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Childhood Abuse, Rumination, Social Anxiety, and Mindfulness among College Students: Basis for Psychological Intervention Program Development

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Abstract
This study examined the relationship between childhood abuse, rumination, social anxiety and mindfulness in 1145 Chinese college students, using the Childhood Abuse Scale (CTQ-SF), Rumination Reaction Scale (RRS), Interaction Anxiousness Scale (IAS) and Mindful Attention Awareness Scale (MAAS). Findings showed that childhood abuse significantly positively predicted social anxiety, with rumination playing a fully mediating role. Mindfulness demonstrated a significant moderating effect in both the first and second halves of the mediational model. The findings emphasized the importance of mental health education activities aimed at reducing rumination and enhancing mindfulness, which could potentially help college students better cope with the psychological impact of childhood abuse, lower their social anxiety levels, and promote their mental health development.

Keywords
Childhood Abuse; Rumination; Social Anxiety; Mindfulness

1 Introduction

With the popularization of higher education in China and increasingly fierce competition, the context of college students' existence has become particularly complex and challenging(Hoyle, & Weeks, 2021). They not only face pressure from various aspects, such as academics, employment, and interpersonal relationships, but also have to adapt and grow in a rapidly changing social environment. This highly competitive environment has led to a trend of anxiety and mediocrity in the mental lives of college students (Cai, 2022), and the frequent occurrence of mental health problems among college students, such as anxiety, depression, and sleep disorders (Karyotaki, et al., 2020). In this context, this study will focus on the influencing factors and mechanisms of social anxiety among college students, with an emphasis on four key psychological concepts: social anxiety, childhood abuse, rumination, and mindfulness.

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Social anxiety refers to the psychological phenomena of tension, fear, and embarrassment that individuals experience during normal interpersonal interactions with others (Marino, et al., 2020), and it is one of the common psychological problems among contemporary college students (Jefferies, & Ungar, 2020; Jaiswal, et al., 2020). A survey found that 87.8% of Chinese college students have varying degrees of social anxiety, with a high proportion of 22.4% suffering from moderate to severe social anxiety (Zhao, & Dai, 2016). Social anxiety has many negative effects on individual physical and mental health, which can seriously affect academic performance, reduce individual happiness, increase the probability of addiction problems, and even increase college students' suicidal ideation and behavior. Therefore, exploring the mechanisms and intervention methods of social anxiety among college students is of great significance.

Social anxiety, as a psychological stress response of individuals, is influenced by factors such as their growth environment and their own cognitive activities. Previous studies have shown that social anxiety is associated with childhood abuse. Childhood abuse was first proposed by Sigmund Freud, and the concept has been widely accepted since 1999, when the World Health Organization defined child abuse (Danese, 2020). Child abuse is behavior by a child's caretakers, guardians, and those who have control over the child that causes significant or potential harm to the child's body, mind, or dignity. In the literature, emotional abuse, physical abuse, emotional neglect, physical neglect, and sexual abuse are generally regarded as the five primary domains of childhood abuse (Salokangas, 2021). In recent years, incidents of child abuse have been frequently reported in the media and have garnered widespread attention from all sectors of society(Seddighi, et al., 2021). A survey of 2,120 college students in China (Zhang, R., Zhang, S., & Shang, Y., 2023) found that the detection rate of childhood maltreatment was 35.99%, and the detection rate of multiple types of maltreatment was 19.29%. It is equally noteworthy that in 2018, the United States Child Protective Services (CPS) received over 4 million reports of suspected abuse, encompassing roughly 7.8 million children (Austin, Lesak, & Shanahan, 2020). Additional studies reveal that one out of every eight children had suffered from abuse confirmed through CPS investigations (Wildeman, et al., 2014). It is evident that childhood abuse experiences (physical, emotional, sexual, neglect, etc.) are common among college students and have long-lasting harmful effects (Ho, et al., 2020; Sheldon, et al., 2021). The health needs of college students are continuously increasing (Karatekin, & Ahluwalia, 2020), and adverse childhood experiences (such as abuse, violence, etc.) are possible contributing factors (Zivin, Eisenberg, Gollust, and Golberstein, 2009). For example, previous studies have found that childhood abuse can positively predict social anxiety levels in adolescence and adulthood (Fitzgerald, & Gallus, 2020), and emotional abuse experiences of former rural college students in China can predict their social anxiety levels (Liang, Zhang, & Wu, 2019).

