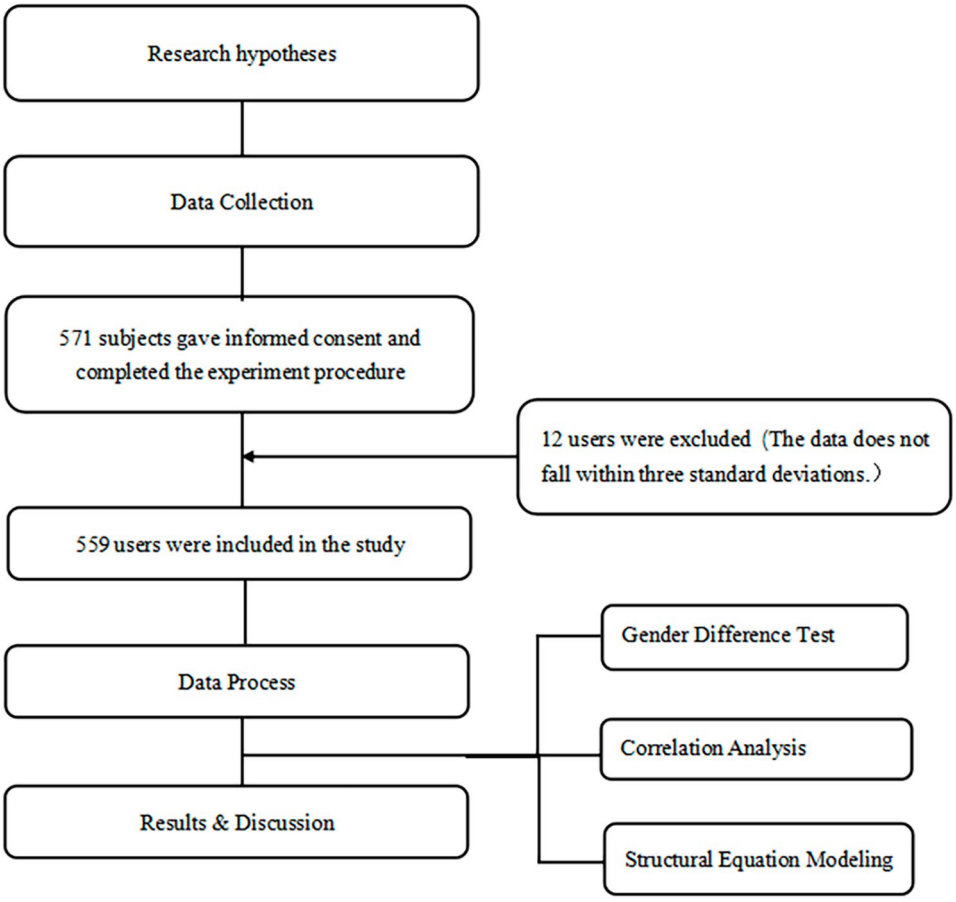

Fig. 2 Research design flowchart

Table 1 The demographic variables of the subjects and the statistical results of each scale

Variable	Gender	Men	Women
N/(%)		229(41.0)	330(59.0)
LSAS(M ± SD)		58.70 ± 28.573	61.32 ± 27.241
F/t	-1.096[a]		
P	0.274		
FPES(M ± SD)		40.35 ± 15.084	38.06 ± 15.550
F/t	1.735[a]		
P	0.083		
BFNE(M ± SD)		40.73 ± 11.947	43.95 ± 10.098
F/t	-3.330[a]		
P	<0.001		
CTQ (M ± SD)		46.76 ± 12.037	46.58 ± 10.556
F/t	0.196[a]		
P	0.845		

Note: CTQ, Childhood Trauma Questionnaire; FPES, Fear of Positive Evaluation Scale; BFNE, Brief Fear of Negative Evaluation Scale; LSAS, Liebowitz Social Anxiety Scale; **p* < 0.05, ***p* < 0.01, ****p* < 0.001; Mean ± SD or median (quartile); [a] Single-factor analysis was conducted using the t test

reliability of the responses. The overall research design process is illustrated in Fig. 2.

Participants

According to previous research [35], the sample size should be between 300 and 500 to ensure sufficient statistical test power. In this study, the following formula guided our sample size calculation: n = $[Z_{1-\alpha/2}$^2*π(1-π)]/δ^2, which allows for a 15% relative error, so the absolute error δ = 0.15π, accepting a 95% confidence interval, and $Z_{1-\alpha/2}$= 1.96. In accordance with previous studies, 45.7% of Chinese undergraduates experience social anxiety, so π ≈ 45% [36]. This study necessitated a minimum sample size of n = $[1.96^2 \times 45\%\ (1–45\%)]\ /\ (0.15 \times 45\%)^2$ ≈212. This study's participant count is sufficient to meet the sample size requirements. In September 2023, via the Questionnaire Star platform (https://wj.qq.com), a cross-sectional survey was implemented on 559 young people at the undergraduate stage (mean age = 20.20, *SD* = 1.211; including 229 males and 330 females) from diverse provinces and cities in China via convenience sampling. The demographic data of the subjects and the scale scores can be found in Table 1.

