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The relationship between childhood psychological abuse and depression in college students: internet addiction as mediator, different dimensions of alexithymia as moderator

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Abstract

Background and objective Childhood psychological abuse (CPA) is highly associated with depression among college students. However, the underlying mechanisms between these variables need further exploration. This study aims to investigate internet addiction as a mediating factor and alexithymia and its different dimensions as moderating factors, to further complement the psychological mechanisms between CPA and depression among college students.

Methods A self-report survey was conducted on 625 college students from two universities in Hunan Province, China. The survey included CPA, internet addiction, alexithymia, and depression. Descriptive and correlational analyses were performed on these variables, and a moderated mediation model was constructed.

Results CPA is positively correlated with depression, internet addiction, and alexithymia among college students. Internet addiction partially mediates the relationship between CPA and depression among college students, while alexithymia enhances the relationship between CPA and internet addiction as well as depression among college students. The moderating effect of the different dimensions of alexithymia is inconsistent, with the modulation effect of difficulty in identifying feelings being the strongest.

Conclusion This study further elucidates the psychological mechanisms between CPA and depression among college students. Internet addiction serves as a mediating factor, while alexithymia may strengthen the relationship between CPA and internet addiction, as well as between CPA and depression.

Keywords Child psychological abuse, Depression, Alexithymia, Internet addiction, College students

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Introduction

Depression is a high-risk mental disorder among young people, characterized by symptoms such as lack of energy or sadness [1]. Over the past decade, the prevalence of depression has been continuously increasing [2, 3]. Studies have found that the prevalence of depression among Chinese university students exceeds 25% [4, 5], and the global prevalence has also reached nearly 30% [6]. Depression has diverse and complex etiological factors, posing serious risks to young individuals and potentially leading to adverse outcomes such as self-harm and suicide. Among these factors, childhood abuse is closely associated with depression [7–10], and research has found that childhood psychological abuse is most strongly linked to depression [8]. Due to the severe harm of depression, the level of social concern, and its strong association with childhood psychological abuse, it is crucial to explore the underlying mechanisms between the two in order to facilitate timely intervention, prevention, and prediction of the impact of childhood psychological abuse on individual depression.

Childhood psychological abuse refers to the consistent and repeated inappropriate psychological nurturing behaviors imposed on an individual during childhood, which have detrimental effects on their development [11]. Due to its unique nature, the detection rate of childhood psychological abuse is relatively high in different countries [12, 13]. Emotional abuse and emotional neglect are two subtypes of childhood psychological abuse that have been increasingly accepted by scholars in related research. Longitudinal studies have found that parental psychological neglect predicts future occurrence of depression in adolescents [14]. Moreover, among the classification of childhood abuse, psychological abuse has the highest correlation with depression [8]. Recent research has found that positive childhood experiences significantly and negatively predict depression levels in adulthood [15]. Based on the aforementioned reviews, this study hypothesizes that childhood psychological abuse significantly predicts the occurrence of depression in university students.

In the relationship between childhood psychological abuse and depression among university students, internet addiction serves as an important mediator. Excessive use of the internet leading to deteriorations in physical, mental, and social aspects, and the difficulty to cease such behaviors even when the situation worsens, are typical characteristics of internet addiction [16]. With the continuous development of technology, the accessibility threshold of internet use media (such as smartphones) and internet connection has become increasingly lower, further exacerbating the aforementioned situation. A survey conducted in representative provinces of China found that internet addiction plays a significant mediating role between adverse experiences in childhood (including a high detection rate of neglect) and high-risk behaviors [17], with emotional neglect having the most significant impact on internet addiction [18]. According to the social compensation theory [19], when an individual's social needs are not met, they will choose substitute strategies to satisfy their current emotional needs, and the internet naturally fulfills this role, gradually leading to internet addiction. Unfortunately, internet addiction brings about many negative consequences for individuals, with depression being one of the typical outcomes. Studies have found a strong relationship between internet addiction and depression [20–22], with initial internet addiction predicting subsequent depression [23]. Based on the aforementioned reviews, this study hypothesizes that internet addiction plays a mediating role between childhood psychological abuse and depression among university students.

However, when individuals possess certain traits, the relationships among the aforementioned variables may be enhanced, exacerbating negative behaviors or psychological outcomes. Among these traits, alexithymia is one of the more important variables. Alexithymia is a stable personality trait [24], and individuals with this trait have limited ability to understand their own emotions and the emotions of others, making it difficult for them to regulate emotions in interpersonal interactions [25]. Difficulty in identifying feelings (DIF), difficulty in describing feelings (DDF), and externally oriented thinking (EOT) are the main dimensions of alexithymia [26]. Due to emotional dysregulation, alexithymia can exacerbate negative emotions such as anxiety and depression [27], and inaccurate attention and expression of emotions can lead to poor interpersonal relationships [28], thereby increasing individual psychological burdens. To escape from and alleviate these negative emotions, the use of mobile phones and the internet provides an easily accessible avenue [28–31]. Studies have found varying relationships between different dimensions of alexithymia and internet addiction or smartphone addiction, as well as with depression, with difficulty in identifying feelings showing the strongest relationship with internet addiction and depression [32, 33]. This may be due to different emotional pressures associated with different dimensions of alexithymia [34], so further research is needed to discuss the predictive level of different dimensions of alexithymia on behavior and psychology. Based on the alexithymia stress hypothesis, individuals with high levels of alexithymia often experience stress due to their limited understanding and recognition of their own emotions and the emotions of others [35], which in turn predicts severe negative psychological states [36]. Therefore, based on the aforementioned reviews, it is evident that alexithymia enhances the strength of the relationship between

childhood psychological abuse and internet addiction and depression among university students, further exacerbating the degree of negative psychology and behavior. Therefore, we hypothesize that alexithymia enhances the predictive strength of childhood psychological abuse on internet addiction and depression among university students, and the moderating effect varies across different dimensions of alexithymia.