Rumination is thought to play a central role in social anxiety (Modini, Rapee, & Abbott, 2018). As an adaptive cognitive and emotional regulation strategy, rumination refers to an individual's unconscious state of repeatedly thinking about thoughts and behaviors related to their own negative state, but they do not take action to solve problems, such as "repeatedly thinking about why they cannot handle things better" (Moulds, Bisby, Wild, & Bryant, 2020). Past research indicates that rumination tends to exacerbate social anxiety and increase the risk of engaging in maladaptive coping behaviors, e.g., avoiding social activities（Seah, Aurora, & Coifman, 2020）.

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According to the cognitive theory of rumination, individual rumination is the result of external adverse factors (such as stressful life events, psychological abuse, contact with violent events, etc.), which make individuals sensitive to negative information, cause deviations in their thinking, and easily induce individuals to ruminate, resulting in the loss of various social functional mechanisms (Watkins, & Roberts, 2020; Zhao, Lopez, Zhang, et al., 2024). Empirical studies have confirmed that childhood sexual abuse can positively predict rumination (Conway, Mendelson, Giannopoulos, et al., 2004), and childhood emotional abuse can positively predict rumination among high school students (Domke, Hartling, Stippl, et al.,2023).

However, the interaction effects between childhood abuse and rumination on college students' social anxiety have not been researched, despite childhood abuse, rumination and social anxiety being highly correlated. An individual's cognitive activities of environmental stimuli play an important mediating role in the occurrence of psychological stress reactions. Therefore, childhood abuse (environmental stimuli) may mediate individual social anxiety through rumination (a cognitive activity). The current study hypothesized that rumination plays a mediating role between childhood abuse and social anxiety in college students.

In addition, the Stress-Diathesis Interaction Model points out that the interaction between stressors (i. e. pressure) and individual psychological qualities will produce stress response or coping behavior, which in turn affects the individual's psychological and social adaptation. That is, individual psychological quality may play a regulatory role in the process of stress-induced stress reactions. Trait mindfulness is a positive individual quality factor that refers to an individual's habitual awareness of current thoughts and emotions, including observing experiences, labeling perceptions with words, being aware of the present moment, not judging one's own thoughts and emotions, and not overreacting (Baer, Smith, & Allen, 2004). Individuals high in trait mindfulness have more adaptive emotion regulation skills (Fisher, Duraney, Friess, et al., 2022) and generally experience less social anxiety (Makadi, & Koszycki, 2020). Therefore, the current study hypothesized that trait mindfulness may also have a buffering effect on both the positive effects of childhood abuse on social anxiety and the positive effects of childhood abuse on rumination.

The stress buffering theory of mindfulness (Creswell & Lindsay, 2014) points out that mindfulness can reduce an individual's destructive evaluation of stressful events, reduce stress reactions, and further promote physical and mental health. Research shows that trait mindfulness can alleviate the negative emotions caused by stress perception in daily life (Dillard, & Meier, 2021). Therefore, the negative impact of rumination may also be regulated by trait mindfulness. Therefore, trait mindfulness may also have the effect of buffering the positive impact of rumination on social anxiety.

In summary, this study aims to explore the mechanism of childhood abuse's impact on college students' social anxiety, revealing the mediating role of rumination and the moderating role of trait mindfulness. It further enriches the theoretical framework of the causes of social anxiety and provides a new perspective for understanding the relationship between childhood abuse and social anxiety. At the same time, this study provides empirical evidence and intervention strategies for alleviating college students' social anxiety, offering valuable reference for college mental health education and counseling.