Inclusion criteria included: [1] college students aged 18 to 22; [2] ability to understand the meaning of the questionnaire items; [3] ability to use the internet. Exclusion

criteria included: [1] repeated submission of the questionnaire; [2] failure to pass the lie detection questions; [3] self-reported past or current major mental disorders (severe depression, bipolar disorder, schizophrenia, anxiety disorder, substance use disorder, personality disorder, posttraumatic stress disorder); and [4] self-reported past or current neurodevelopmental disorders (intellectual disability, autism spectrum disorder, attention deficit/hyperactivity disorder). All participants voluntarily participated in this study and signed informed consent forms. This study was approved by the Ethics Committee of the Institute of Brain and Psychological Sciences at Sichuan Normal University (SCNU-211120) and was conducted in accordance with the latest revision of the Declaration of Helsinki.

Experimental scales

Liebowitz social anxiety scale

The Liebowitz Social Anxiety Scale (LSAS), created by Liebowitz et al. (1987), is a self-assessment tool comprising 24 items categorized into four dimensions: fear of performance, avoidance of performance, fear of social interaction, and avoidance of social interaction. It evaluates participants' levels of social anxiety over the past three months [37]. The scale employs a 0–3-point scoring system, where "fear" reflects the intensity of subjective anxiety, rated from 0 (none) to 3 (severe), and "avoidance" indicates the frequency of avoidance behaviors, scored from 0 (never) to 3 (almost always) [37]. Additionally, item 25 requires participants to describe the three situations that cause them the most anxiety; however, this item does not contribute to the final score. A multicenter study conducted by He Yanling et al. (2004) confirmed that the LSAS demonstrates strong reliability and validity as a self-report instrument [38]. In this study, the scale achieved a Cronbach's α coefficient of 0.969.

Brief fear of negative evaluation scale

The Brief Fear of Negative Evaluation Scale (BFNE), created by Leary et al. (1983), is a 12-item self-report measure designed to assess individuals' fear and discomfort regarding negative evaluation from others [39]. The scale employs a 5-point Likert scoring system, ranging from 1 (not at all characteristic) to 5 (extremely characteristic). It includes 8 positively scored items and 4 reverse-scored items. Previous research has confirmed that the BFNE exhibits high reliability and validity among both college students [40] and clinical populations [41], with a Cronbach's α consistently exceeding 0.92 [42]. In the current study, the BFNE had a Cronbach's α coefficient of 0.943.

Fear of positive evaluation scale

The Fear of Positive Evaluation Scale (FPES), developed by Weeks et al. (2008), is a 10-item self-report tool that evaluates fear and distress associated with receiving positive evaluations from others [43, 44]. The FPES uses a 10-point scoring system, ranging from 0 (not at all true) to 9 (very true). Eight of the items are positively scored, while two are reverse-scored, although the reverse-scored items are not included in the total score. Prior studies have confirmed the strong reliability and validity of the FPES in both college [43, 45] and clinical [46] samples, with Cronbach's α values consistently exceeding 0.80. In this study, the FPES demonstrated a Cronbach's α coefficient of 0.880.

Childhood trauma questionnaire

The Childhood Trauma Questionnaire (CTQ), developed by Bernstein et al. (1994) [47], consists of 28 items divided into five subscales. Participants answered each item on a five-point Likert scale that ranges from 1 ("never") to 5 ("very often"). Three specific items (10, 16, and 22) are included to detect response bias and are excluded from the total score. The cutoff thresholds for identifying childhood trauma are as follows: physical abuse > 9, emotional abuse > 12, sexual abuse > 7, somatic neglect > 9, and emotional neglect > 14. Fu Wenqing's (2005) research on Chinese college students demonstrated that the CTQ has satisfactory reliability and validity in this population [48]. Within the current research project, the CTQ demonstrated excellent internal consistency, as evidenced by a Cronbach's α coefficient registering at 0.850.

Data analysis

An online survey yielded a total of 571 questionnaires, of which 12 invalid responses were excluded based on screening criteria (e.g., scores beyond three standard deviations). Statistical analysis was conducted using SPSS 27.0 and Amos 26.0. Descriptive statistical analyses were performed on the variables, including calculating frequencies, means, and standard deviations to provide an overview of the distribution of the data. The relationships among social anxiety, fear of positive evaluation, fear of negative evaluation, and the various dimensions of childhood trauma were examined through partial correlation analysis. Structural equation modeling was conducted using the maximum likelihood estimation method in Amos 26.0 statistical software, combined with the bias-corrected percentile Bootstrap method (5,000 replications) to evaluate the structural model and test mediating effects [49]. The comparative fit index (CFI), Tucker-Lewis index (TLI), and incremental fit index (IFI) were included as relative fit indices, while ratio of Chi-square to the degree of freedom(χ^2/df), root mean square error of approximation (RMSEA), goodness-of-fit index (GFI), and adjusted goodness-of-fit index (AGFI) were included as absolute fit indices.