In summary, this study further explored the internal psychological and behavioral mechanisms between childhood emotional abuse and depression by using Internet addiction as the mediating variable and the different dimensions of alexithymia as the moderating variable. And constructed a moderated mediation hypothesis model (see Fig. 1).

Methods

Participants

In October 2023, we conducted a cross-sectional survey among Chinese university students from two universities in Hunan Province. Ethical approval was obtained from the institutional medical ethics committee before commencement. The study was conducted in accordance with the Declaration of Helsinki. Participants were informed about the survey's primary objectives, the confidentiality of their data, and the intended use of the information before the distribution of electronic questionnaires. Electronic questionnaires were distributed on a class-by-class basis, with an informed consent form attached to the front page of the questionnaire. Participation was voluntary, and consent was implied by the participant's agreement to proceed with the survey; non-consent or withdrawal at any stage resulted in exclusion from the study. Only responses fully completing the survey were recorded. Participation in the survey was voluntary and anonymous, and the questionnaire could be completed within 20 min. A total of 677 university students completed the survey, and after screening for short response time and obvious regularity, 625 valid data sets were obtained (265 males, 360 females), and the age range was 17–22 years, with a average age of 18.70 (SD = 1.08).

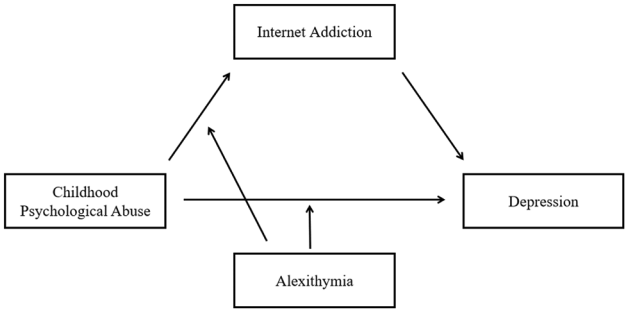

Fig. 1 Hypothesized a moderated and mediation model

Measures

Childhood psychological abuse

The measurement of childhood psychological abuse was based on the Psychological Abuse and Psychological Neglect subscales of the revised Short-Form Childhood Trauma Questionnaire by Zhao et al. (2005) [37]. Each subscale consisted of 5 questions rated on a 5-point answering scale, ranging from 1 (never) to 5 (always), evaluating the experiences of university students before the age of 17. Higher scores indicated a higher level of psychological abuse experienced in childhood. In this study, the Cronbach's α of the sample was 0.874.

Depression

This study employed the Depression Anxiety Stress Scale (DASS-21), translated and validated by Gong et al. [38], based on the original scale developed by previous studies [39]. Specifically, the depression subscale was utilized to assess the depressive levels among university students. The subscale comprised 7 items rated on a Likert 4-point scale, ranging from 1 (do not agree at all) to 4 (totally agree), evaluating the level of depression experienced by university students. Higher scores indicated a more severe level of depression. In this study, the Cronbach's α of the sample was 0.907.

Internet addiction

The measurement of internet addiction among university students was based on the Problematic Social Network Site Use Scale (PSNSUS) revised and compiled by Wei et al. (2019) [40]. The scale consisted of 8 items rated on a 5-point answering scale, ranging from 1 (completely inconsistent) to 5 (completely consistent), evaluating the level of internet addiction experienced by university students. Higher scores indicated a more severe level of internet addiction. In this study, the Cronbach's α of the sample was 0.871.

Alexithymia

The Toronto Alexithymia Scale-20 (TAS-20) was used to assess the level of alexithymia among university students [41]. The scale consisted of 20 items rated on a Likert 5-point scale, ranging from 1 (totally disagree) to 5 (totally agree), evaluating the level of alexithymia experienced by university students. Higher scores indicated a more severe level of alexithymia. In this study, the Cronbach's α of the sample was 0.814.

Covariates

Considering the influence of demographic variables on the analysis results, such as gender (1 = male, 2 = female) and age [18, 42], we controlled for these variables during the analysis.

Statistical analyses

All statistical analyses were conducted using SPSS 26.0 software. First, we tested for methodological bias to check for biases that may arise from the use of self-report questionnaires. Next, we conducted descriptive statistics and correlation analyses of demographic variables and the main analysis variables. Then, we standardized the main variable data before analysis. Finally, to test our hypothesis, we used the PROCESS macro plugin (Model 8) in SPSS for variable analysis [43]. The PROCESS macro plugin was based on 5000 times of bootstrap resampling to evaluate model testing and 95% confidence interval estimation, with a relationship being considered significant if the 95% CI did not include zero. Gender and age were controlled as covariates during the analysis, with a significance level of $\alpha = 0.05$.

Results

Harman's single-factor test

Harman's single-factor test was used to examine the influence of common method bias. The analysis results showed that there were 2 factors with eigenvalues greater than 1. Without rotating the principal component factors, the first factor accounted for 35.07% of the variance, which is below the recommended threshold of 40% [44]. Therefore, this study did not exhibit significant common method bias.