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2 Methods

2.1 Participants and procedure

A cross-sectional survey was carried out in November 2023, targeting a convenience sample of college students from two universities located in central China. Prior to the initiation of the study, ethical clearance was granted by the university's institutional review board, and informed consent was obtained from all participants. Upon completion of their participation, each participant received a small incentive. The survey's specific timing was scheduled by the respective schools. Standardized guidelines were provided to participants, outlining the study's objectives and emphasizing the significance of their involvement. They were assured of anonymity and confidentiality throughout the study and completed a set of printed self-report questionnaires under the guidance of their head teachers and one of our research assistants. A total of 1,316 questionnaires were distributed, with 171 participants excluded due to missing data on any of the measured variables. The final sample comprised 1,145 participants. The demographic characteristics of the sample are detailed in Table 1. Upon the retrieval of all questionnaires and the collection of data, the research adviser promptly assigned her statistician for data computation and analysis.

Table 1. Demographic characteristics of participants(N=1145)

Profile	Frequency	Percentage%
Gender		
Male	246	21.5
Female	899	78.5
Grade		
Freshman year	316	27.6
Sophomore year	369	32.2
Junior year	352	30.7
Senior year	108	9.4
Only child		
Yes	432	37.7
No	713	62.3
Inhabitation		
City	353	30.8
Town	240	21.0
Countryside	552	48.2

2.2 Measures

Childhood Abuse Scale (CTQ-SF) This article adopted the Bernstein Childhood Abuse Scale (CTQ-SF) revised by Zhao et al. (2005) in Chinese. This scale consists of 28 questions and is scored using a 5-point Likert's scale (1 represents never, 5 represents always). The 10th, 16th, and 22nd validity headings constitute the Minimization/Denial validity scale (MD scale), which is scored at two points: select 5 and score 1; If not 5, score 0. The total score of the MD scale is 0-3 points. If the score is 3, it indicates that the sample has a tendency to deny the answer, and the sample data is invalid and needs to be deleted. The 25 questions except for the 3 valid titles are clinical scoring items, of which 7 are reverse scoring questions. After reverse scoring, the total score is 25-125. The higher the total score on the scale, the higher the individual's level of childhood abuse. In this study, the total Cronbach score of the Chinese version of the Child Maltreatment Questionnaire was 0.81; the Cronbach's range of each subscale was 0.43 to 0.73.

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Rumination Reaction Scale (RRS). This study adopted the "Rumination Reaction Scale" revised by Han. (2009). This scale consists of 22 questions and includes three dimensions: symptomatic rumination, forced thinking, and reflective contemplation. It uses a 4-point scoring system (1-4) and is mainly used to evaluate the degree of rumination caused by negative events faced by individuals. In this study, the total Cronbach score of Rumination Reaction Scale was 0.95; the Cronbach's range of each subscale was 0.77 to 0.91.

Interaction Anxiousness Scale (IAS) This study adopted the Leary Interaction Anxiousness Scale (IAS) revised in Chinese by Peng et al.. (2004). It is widely used in social anxiety research in China and can effectively measure the level of social anxiety among Chinese college students. The scale consists of 15 questions, with a Likert 5-point rating (1 representing complete non-compliance and 5 representing extreme compliance), including four reverse scoring questions. The higher the total score on the scale, the higher the individual's level of social anxiety. In this study, the total Cronbach score of Interaction Anxiousness Scale was 0.85.

Mindful Attention Awareness Scale (MAAS) This scale was developed by Brown and Ryan in 2003 as an instrument for assessing mindfulness levels. Chen et al. (2012) revised this scale and found that it can also be promoted and applied in China. This scale contains 15 items, and all items are reverse scored. The scale adopts a 6-point Likert scale, ranging from "never" to "always", and the subjects report the option that best suits them among each item based on their actual situation in the past few weeks. High scores reflect higher levels of individual mindfulness traits in daily life. The higher the total score, the higher the individual's level of trait mindfulness. In this study, the total Cronbach score of Mindful Attention Awareness Scale was 0.88.