Table 2 Matrix of pearson correlation coefficient for variables

Control variable		1	EA	PA	SA	EN	SN	2	3	4
Gender&Age	1.CTQ	-								
	EA	0.817***	-							
	PA	0.630***	0.568***	-						
	SA	0.343***	0.281***	0.208***	-					
	EN	0.816***	0.548***	0.303***	0.112***	-				
	SN	0.832***	0.529***	0.373***	0.163***	0.757***	-			
	2.LSAS	0.402***	0.343***	0.249***	0.123***	0.329***	0.358***	-		
	3.FPES	0.323***	0.250***	0.183***	0.133***	0.284***	0.320***	0.654***	-	
	4.BFNE	0.248***	0.179***	0.142***	0.043***	0.223***	0.233***	0.613***	0.595***	-

Note: CTQ, Childhood Trauma Questionnaire; FPES, Fear of Positive Evaluation Scale; BFNE, Brief Fear of Negative Evaluation Scale; LSAS, Liebowitz Social Anxiety Scale; EA, Emotional Abuse; PA, Physical Abuse; SA, Sexual Abuse; EN, Emotional Neglect; SN, Somatic Neglect; *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Table 3 Goodness-of-fit index for structural models

Fit index	χ2/df	RMSEA	GFI	AGFI	IFI	CFI	TLI
Recommended value	0–5	0–0.080	> 0.800	> 0.800	> 0.800	> 0.800	> 0.800
Values for this study	4.991	0.085	0.797	0.762	0.849	0.849	0.835

Note: χ2/df, Ratio of Chi-square to the degree of freedom; GFI, Goodness of Fit Index; CFI, Comparative Fit Index; TLI, Tucker-Lewis Index; IFI, Incremental Fit Index; AGFI, Adjusted Goodness-of-fit Index; RMSEA, Root Mean Square Error of Approximation

Results

Control and testing of common method Bias

The results of the Harman single-factor test indicate that the KMO value is 0.951, the Bartlett's test of sphericity value is 38,127.023, and the first principal component accounts for 28.367% of the variance (less than 40%). A total of 98 factors were extracted, of which 17 had eigenvalues greater than 1. These results suggest that the potential impact of common method bias in this study is deemed to be within acceptable limits.

Gender differences in childhood trauma, fear of positive evaluation, fear of negative evaluation, and social anxiety

Independent samples t-tests were performed to examine gender differences in childhood trauma, fear of positive evaluation, fear of negative evaluation, and social anxiety. The analysis revealed a significant gender difference in fear of negative evaluation ($t(435.856) = -3.330$, $p < 0.001$, Cohen's d = 0.295, *95%CI* [-5.113, -1.317]), with females ($M = 43.95$, $SD = 10.098$) outscoring males significantly ($M = 40.73$, $SD = 11.947$). Significant gender differences were not observed for the other variables ($p > 0.05$). Table 1 displays the detailed results.

Correlation analysis of childhood trauma dimensions, fear of evaluation, and social anxiety

Upon controlling for gender and age, Childhood trauma was significantly positively correlated with fear of positive evaluation, fear of negative evaluation, and social anxiety($r = 0.323$, $p < 0.001$;$r = 0.248$, $p < 0.001$;$r = 0.402$, $p < 0.001$), according to the study. Additionally, fear of positive evaluation and fear of negative evaluation were strongly positively correlated with social anxiety ($r = 0.654$, $p < 0.001$; $r = 0.613$, $p < 0.001$). Among childhood trauma dimensions, somatic neglect showed the strongest positive correlation with social anxiety, fear of positive evaluation and fear of negative evaluation ($r = 0.358$, $p < 0.001$; $r = 0.320$, $p < 0.001$; $r = 0.233$, $p < 0.001$), whereas sexual abuse had the weakest positive correlation with these variables($r = 0.123$, $p < 0.001$; $r = 0.133$, $p < 0.001$; $r = 0.043$, $p < 0.001$). Specific details are provided in Table 2.

Structural model

Based on the relationships between childhood trauma, fear of positive evaluation, fear of negative evaluation, and social anxiety, a theoretical model was proposed. This mediation model posited childhood trauma as the independent variable, with fear of positive evaluation and fear of negative evaluation as mediators, jointly influencing social anxiety. As shown in Table 3, the structural model demonstrated a good fit, with $\chi^2/df = 4.991$, GFI = 0.797, CFI = 0.849, TLI = 0.835, IFI = 0.849, AGFI = 0.762, and RMSEA = 0.085.