Descriptive data and correlational analyses

Table 1 presents the Pearson correlation coefficients between the variables of interest. Childhood psychological abuse was significantly positively correlated with college students' internet addiction ($r = 0.211$, $p < 0.001$), depression ($r = 0.468$, $p < 0.001$), and alexithymia ($r = 0.307$, $p < 0.001$). College students' internet addiction was significantly positively correlated with depression ($r = 0.350$, $p < 0.001$) and alexithymia ($r = 0.294$, $p < 0.001$). Depression was significantly positively correlated with college students' alexithymia ($r = 0.487$, $p < 0.001$).

Moderated and mediation analysis

Regardless of whether the moderating effects of alexithymia and its dimensions were considered, after controlling for covariates, childhood psychological abuse significantly and positively predicted college students' internet addiction ($\beta = 0.143 \sim 0.215$, $p < 0.001$). In addition, in the moderation and mediation analyses, childhood psychological abuse still significantly and positively predicted college students' depression levels ($\beta = 0.323 \sim 0.381$, $p < 0.001$), and internet addiction partially mediated the relationship between childhood psychological abuse and college students' depression levels ($\beta = 0.169 \sim 0.261$, $p < 0.001$). As for the relationship between childhood psychological abuse and college students' internet addiction, alexithymia and its dimensions exhibited different moderating effects (alexithymia: $\beta = 0.077$, $p < 0.05$; difficulty identifying emotions: $\beta = 0.072$, $p < 0.05$; difficulty describing emotions: $\beta = 0.030$, $p > 0.05$; externally oriented thinking: $\beta = 0.073$, $p > 0.05$), as well as in the relationship between childhood psychological abuse and college students' depression (alexithymia: $\beta = 0.089$, $p < 0.01$; difficulty identifying emotions: $\beta = 0.091$, $p < 0.01$; difficulty describing emotions: $\beta = 0.100$, $p < 0.01$; externally oriented thinking: $\beta = 0.006$, $p > 0.05$). Refer to Table 2; Figs. 2 and 3 for details.

Discussion

This study investigates the association between childhood psychological abuse and depression among college students. Furthermore, it examines the mediating role of internet addiction in the relationship between childhood psychological abuse and depression in college students, as well as the moderating effects of alexithymia and its subdimensions within the mediation model. Specifically, the study reveals that childhood psychological abuse significantly predicts depression in college students. Additionally, this predictive relationship is further mediated by internet addiction. The moderating

Table 1 Pearson correlation matrix between relevant variables

	1	2	3	4	5	6	7	8
1 Age	-							
2 CPA	0.206***	-						
3 Internet addiction	0.016	0.211***	-					
4 Depression	0.107**	0.468***	0.350***	-				
5 DIF	–0.038	0.275***	0.318***	0.483***	-			
6 DDF	0.000	0.260***	0.260***	0.391***	0.718***	-		
7 EOT	0.042	0.182***	0.087*	0.233***	0.343***	0.315***	-	
8 Total alexithymia	–0.007	0.307***	0.294***	0.487***	0.912***	0.846***	0.625***	-
Mean	18.70	20.06	21.67	12.48	17.59	13.52	21.53	52.63
SD	1.08	7.11	6.58	4.38	5.52	3.51	3.28	10.05

CPA: Childhood psychological abuse; DIF: Difficulty in identifying feelings; DDF: Difficulty in describing feelings; EOT: Externally oriented thinking; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 2 Moderated and mediation analysis

	Outcome variables	Predictor variables	β	SE	t	R^2	F
Total alexithymia	Internet addiction	CPA	0.144	0.041	3.549***	0.119	16.738***
		Alexithymia	0.246	0.040	6.173***		
		CPA × Alexithymia	0.077	0.037	2.100*		
	Depression	CPA	0.323	0.034	9.393***	0.385	64.594***
		Internet addiction	0.183	0.034	5.444***		
		Alexithymia	0.321	0.034	9.373***		
		CPA × Alexithymia	0.089	0.031	2.910**		
DIF	Internet addiction	CPA	0.143	0.040	3.560***	0.133	18.956***
		DIF	0.271	0.039	6.899***		
		CPA × DIF	0.072	0.036	2.005*		
	Depression	CPA	0.330	0.034	9.751***	0.395	67.144***
		Internet addiction	0.169	0.034	5.023***		
		DIF	0.334	0.034	9.786***		
		CPA × DIF	0.091	0.030	3.011**		
DDF	Internet addiction	CPA	0.159	0.041	3.925***	0.102	13.989***
		DDF	0.218	0.040	5.482***		
		CPA × DDF	0.030	0.037	0.815		
	Depression	CPA	0.351	0.035	10.007***	0.348	54.951***
		Internet addiction	0.214	0.034	6.257***		
		DDF	0.234	0.035	6.745***		
		CPA × DDF	0.100	0.031	3.195**		
EOT	Internet addiction	CPA	0.215	0.040	5.320***	0.064	8.523***
		EOT	0.053	0.040	1.341		
		CPA × EOT	0.073	0.038	1.947		
	Depression	CPA	0.381	0.036	10.711***	0.307	45.579***
		Internet addiction	0.261	0.035	7.544***		
		EOT	0.141	0.034	4.115***		
		CPA × EOT	0.006	0.033	0.187		