2.3 Data analysis

This study used SPSS27.0 software for data analysis, mainly using the following methods: descriptive analysis, internal consistency coefficient analysis, normal distribution test, correlation analysis, and regression analysis. Specifically, quantitative data such as frequencies and percentages, means, and standard deviations were first processed using descriptive statistics. Then, based on the results of the normal distribution test, decide whether to use the independent samples t test and one-way analysis of variance (ANOVA) or the Mann-Whitney U test and Kruskal-Wallis H test to statistically analyze significant differences between variables grouped according to their characteristics. difference. Pearson product-moment correlation analysis was used to examine whether relationships existed between childhood abuse, rumination, social aversion, and mindfulness. Finally, the PROCESS4.1 plug-in was used to establish a moderated mediation model to test the mediating effect of contemplation and the moderating effect of mindfulness.

3 Results and Discussion

3.1 Correlation analysis

The means, standard deviations and correlations between variables are listed in Table 2. The results showed that all the variables were significantly correlated.

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Table 2 Correlation Analysis

Variable	*Weighted Mean*	*SD*	1	2	3	4
1Childhood Abuse	34.19	8.11	—			
2 Social Anxiety	48.61	10.54	0.15**	—		
3 Rumination	36.98	10.99	0.25**	0.45**	—	
4 Mindfulness	68.46	12.49	-0.27**	-0.61**	-0.47**	—

Note: ** $p < 0.01$.

3.2 Testing of the mediating role of rumination

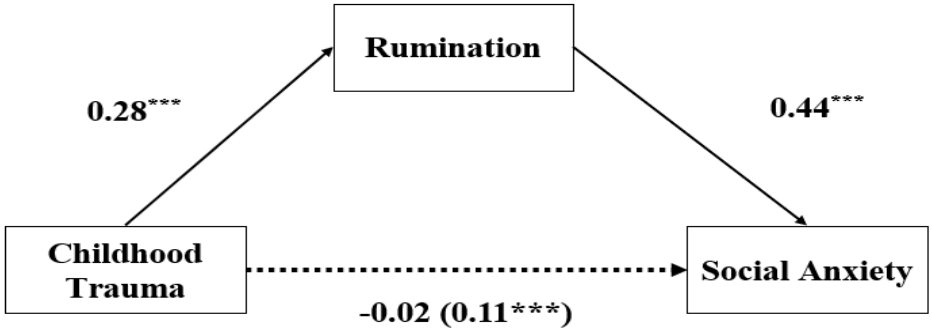


Figure 1 Mediation Model Diagram of Rumination

In order to determine the cause of this correlation, the researcher examined the mediating effect of rumination, with childhood abuse as the independent variable (X), rumination as the mediating variable (M), and social anxiety as the dependent variable (Y). The results are shown in and Figure 1. Childhood abuse positively predicts social anxiety (Equation 1: β=0.11, P<0.001) and rumination (Equation 2: β=0.28, P<0.001). When both childhood abuse and rumination are included in the regression equation, the predictive effect of childhood abuse on social anxiety becomes non-significant (Equation 3: β=-0.02, P>0.05). Through the Bootstrap mediation effect test, it was found that childhood abuse has a significant influence on social anxiety. The 95% confidence interval for the total effect [0.07, 0.22] and the indirect effect [0.13, 0.20] do not contain 0, while the 95% confidence interval for the direct effect [-0.09, 0.05] does contain 0. This indicates that rumination played a fully mediating role between childhood abuse and social anxiety. See Table 3 for details.

Table 3Rumination Mediation Effect Test

Childhood abuse →Social anxiety	Effect	SE	95% CI
Total	0.14	0.04	[0.07, 0.22]
Indirect	0.16	0.02	[0.13, 0.20]
Direct	-0.02	0.04	[-0.09, 0.05]

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3.3 Testing the moderating effect of mindfulness