The impact of childhood trauma on social anxiety in college students: the mediating effect of fear of evaluation

As illustrated in Fig. 3, the model demonstrates that childhood trauma has a significant direct positive effect on social anxiety ($\beta = 0.20$, $p < 0.001$). Additionally, childhood trauma significantly predicts both fear of positive and negative evaluation in a positive direction (($\beta = 0.40$, $p < 0.001$; $\beta = 0.31$, $p < 0.001$). Fear of positive evaluation and fear of negative evaluation, in turn, significantly predict social anxiety positively ($\beta = 0.45$, $p < 0.001$; $\beta = 0.43$, $p < 0.001$).

Table 4 shows that fear of positive and negative evaluation each partially mediate the relationship between

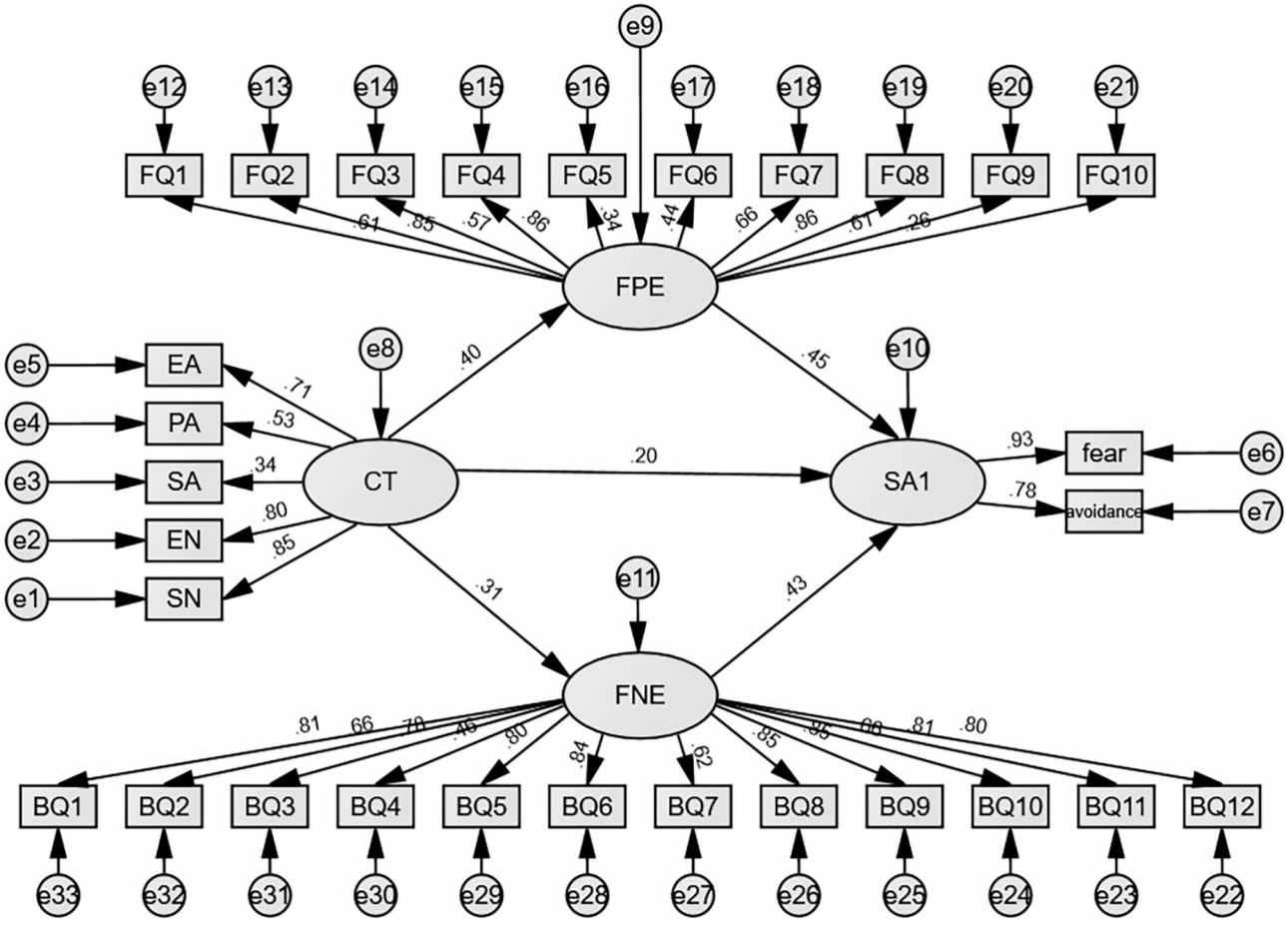

Fig. 3 The mediating role of fear of positive and negative evaluation between childhood trauma and social anxiety. *Note*: CT, Childhood Trauma; FPE, Fear of Positive Evaluation; FNE, Fear of Negative Evaluation; SA1, Social Anxiety; EA, Emotional Abuse; PA, Physical Abuse; SA, Sexual Abuse; EN, Emotional Neglect; SN, Somatic Neglect; FQ and BQ refer to the question numbers on the questionnaire; path coefficients in the model are all significant.($p < 0.01$)