CPA: Childhood psychological abuse; DIF: Difficulty in identifying feelings; DDF: Difficulty in describing feelings; EOT: Externally oriented thinking; * $p<0.05$; ** $p<0.01$; *** $p<0.001$

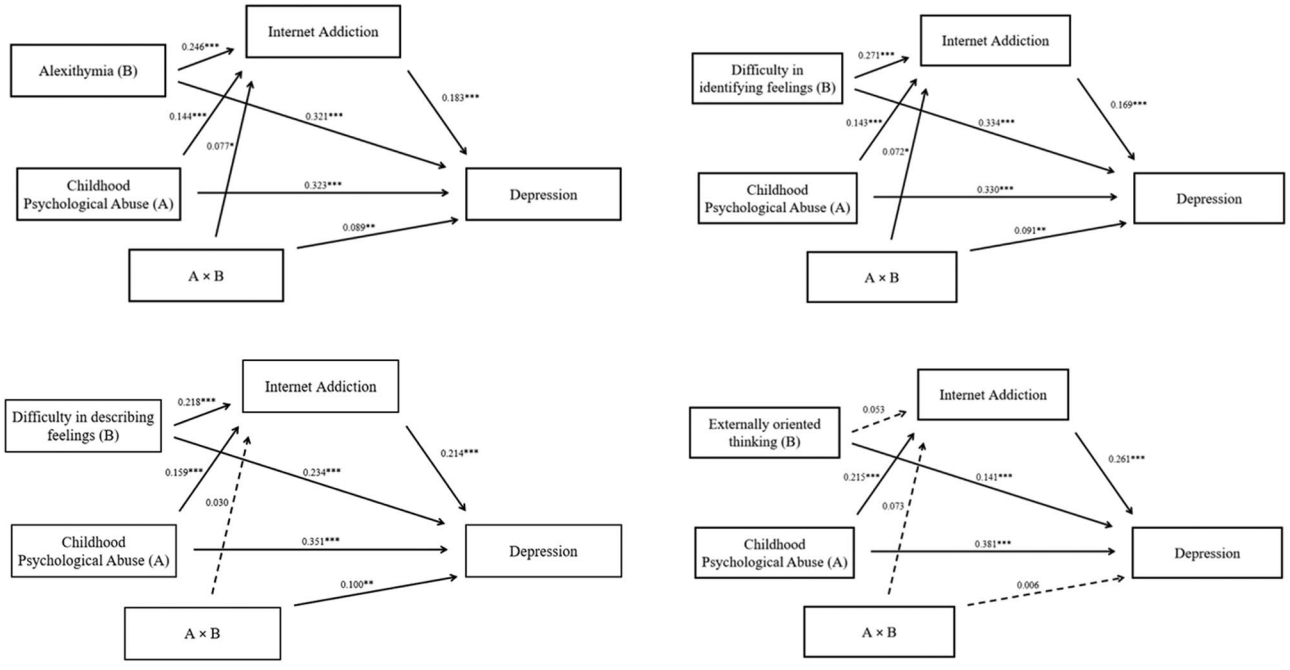

Fig. 2 A moderated and mediation model

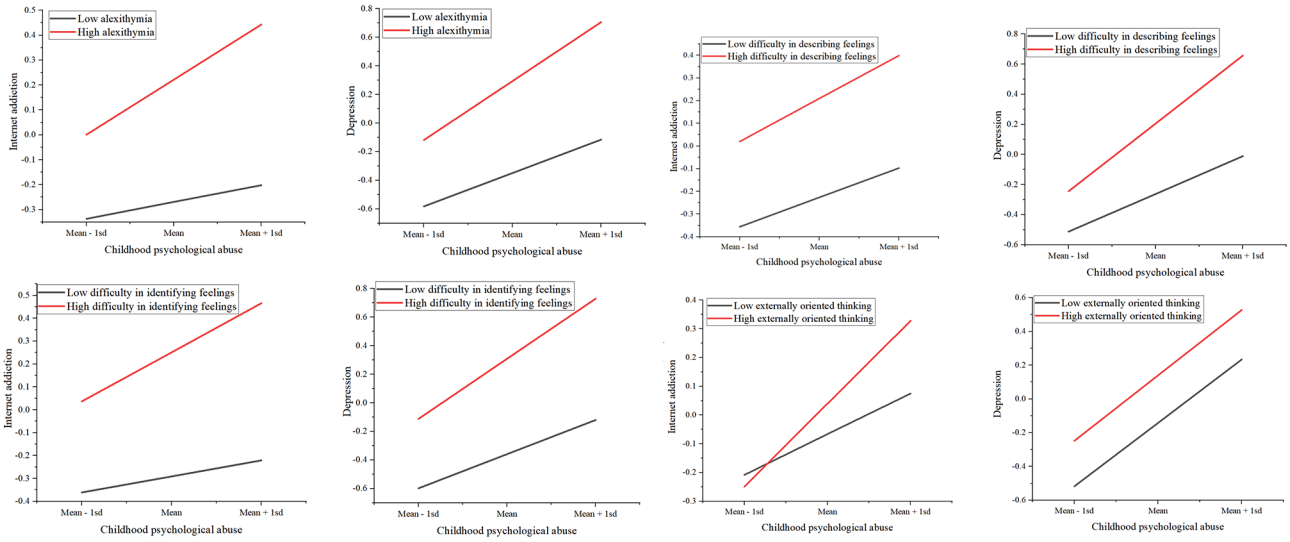

Fig. 3 Simple slope plot

variables—alexithymia and its subdimensions—exert varying degrees of influence on the relationship between childhood psychological abuse and both internet addiction and depression among college students.