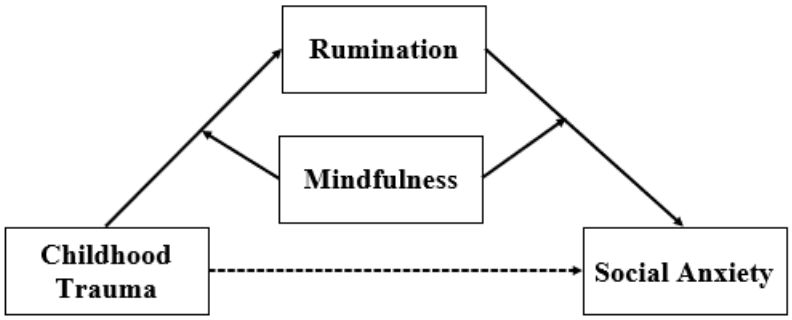


Figure 2 A moderated mediation model

In order to test the moderating effect of mindfulness in the above mediation model, we employed Model 59 from the SPSS PROCESS macro, controlling for gender, grade, and only-child status. We estimated the mediating and moderating effects using a bootstrap 95% confidence interval based on a 5000 bootstrap sample The interaction term between mindfulness and childhood abuse significantly predicted rumination (β=-0.08, SE=0.002, t=-3.31, P<0.01, 95% CI -0.012 to 0.003). Similarly, the interaction term between mindfulness and rumination had a significant impact on social anxiety (β=0.08, SE=0.001, t=-3.80, P<0.01, 95% CI 0.003 to 0.009). However, the interaction term between mindfulness and childhood abuse did not significantly predict social anxiety (β=-0.01, SE=0.002, t=0.41, P>0.05, 95% CI -0.004 to 0.006). These findings suggest that mindfulness moderates both the first and second halves of the mediated effect but does not moderate the direct path of the mediated effect.

To further illustrate the moderating role of mindfulness, we conducted a simple slope analysis by dividing the sample into high (M+1SD) and low (M-1SD) mindfulness groups. The results showed that mindfulness moderates the relationship between childhood abuse and rumination. For college students with low mindfulness (M-1SD), childhood abuse significantly predicted their rumination tendency (Bsimple=0.18, p<0.001, 95% CI 0.16 to 0.31). This suggests that among these students, more severe childhood abuse is associated with a higher likelihood of engaging in ruminative thinking about negative emotions or experiences. In contrast, for college students with high mindfulness (M+1SD), childhood abuse scores did not significantly predict their rumination (Bsimple=0.03, p>0.05, 95% CI -0.16 to 0.14). This indicates that high mindfulness may help buffer the negative impact of childhood abuse on rumination.

Additionally, rumination positively predicted social anxiety in both the low mindfulness group (Bsimple=0.22, p<0.001, 95% CI 0.14 to 0.27) and the high mindfulness group (Bsimple=0.34, p<0.001, 95% CI 0.30 to 0.43). However, the predictive coefficient of social anxiety was higher in the high mindfulness group (Bsimple=0.34) compared to the low mindfulness group (Bsimple=0.22). This shows that as college students' own mindfulness levels increased, rumination had a stronger impact on social anxiety.

4 Discussion

The mediation effect model shows that rumination plays a complete mediating role between childhood abuse and social anxiety in college students, which means that childhood abuse intensifies social anxiety

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by increasing the individual's tendency to ruminate. This finding is consistent with previous research and related theories, and highlights the important role of rumination in the development and maintenance of social anxiety. Similarly, some researchers (Lin, Wu, & Dang, 2020) found that rumination plays a mediating role between negative life events and social anxiety. Childhood abuse may cause profound emotional and psychological trauma to individuals, causing them to have difficulties in emotional processing and cognitive control. Abused children may tend to use rumination, a maladaptive coping strategy, to deal with negative emotions, dwelling on past painful experiences and becoming trapped in a negative emotional cycle (Im, & Follette, 2016). Therefore, rumination serves as a bridge between childhood abuse and social anxiety, making individuals more sensitive and vulnerable in social situations. Understanding this mediating role can help us better understand the mechanism by which childhood maltreatment affects individual social functioning and provide targeted strategies and methods for prevention and intervention efforts. For example, by helping individuals reduce rumination, we can reduce their social anxiety symptoms and improve their mental health and quality of life.