Table 4 Indirect effects with fear of positive and negative evaluation as mediators

Model	Effect	Boot SE	Boot 95%		Ratio
			Boot LLCL	Boot ULCL	
Total indirect effect	0.309***	0.036	0.240	0.380	60.78%
CT→FPE→SA	0.179***	0.027	0.131	0.238	35.30%
CT→FNE→SA	0.130***	0.024	0.087	0.186	25.49%
FPE - FNE	0.049	0.038	-0.029	0.121	-

Note: CT, Childhood Trauma; FPE, Fear of Positive Evaluation; FNE, Fear of Negative Evaluation; SA, Social Anxiety; LLCL, Lower limit of confidence interval; ULCL, Upper limit of confidence interval; *SE*, Standard Error; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

childhood trauma and social anxiety, with mediating effects of 0.179(95% *CI* [0.131, 0.238])and 0.130(95% *CI* [0.087, 0.186]), respectively. The structural path diagram is presented in Fig. 3.

Discussion

This study conducted an in-depth analysis of the positive predictive effects of fear of positive evaluation, fear of negative evaluation, and childhood trauma on social anxiety among college students. It highlighted the mediating roles of fear of positive and negative evaluation in the relationship between childhood trauma and social anxiety, offering insights into the mechanisms through which childhood trauma contributes to the development of social anxiety. From a theoretical standpoint, the mechanisms underlying social anxiety are further elucidated by this research, and an innovative parallel mediation model involving fear of positive and negative evaluation is introduced. From a practical perspective, mental health challenges such as social anxiety, childhood trauma, and fear of evaluation have become significant issues in modern society. To address these concerns, the World Health Organization has introduced initiatives like the "WHO Special Initiative for Mental Health (2019–2023)" [50] and the "WHO Guidelines on Mental Health at Work" [51], emphasizing the imperative of mental health

promotion and intervention. This study offers valuable strategies for combating and managing social anxiety, providing meaningful practical implications for addressing these mental health challenges.

Gender differences in social anxiety, fear of evaluation, and childhood trauma

This study found significant gender differences in fear of negative evaluation among college students, with female students being more vulnerable to its effects. This finding aligns with the results of several prior studies [52]. Some scholars have noted that the elevated magnitudes of fear of negative evaluation observed in females versus males may stem from differences in self-perception and self-identity. For instance, females are susceptible to feelings of self-doubt and self-criticism when confronted with negative evaluations, whereas males are more apt to react with emotions like anger or a heightened sense of self-importance [53].

In contrast, this study did not identify significant gender differences in fear of positive evaluation, social anxiety, or childhood trauma. However, earlier finding has indicated that girls are inclined to score significantly higher than boys in social anxiety [54], with the lifetime prevalence of social phobia reported as 5.7% for females and 4.2% for males [55]. Some researchers suggest that the absence of significant gender differences in social anxiety may be attributed to females demonstrating greater resilience after experiencing trauma. Behaviors such as maintaining optimism, accepting difficult circumstances, and seeking social support may enable them to achieve greater emotional stability in social situations, thereby reducing their likelihood of future trauma exposure [56].

The relationship between social anxiety and childhood trauma: the mediating role of fear of evaluation

The findings of this study revealed significant positive correlations between childhood trauma, social anxiety, and fear of both positive and negative evaluation after controlling for gender and age. These results align with prior research [27, 57]. Furthermore, this study observed variations in the strength of correlations between different dimensions of childhood trauma and social anxiety, as well as fear of evaluation. Among childhood trauma dimensions, somatic neglect showed the strongest positive correlation with social anxiety, fear of positive evaluation and fear of negative evaluation, whereas sexual abuse had the weakest positive correlation with these variables. Divergent conclusions exist regarding the influence of different types of childhood trauma. For instance, some studies have found that individuals with histories of emotional abuse, emotional neglect, physical abuse, and sexual abuse score higher on state anxiety compared to those without such experiences, with sexual abuse showing a relatively strong correlation with anxiety and emotional neglect ranking lower [58]. Other research suggests that childhood sexual abuse does not necessarily increase the likelihood of developing social anxiety [59], and no differences in social anxiety sensitivity or avoidance have been observed between undergraduate women who experienced childhood abuse and those who did not [60]. Additionally, some scholars argue that emotional abuse has a more profound impact on long-term mental health than physical or sexual abuse [61, 62]. Such discrepancies highlight the lack of consensus regarding the relationships between dimensions of childhood trauma and both social anxiety and fear of evaluation.