This study reveals that childhood psychological abuse significantly predicts depression among college students. Such abuse is a profoundly negative experience that leaves individuals feeling unloved, with a diminished sense of belonging and support [37, 45], undermining their well-being and perceived value. It is understood that childhood maltreatment can impair the developmental structures of the brain, including areas such as the Cingulate, Precuneus, Temporal Pole, and Insula [46, 47], increasing the susceptibility to mood disorders [48]. These findings are of significant importance, corroborating previous research [49]. Concurrently, childhood psychological abuse has been linked to a myriad of psychological issues, including emotional dysregulation [50], poor coping mechanisms and low self-esteem [51], despair [52], and negative cognitions [53, 54]. These psychological factors are known predispositions for depression [55, 56]. Emotional abuse confers negative self-perceptions, while emotional neglect may lead individuals to seek internal attributions [57]. Both scenarios can entrench individuals in a quagmire of negative emotions from which escape becomes exceedingly difficult. Thus, childhood psychological abuse was significantly associated with depression in college students, as presented by the results of the present study.

Our study supports the hypothesis that internet addiction mediates the relationship between childhood psychological abuse and college student depression, which has been validated in similar studies [58]. Previous research has found a strong relationship between childhood psychological abuse and internet addiction among youth [17, 18, 59, 60]. The relationship between internet addiction and depression has also been well established [23], including in studies conducted in China [61]. Based on the explanations of social control theory [62] social compensation theory [19], childhood psychological abuse seems to indicate unfavorable family support environments for adolescents, leading them to seek support from the virtual world and develop internet addiction. Previous study was found that adolescents with baseline internet addiction were more likely to develop depression in the future [23], which was also supported by other domestic studies [63]. Adolescents with internet addiction often experience higher levels of stress [64], making them more susceptible to developing depression in the future [65].

Individuals with alexithymia have limited understanding of their own and others' emotions, leading to difficulties in regulating their emotions during daily interpersonal interactions [25]. This limitation further exacerbates their negative emotions [27]. Additionally, according to the general strain theory [66] and the compensatory internet use theory [67], individuals with alexithymia experience stress in dealing with interpersonal relationships [68]. Under the pressure of multiple negative emotions, they naturally turn to the online world to meet their social needs and alleviate the stress arising from real-life situations, leading to the development and intensification of internet addiction. In summary, alexithymia naturally reinforces the two paths of the mediating model we constructed. Furthermore, we discussed the moderating effects of different dimensions of alexithymia and found that DIF and DDF were associated with more severe depression, while EOT was unrelated to the level of depression [69–71]. Our research results are consistent with these viewpoints. Previous review studies

have shown that DIF and DDF are affective components of alexithymia [33]. When individuals have low sensitivity in recognizing and expressing emotions, they receive less support in their emotional experiences, which in turn affects their social interaction and communication skills [28, 72, 73]. DIF and DDF naturally become strong predictors of negative emotions and maladaptive behaviors. In summary, our study not only investigates the moderating role of alexithymia in the relationship between childhood emotional abuse and internet addiction and depression in college students but also analyzes the effects of different dimensions of alexithymia. This further contributes to our understanding of relevant theories and psychological mechanisms.

One of the strengths of this study is its exploration of the relationship between childhood psychological abuse and depression among college students, mediated by internet addiction, and most importantly, its consideration of the moderating role of alexithymia and its subdimensions within the mediation model. The research found that internet addiction plays a significant mediating role between childhood psychological abuse and depression in college students. Additionally, alexithymia and its subdimensions reinforce the relationship between childhood psychological abuse and both internet addiction and depression among college students to varying degrees. This further reveals the pivotal role of alexithymia among these variables. In light of these findings, we believe that college students with a history of childhood psychological abuse should be closely monitored, as they may be more susceptible to negative emotions or disorders such as depression. It is also important to note that this population may use internet addiction as an emotional regulation strategy, potentially leading to the onset of depression. Notably, college students with a history of childhood psychological abuse who also exhibit high levels of alexithymia are at an increased risk for the aforementioned adverse internalizing and externalizing behaviors. On a theoretical level, future research should pay attention to the different effects of the various dimensions of alexithymia, as our study identified distinct moderating roles for alexithymia and its subdimensions. Specifically, beyond the total score of alexithymia, the DIF dimension showed a particularly strong moderating effect, followed by the DDF, while the EOT was the weakest. On a practical level, for college students with a history of childhood psychological abuse, whether it be the individuals themselves or their friends and family, we cannot change the past. However, what we can do is to accept the present and ourselves, and to focus on the here and now. Timely participation in physical exercise or communication with friends, as well as seeking help from campus or external counseling centers, can strengthen self-salvation and self-affirmation. It is crucial to monitor and regulate emotions in a timely and appropriate manner.