Mindfulness, as a positive psychological resource, plays a crucial role in moderating the impact of childhood abuse on rumination among college students. For college students who have experienced childhood abuse, they may struggle to form a clear sense of self due to the trauma inflicted by their parents, making them prone to negative self-schemas (Chen, Xiao, Wang, 2022). Such negative self-schemas can lead them to be more sensitive to negative information and tend to ruminate on past painful experiences. However, the presence of mindfulness can provide them with an effective psychological resource to better cope with these challenges.

Mindfulness, as an intervention widely explored in neurobiological research, is believed to enhance individuals' brain networks (Sezer et al., 2022) and plays a significant role in maintaining and promoting mental health. However, an interesting phenomenon was observed in this study: among college students, increased mindfulness levels actually strengthened the association between rumination and social anxiety. This finding contradicts previous research. Nonetheless, one study aligns with our results. Mao (2023) found that the link between rumination and trait depression intensified with increasing mindfulness levels in patients with depression. Some scholars suggest that while mindfulness can protect individuals from the negative impact of adverse experiences, its effectiveness varies among individuals (Farias & Wikholm, 2016). This variability indicates a complex interplay between mindfulness, rumination, and social anxiety. Interpreting these relationships requires attention to their dynamic balance and mutual influences.

Firstly, according to the Monitoring and Acceptance Theory (MAT), attentional monitoring in mindfulness can enhance cognitive function but may also escalate emotional reactions, while an attitude of acceptance can mitigate these emotional responses (Lindsay E. K., & Creswell J. D. 2017). In the treatment of depression, meta-analyses have found that a moderate reduction in rumination may be achieved through acceptance (Perestelo-Perez L., et al., 2017). Nevertheless, excessive rumination can negatively impact the process of acceptance (Yu, Zhou, Xu, & Zhou, 2021), leading to depression. This provides insights into understanding the moderating role of mindfulness in the relationship between rumination and social anxiety. It suggests that increased awareness without an attitude of acceptance may make individuals more prone to social failure worries and fears, thereby exacerbating social anxiety.This explains why, in this study, increased mindfulness levels led to a stronger association between rumination and social anxiety.

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Additionally, previous studies have found that simply focusing on attention awareness training in mindfulness may maintain or even strengthen the impact of rumination on depression (Sahdra, Ciarrochi, Parker, et al., 2017)). Similarly, this study found that an increase in mindfulness levels led to a stronger association between rumination and social anxiety. The reason may be that attention monitoring in mindfulness training may inadvertently increase an individual's alertness to social threats. This alertness is beneficial in some cases because it can help individuals better cope with potential social challenges. However, if this alertness is excessive or not effectively regulated, it may cause individuals to over-focus on social threat signals, thereby exacerbating social anxiety.

In conclusion, the relationships between mindfulness, rumination, and social anxiety are complex and dynamic. To effectively alleviate social anxiety, individuals need to cultivate both mindfulness and an attitude of acceptance, adopting a more balanced and holistic approach to social challenges. Future research should further explore how to integrate acceptance elements into mindfulness training to achieve more effective mental health interventions.

5 Conclusions

Childhood abuse had a significant predictive effect on college students' social anxiety, rumination played a complete mediating role, and mindfulness played a significant moderating role in the first half of the path and the latter path of the mediation model.

6 Recommendation

Building a support network: College students who have experienced childhood abuse should actively seek and establish a support network with trusted individuals such as friends, mentors, or mental health professionals. By sharing their experiences and feelings, they can gain emotional support and understanding, which can help reduce rumination and social anxiety.

Receiving professional psychological counseling: Seeking out professional psychological counselors or therapists to receive personalized psychological treatment. Psychological intervention methods such as Cognitive Behavioral Therapy (CBT) and mindfulness-based therapies have been proven effective in reducing rumination and improving mindfulness.

Learning mindfulness techniques: Actively participating in mindfulness exercises such as meditation, deep breathing, and body awareness. These techniques can help college students shift their attention to current bodily sensations and thoughts, reducing the tendency to ruminate on past painful experiences.
Cultivating self-care and self-acceptance: Learning how to care for themselves and accept their past and present circumstances. Through self-compassionate practices such as self-forgiveness, they can alleviate inner burdens and improve self-esteem and confidence.

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