This study further revealed that childhood trauma, fear of positive evaluation, and fear of negative evaluation are significant factors predicting social anxiety. Psychotherapeutic interventions targeting the reduction of evaluation-related fears or addressing the impact of childhood trauma are essential for mitigating social anxiety symptoms. Interestingly, the predictive value of fear of positive evaluation on social anxiety is slightly higher than that of fear of negative evaluation. This highlights the often-overlooked role of fear of positive evaluation, suggesting it may have a more direct impact on social anxiety and should be prioritized in intervention efforts. These findings stress the need to address fear of positive evaluation, offering valuable theoretical insights and practical recommendations for designing more effective treatment strategies.

The research additionally revealed that fear of positive and negative evaluation serves as partial mediators in the connection between childhood trauma and social anxiety. This suggests that individuals who have experienced higher levels of childhood trauma are more prone to developing an intensified fear of evaluation, which subsequently aggravates symptoms of social anxiety. According to attachment theory, early interactions with primary caregivers, such as parents, play a crucial role in shaping internalized relationship models that later affect interpersonal behaviors in adulthood. Consequently, childhood trauma is strongly associated with social anxiety as well as other interpersonal challenges [27]. From a neurobiological standpoint, trauma can lead to dysfunction in brain regions responsible for emotion regulation and social cognition, such as the amygdala, prefrontal cortex and hippocampus. Additionally, traumatic experiences may disrupt the hypothalamic-pituitary-adrenal (HPA) axis and result in imbalances in neurotransmitters such as serotonin and dopamine [63, 64]. These disruptions make individuals more reactive to negative stimuli or stress, leading to emotional processing patterns characterized by heightened reactivity, low emotional awareness, and difficulties in emotional regulation

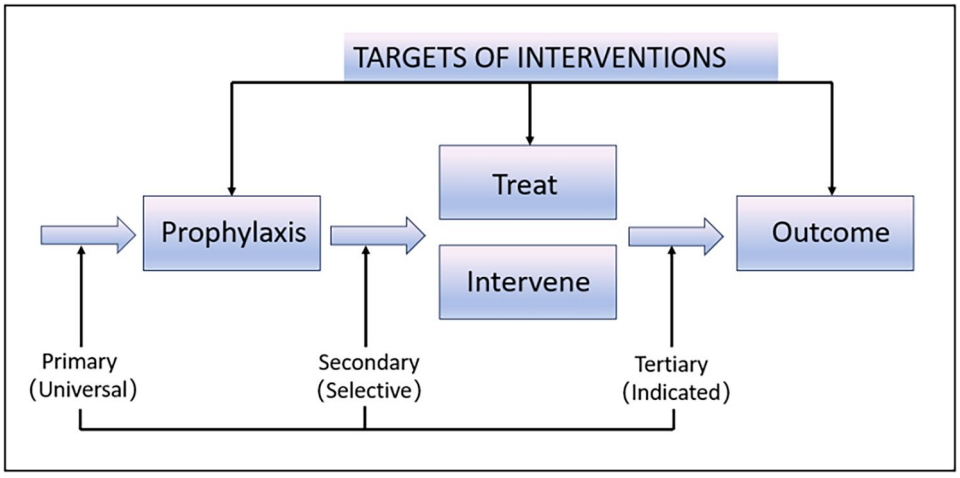

Fig. 4 Intervention flowchart. *Note* The flowchart illustrates the progression of healthcare interventions. "Primary (Universal)" targets entire populations for large-scale prevention, "Secondary (Selective)" focuses on at-risk groups, and "Tertiary (Indicated)" provides targeted care for individuals with specific conditions. The process moves from broad prevention to focused intervention and treatment, concluding with the desired outcome.

and learning. This emotional vulnerability increases the likelihood of developing emotional symptoms, including social anxiety [29]. Psychologically and socially, childhood trauma undermines an individual's self-concept, emotional regulation abilities, and interpersonal relationships. This fosters the development of negative self-perceptions and negative perceptions of others [65, 66], which are key factors in the onset of social anxiety. Greater emotional sensitivity, a weakened capacity to regulate emotions, and an increased susceptibility to emotional disorders are often exhibited by individuals with a past of trauma. Consequently, they struggle to manage negative emotions effectively when faced with negative evaluations, further intensifying their fear of such evaluations [67, 68]. Additionally, childhood trauma often gives rise to insecure attachment styles, which influence individuals to process information in ways in line with their negative attachment experiences [69]. This negative processing style can also contribute to the development of fear of evaluation. Regarding fear of positive evaluation, studies have shown that individuals with histories of trauma often rely on dysfunctional coping behaviors(e.g., self-blame, rumination, catastrophizing) and use fewer adaptive strategies (e.g., acceptance, positive reframing). This predisposition may lead to a fear of happiness [70], which, through similar mechanisms, could also explain the link between childhood trauma and fear of positive evaluation. In summary, childhood trauma influences fear of evaluation through multiple pathways, and fear of evaluation is closely tied to the severity of social anxiety [71], ultimately amplifying social anxiety symptoms.