In conclusion, this study extends our understanding of the link between childhood psychological abuse and depressive in college students. It also elucidates the mediating influence of internet addiction and the moderating effects of alexithymia, including its various dimensions, which have not been extensively explored in prior research. Despite these contributions, our work is not without limitations. The reliance on retrospective self-reported data for childhood psychological abuse may introduce inaccuracies due to potential recall bias. Future studies could benefit from longitudinal designs to enhance the accuracy of such assessments. Additionally, our research did not delve into the nuances of childhood psychological abuse, as emotional abuse and emotional neglect may impart distinct adverse effects on individuals [49]. Subsequent investigations could examine the diverse facets of psychological abuse and their specific outcomes. Lastly, the cross-sectional nature of our data precludes definitive assertions about causality among the variables. Therefore, it is recommended that future research employ longitudinal methodologies to establish causal relationships with greater certainty. By addressing these limitations, future work can further refine our knowledge of the psychological mechanisms underlying the development of depression in the context of childhood psychological abuse.

Conclusion

Overall, our study further investigates the relationship between childhood psychological abuse and depression in college students, and discusses the mediating role of internet addiction and the moderating effect of alexithymia. Our findings highlight the importance of recognizing the negative effects of childhood psychological abuse at the individual, especially for individuals with high levels of alexithymia. Interventions focusing on difficulty in identifying feelings and expression are crucial for individuals with alexithymia. By implementing these interventions and providing support, we can assist them in effectively managing negative emotions and enhancing their psychological well-being.

Author contributions

Yang Liu: Conceptualization, Methodology, Data curation, Writing - Original Draft, Writing - Review & Editing. Liangfan Duan and Liangfan Duan: Data curation and Funding acquisition. Lei Xu and Tiancheng Zhang: Conceptualization, Methodology, Funding acquisition.

Funding

Not applicable.

Data availability

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

Declarations

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

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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References

1. Clark MS, Jansen KL, Cloy JA. Treatment of childhood and adolescent depression. Am Fam Physician. 2012.
2. Moreno-Agostino D, Wu Y, Daskalopoulou C, Hasan MT, Huisman M, Prina M. Global trends in the prevalence and incidence of depression:a systematic review and meta-analysis. J Affect Disord. 2020.
3. Twenge JM, Cooper AB, Joiner TE, Duffy ME, Binau SG. Age, period, and cohort trends in mood disorder indicators and suicide-related outcomes in a nationally representative dataset, 2005–2017. J Psychopathol Clin Sci 2019.
4. Gao L, Xie Y, Jia C, Wang W. Prevalence of depression among Chinese university students: a systematic review and meta-analysis. Sci Rep. 2020.
5. Zeng W, Chen R, Wang X, Zhang Q, Deng W. Prevalence of mental health problems among medical students in China. Medicine. 2019.
6. Ibrahim AK, Kelly SJ, Adams CE, Glazebrook C. A systematic review of studies of depression prevalence in university students. J Psychiatr Res. 2012.
7. Chang JJ, Ji Y, Li YH, Yuan MY, Su PY. Childhood trauma and depression in college students: Mediating and moderating effects of psychological resilience. Asian J Psychiatry. 2021;65.
8. Pirdehghan A, Vakili M, Rajabzadeh Y, Puyandehpour M, Aghakoochak A. Child abuse and Mental disorders in Iranian adolescents. Iran J Pediatr. 2016;26(2).
9. Wang ZC. Childhood abuse and adolescent depression: moderating roles of social support and friendship quality. Soc Behav Personal. 2023;51(1).
10. VanMeter F, Nivison MD, Englund MM, Carlson EA, Roisman GI. Childhood abuse and neglect and self-reported symptoms of psychopathology through midlife. Dev Psychol. 2021;57(5):824–36.
11. McCrory EJ, Gerin MI, Viding E. Annual Research Review: Childhood maltreatment, latent vulnerability and the shift to preventative psychiatry - the contribution of functional brain imaging. J Child Psychol Psychiatry. 2017.
12. Diaz A, Shankar V, Nucci-Sack A, Linares LO, Salandy A, Strickler HD, Burk RD, Schlecht NF. Effect of child abuse and neglect on risk behaviors in inner-city minority female adolescents and young adults. Child Abuse Negl. 2020;101.
13. Liang JY, Zhuo YS, Li XR, Qin F. Structural equation model of childhood psychological abuse and neglect,psychological resilience life satisfaction and mobile phone addiction in medical students. Occup Health. 2020;36(19):2702–6.
14. Christ SL, Kwak YY, Lu T. The joint impact of parental psychological neglect and peer isolation on adolescents' depression. Child Abuse Negl. 2017.
15. Şanli ME, Çiçek İ, Yıldırım M, Çeri V. Positive childhood experiences as predictors of anxiety and depression in a large sample from Turkey. Acta Psychol. 2024;243:104170.
16. Naseri L, Mohamadi J, Sayehmiri K, Azizpoor Y. Perceived Social Support, Self-Esteem, and internet addiction among students of Al-Zahra University, Tehran, Iran. Iran J Psychiatry Behav Sci. 2015;9(3):e421.
17. Peng C, Wang MN, Cheng JH, Tan YF, Huang YX, Rong FJ, Kang C, Ding HL, Wang Y, Yu YZ. Mediation of internet addiction on association between childhood maltreatment and suicidal behaviours among Chinese adolescents. Epidemiol Psych Sci 2021;30.
18. Dong X, Zhang RX, Zhornitsky S, Le TM, Wang WY, Li C, Zhang S. Depression mediates the relationship between Childhood Trauma and Internet Addiction in female but not male Chinese adolescents and young adults. J CliN Med 2021;10(21).
19. Valkenburg PM, Peter J. Social consequences of the internet for adolescents: a decade of Research. Curr Dir Psychol Sci. 2009;18(1):1–5.
20. Guo WJ, Tao YJ, Li XJ, Lin X, Meng YJ, Yang X, Wang HY, Zhang YM, Tang WJ, Wang Q et al. Associations of Internet Addiction Severity with psychopathology, Serious Mental Illness, and suicidality: large-sample cross-sectional study. J Med Internet Res 2020;22(8).
21. Saikia AM, Das J, Barman P, Bharali MD. Internet addiction and its relationships with Depression, anxiety, and stress in Urban adolescents of Kamrup District, Assam. J Family Community Med. 2019;26(2):108–12.
22. Çiçek I, Şanlı ME, Gökmen A, Yıldırım M. Problematic social media use, satisfaction with life, and levels of depressive symptoms in university students during the COVID-19 pandemic: mediation role of social support. Psihologija. 2024;57(2):177–97.
23. Lau J, Walden DL, Wu A, Cheng KM, Lau M, Mo P. Bidirectional predictions between internet addiction and probable depression among Chinese adolescents. J Behav Addict. 2018;7(3):633–43.
24. de Timary P, Luts A, Hers D, Luminet O. Absolute and relative stability of alexithymia in alcoholic inpatients undergoing alcohol withdrawal: relationship to depression and anxiety. Psychiatry Res. 2008;157(1–3):105–13.
25. Hesse C, Floyd K. Affectionate experience mediates the effects of alexithymia on mental health and interpersonal relationships. J Soc Pers Relat. 2008;25(5):793–810.
26. Preece DA, Becerra R, Robinson K, Allan A, Boyes M, Chen W, Hasking P, Gross JJ. What is alexithymia? Using factor analysis to establish its latent structure and relationship with fantasizing and emotional reactivity. J Pers. 2020;88(6):1162–76.
27. De Berardis D, Campanella D, Gambi F, La Rovere R, Sepede G, Core L, Canfora G, Santilli E, Valchera A, Mancini E, et al. Alexithymia, fear of bodily sensations, and somatosensory amplification in young outpatients with panic disorder. Psychosomatics. 2007;48(3):239–46.
28. Lee BW, Stapinski LA. Seeking safety on the internet: relationship between social anxiety and problematic internet use. J Anxiety Disord. 2012;26(1):197–205.
29. Babadi-Akashe Z, Zamani BE, Abedini Y, Akbari H, Hedayati N. The relationship between Mental Health and Addiction to Mobile Phones among University Students of Shahrekord, Iran. Addict Health. 2014;6(3–4):93–9.
30. De Berardis D, D'Albenzio A, Gambi F, Sepede G, Valchera A, Conti CM, Fulcheri M, Cavuto M, Ortolani C, Salerno RM, et al. Alexithymia and its relationships with dissociative experiences and internet addiction in a nonclinical sample. Cyberpsychol Behav. 2009;12(1):67–9.
31. Taylor GJ, Bagby RM, Parker JD. The alexithymia construct. A potential paradigm for psychosomatic medicine. Psychosomatics. 1991;32(2):153–64.
32. Mei SL, Xu G, Gao TT, Ren H, Li JY. The relationship between college students' alexithymia and mobile phone addiction: Testing mediation and moderation effects. BMC Psychiatry 2018, 18.
33. Li S, Zhang B, Guo Y, Zhang J. The association between alexithymia as assessed by the 20-item Toronto Alexithymia Scale and depression: a meta-analysis. Psychiatry Res. 2015;227(1):1–9.
34. Hisli SN, Güler M, Basim HN. [The relationship between cognitive intelligence, emotional intelligence, coping and stress symptoms in the context of type a personality pattern]. Turk Psikiyatri Derg. 2009;20(3):243–54.
35. de Timary P, Roy E, Luminet O, Fillée C, Mikolajczak M. Relationship between alexithymia, alexithymia factors and salivary cortisol in men exposed to a social stress test. Psychoneuroendocrino. 2008;33(8):1160–4.
36. Nekouei ZK, Doost HT, Yousefy A, Manshaee G, Sadeghei M. The relationship of Alexithymia with anxiety-depression-stress, quality of life, and social support in Coronary Heart Disease (a psychological model). J Educ Health Promot. 2014;3:68.
37. Zhao XF, Zhang YL, Li LF, Zhou YF, Li HZ. Reliability and validity of the Chinese version of childhood trauma questionnaire. Chin J Tissue Eng Res. 2005(20; 20).
38. Gong X, Xie XY, Xu R, Luo YJ. Psychometric properties of the Chinese versions of DASS-21 in Chinese College Students. Chin J Clin Psychol. 2010;18(04):443–6.
39. Lovibond PF, Lovibond SH. The structure of negative emotional states: comparison of the Depression anxiety stress scales (DASS) with the Beck Depression and anxiety inventories. Behav Res Ther. 1995;33(3):335–43.
40. Wei Q. *Negative Emotions and Problematic Social NetworkSites Usage: The Mediating Role of Fear of Missing Outand the Moderating Role of Gender* [Master's thesis]: Central China Normal University, 2018.