Previous research on the relationship between childhood trauma and social anxiety has primarily focused on the intermediary function of fear of negative evaluation, often neglecting the role of fear of positive evaluation [27]. By incorporating both fear of positive and negative evaluation into a single model, this study explores their parallel mediating effects, offering a novel perspective on the complex interplay between childhood trauma and social anxiety.

This study's findings also support the cognitive-behavioral model of social anxiety. According to this framework, fear of both positive and negative evaluation not only directly influences the severity of social anxiety but also indirectly impairs social functioning by affecting social behaviors and emotional regulation [20]. The results of this study reinforce this model and provide new empirical evidence for understanding the mechanisms underlying social anxiety. Furthermore, these findings validate the bivalent fear of evaluation model, which posits that fear of positive and negative evaluation are independent yet interrelated constructs that jointly contribute to the development and manifestation of social anxiety [43]. By confirming this model, the study broadens theoretical perspectives on social anxiety and establishes a foundation for further investigation into the distinct and interactive roles of the two types of fear of evaluation.

Conducting intervention work: promoting the development of health and wellness from multiple perspectives

Based on the findings of this study, fear of positive evaluation and fear of negative evaluation serve as partial mediators in the relationship between childhood trauma and social anxiety. These results furnish a scientific basis to designing targeted interventions in practical applications. Intervention efforts can be implemented at two key levels: "prevention" and "treatment." From the prevention perspective, strategies can focus on minimizing the likelihood of trauma occurrence, while from the treatment

perspective, the goal is to address and alleviate existing mental health challenges (See Fig. 4).

Prevention

To prevent childhood trauma, efforts should focus on reducing the risk of children encountering traumatic experiences through interventions at the family, community, and societal levels. For instance, in high-risk families—such as those affected by poverty, domestic conflict, or maternal substance abuse—trauma within the family can be mitigated through initiatives like home visitation programs, crisis intervention services, and parental education. A notable example is the "Nurse-Family Partnership" program in the United States, which supports and educates new mothers. This program has been shown to significantly decrease instances of child abuse while also fostering improvements in children's mental health and behavioral outcomes [72].

At the community level, similar multilevel preventive strategies include providing social support services, such as volunteer programs designed to ease family stress, and implementing policy measures that enhance resource accessibility for vulnerable communities. By employing approaches such as universal screening, early intervention, and coordinated efforts among various agencies, the risk of childhood trauma can be substantially reduced. These measures collectively offer social safeguards to promote the healthy growth and development of individuals.

Clinical treatment

In clinical practice, psychotherapy plays a crucial role in addressing childhood trauma and alleviating social anxiety. One promising approach is the flash technique, a novel intervention in the field of trauma-related psychological treatment. This method focuses on processing traumatic memories within the information processing system of trauma survivors without requiring direct exposure to the traumatic event [73]. It has shown strong efficacy in group interventions, effectively reducing anxiety in college students with a history of childhood trauma and fostering improvements in their overall physical and mental well-being [74].

Additionally, trauma-focused therapy provides a safe therapeutic environment for individuals to process early traumatic experiences, thereby diminishing the long-term negative effects of trauma on self-perception and social behaviors [75]. Mindfulness-based interventions further enhance individuals' emotional awareness, equipping them with tools to better manage anxiety in social situations [76]. Lastly, Cognitive Behavioral Therapy (CBT) has consistently demonstrated its effectiveness in treating social anxiety disorder. By helping patients identify and reframe negative thought patterns related to the fear of evaluation, CBT improves both emotional regulation and behavioral responses [77, 78].

Intervention measures in education and public health

Beyond clinical treatment, the findings of this study offer valuable guidance for implementing psychological health interventions in education and public health settings. Universities should prioritize utilizing their psychological health center resources to organize regular group counseling sessions aimed at addressing social anxiety and fear of evaluation. Additionally, incorporating psychological health screenings into freshman orientation programs can facilitate the early identification of students in need of support. The student affairs office can enhance mental health awareness by including psychological health training modules in student leader development programs. This would enable student leaders to better recognize and provide initial support for psychological issues while collaborating with the psychological health center to host mental health-related activities. Furthermore, universities should actively seek partnerships with local organizations such as women's federations, judicial institutions, and community mental health services to diversify the psychological health resources available to students. Government agencies and nonprofit organizations can also work together to build a comprehensive psychological support network. This could include initiatives such as mental health hotlines, online support forums, and trauma intervention groups, offering ongoing emotional support and professional guidance for individuals with childhood trauma histories. To address the issue of limited psychological resources in rural or remote areas, remote mental health services—such as online counseling platforms—can be utilized to extend the reach of psychological support and enable resource sharing. Conducting regular campus-wide surveys to assess students' psychological health status would allow universities to evaluate the effectiveness of existing interventions. This data could be used to refine and optimize mental health support strategies, enabling more targeted assistance for students struggling with social anxiety and fear of evaluation. Ultimately, these efforts would contribute to the promotion of college students' psychological well-being and personal development.

Limitations and future directions

It is important to acknowledge several limitations inherent in this study. First, the use of self-report questionnaires has inherent drawbacks, as factors such as bias towards socially acceptable answers and defensive psychological tendencies can affect the results. For instance, the assessment of childhood trauma may be affected by participants' memory inaccuracies or their current emotional state. Second, although a mediation model was

constructed to examine how childhood trauma affects social anxiety, this study can't establish definitive causal relationships between the variables. Third, the study did not fully account for the role of cultural differences in shaping social anxiety, fear of evaluation, and childhood trauma. For example, the commonality of social anxiety disorder in the India is reported to be 0.47% [79], while in China, the overall prevalence of social anxiety symptoms is approximately 23.5% [80]. Additionally, data from the 2017–2018 National Survey of Children's Health (NSCH) in the United States indicated that 30 million children (42%) experienced at least one potentially traumatic event [81]. In contrast, the incidence of adverse childhood experiences appears higher in Southeast Asia: 32% of Japanese respondents, 50% of Korean respondents, 74% of Hong Kong Chinese respondents, and 76% of Vietnamese respondents reported at least one adverse childhood experience [82]. Moreover, cultural differences may influence gender-related patterns. For instance, a Swedish study found that girls scored significantly higher than boys in social anxiety [54], whereas a survey of 72 Chinese college students found no significant gender differences in fear of negative evaluation [83]. These variations highlight the need for further cross-cultural research to better understand how cultural backgrounds influence childhood trauma and social anxiety. Fourth, although age and gender were controlled for in this study, other potentially influential factors were not included, such as socioeconomic status and family environment. These variables may also play significant roles in shaping childhood trauma and social anxiety. Future research could integrate more objective measures, such as neuroimaging data, evaluations by others, or implicit testing, to obtain results that more accurately reflect reality. Prospective study designs could be employed to track participants' life experiences from childhood, while experimental or longitudinal methods could help clarify causal relationships. Conducting cross-cultural studies and exploring protective factors, such as resilience, that may buffer the effects of childhood trauma on social anxiety could further refine theoretical models of the mechanisms linking trauma and social anxiety. This would also provide a foundation for developing culturally specific and more precise intervention strategies. Additionally, more control variables can be added to more comprehensively eliminate the interference of confounding variables.

Conclusion

This study identified significant correlations and predictive relationships among childhood trauma, social anxiety, and fear of evaluation in college students. Furthermore, it demonstrated that fear of positive and negative evaluation serves as parallel mediators in the link between childhood trauma and social anxiety, emphasizing the critical role of fear of positive evaluation. These findings deepen the theoretical understanding of social anxiety and also shed light on the underlying mechanisms contributing to its development in college students. Additionally, they provide valuable evidence to inform the design of more effective intervention strategies in practical settings.

Abbreviations

CTQ	Childhood Trauma Questionnaire
CT	Childhood Trauma
LSAS	Liebowitz Social Anxiety Scale
FPE	Fear of Positive Evaluation
SA	Social Anxiety
FNE	Fear of Negative Evaluation
BFNE	Brief Fear of Negative Evaluation Scale
FPES	Fear of Positive Evaluation Scale
WHO	World Health Organization
HPA	Hypothalamic-Pituitary-Adrenal axis
KMO	Kaiser-Meyer-Olkin
95% CI	95% Bias-corrected Confidence Interval
SD	Standard Deviation
SCNU	Sichuan Normal University
EA	Emotional Abuse
EN	Emotional Neglect
SA	Sexual Abuse
PA	Physical Abuse
SN	Somatic Neglect
χ^2/df	Ratio of Chi-square to the degree of freedom
IFI	Incremental Fit Index
CFI	Comparative Fit Index
GFI	Goodness of Fit Index
AGFI	Adjusted Goodness-of-fit Index
TLI	Tucker-Lewis Index
RMSEA	Root Mean Square Error of Approximation

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Author contributions

Huoyin Zhang was responsible for conceptualization, methodology, investigation, writing - review & editing and visualization. Xinyi Zhu managed data curation, formal analysis, visualization, original draft and writing - review & editing. Hao Zhang contributed to writing - review & editing and supervision. Xin Xie contributed to data curation, software, and writing - review & editing. Erzhan Wei worked on visualization and writing - review & editing. Wei Huang also handled writing the original draft and software. All authors have reviewed the manuscript and approved its submission.

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Data availability

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

Declarations

Ethics approval and consent to participate

All participants voluntarily participated in this study and signed informed consent forms. This study was approved by the Ethics Committee of the Institute of Brain and Psychological Sciences at Sichuan Normal University (SCNU-211120) and was conducted in accordance with the latest revision of the Declaration of Helsinki.

Consent for publication
Not applicable.

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Competing interests
The authors declare no competing interests.

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