41. Cerutti R, Calabrese M, Valastro C. Alexithymia and personality disorders in the Adolescent Non-suicidal Self Injury: preliminary results. In 4th World Conference on Psychology, Counseling and Guidance (WCPCG-2013)|.*114**114*. Edited by Bozkurt T, Demirok M. 4th World Conference on Psychology, Counseling and Guidance (WCPCG); 2014:372–376.
42. Chung MC, Chen ZS. Gender Differences in Child Abuse, emotional Processing difficulties, Alexithymia, psychological symptoms and behavioural problems among Chinese adolescents. Psychiatry Quarterly. 2020;91(2):321-32.
43. Hayes AF. Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. 1st ed. New York: Guilford Press; 2013.
44. Podsakoff PM, Mackenzie SB, Lee JY, Podsakoff NP. Common method biases in behavioral research: a critical review of the literature and recommended remedies. J Appl Psychol. 2003;88(5):879-903.
45. Bernstein DP, Stein JA, Newcomb MD, Walker E, Pogge D, Ahluvalia T, Stokes J, Handelsman L, Medrano M, Desmond D, et al. Development and validation of a brief screening version of the Childhood Trauma Questionnaire. Child Abuse Negl. 2003;27(2):169–90.
46. Teicher MH, Anderson CM, Ohashi K, Polcari A. Childhood maltreatment: altered network centrality of cingulate, precuneus, temporal pole and insula. Biol Psychiatry. 2014;76(4):297-305.
47. Children's Bureau, Health and Human Services Department. Understanding the effects of maltreatment on brain development. Health and Human Services Department; 2015 Jan 1. https://www.govinfo.gov/app/details/GOVPUB-HE23_1200-PURL-gpo87623
48. Lippard ETC, Nemeroff CB. The devastating clinical consequences of child abuse and neglect: increased disease vulnerability and poor treatment response in Mood disorders. Am J Psychiatry. 2019;177(1):20-36.
49. Taillieu TL, Brownridge DA, Sareen J, Afifi TO. Childhood emotional maltreatment and mental disorders: results from a nationally representative adult sample from the United States. Child Abuse Negl. 2016;59:1-12.
50. Coates AA, Messman-Moore TL. A structural model of mechanisms predicting depressive symptoms in women following childhood psychological maltreatment. Child Abuse Negl. 2014;38(1):103-13.
51. Finzi-Dottan R, Karu T. From emotional abuse in Childhood to psychopathology in adulthood: a path mediated by immature defense mechanisms and self-esteem. In: Lippincott Williams & Wilkins, editor. 2006. p. 616-21.
52. Hamilton JL, Shapero BG, Stange JP, Hamlat EJ, Abramson LY, Alloy LB. Emotional maltreatment, peer victimization, and depressive versus anxiety symptoms during adolescence: hopelessness as a mediator. In: Taylor & Francis, editor. 2013. p. 332-47.
53. Gibb BE, Chelminski I, Zimmerman M. Childhood emotional, physical, and sexual abuse, and diagnoses of depressive and anxiety disorders in adult psychiatric outpatients. Depress Anxiety. 2007;24(4):256–63.
54. van Harmelen A, de Jong PJ, Glashouwer KA, Spinhoven P, Penninx BWJH, Elzinga BM. Child abuse and negative explicit and automatic self-associations: the cognitive scars of emotional maltreatment. Behav Res Ther. 2010;48(6):486-94.
55. Wu C, Tan Y, Blain SD, Shao S, Jia L, Wang X. Emotion regulation difficulties in depression and anxiety: evidence from the dynamics of strategy use and daily affect. J Context Behav Sci. 2024;33:100781.
56. Gu H, Zhang P, Li J. The effect of self-esteem on depressive symptoms among adolescents: the mediating roles of hope and anxiety. Humanities and Social Sciences Communications. 2024;11(1):932.
57. Gibb BE. Childhood maltreatment and negative cognitive styles. A quantitative and qualitative review. Clin Psychol Rev. 2002;22(2):223-46.
58. Yang M, Sheng XL, Ge ML, Zhang L, Huang C, Cui S, Yuan QY, Ye MT, Zhou RC, Cao PP et al. Childhood trauma and psychological sub-health among Chinese adolescents: the mediating effect of internet addiction. BMC Psychiatry. 2022;22(1).
59. Chegeni M, Nakhaee N, Shahrbabaki PM, Shahrbabaki ME, Haghdoost A. Does Childhood Trauma Associate with Social Media Addiction? A cross-sectional study from Iran. Int J Ment Health Addict. 2023;21(4):2225-37.
60. Sheng XL, Yang M, Ge ML, Zhang L, Huang C, Cui S, Yuan QY, Ye MT, Zhou RC, Cao PP et al. The relationship between internet addiction and childhood trauma in adolescents: the mediating role of social support. Front Psychol. 2022;13.
61. Yang X, Guo WJ, Tao YJ, Meng YJ, Wang HY, Li XJ, Zhang YM, Zeng JK, Tang WJ, Wang Q, et al. A bidirectional association between internet addiction and depression: a large-sample longitudinal study among Chinese university students. J Affect Disord. 2022;299:416-24.
62. Hirschi T. Theory without ideas: reply to Akers. Criminology. 2010;34(2):249-56.
63. Lam LT, Peng ZW. Effect of pathological use of the internet on adolescent mental health: a prospective study. Arch Pediatr Adolesc Med. 2010;164(10):901.
64. Li W, Garland EL, Howard MO. Family factors in internet addiction among Chinese youth: a review of English- and chinese-language studies. Comput Hum Behav. 2014;31(feb):393-411.
65. Aneshensel CS. Stress and depression. Arch Gen Psychiatry. 1982;39(12):1392.
66. Agnew R. Foundation for a general strain theory of crime and delinquency. Criminology. 1992;30(1):47-87.
67. Kardefelt-Winther D. A conceptual and methodological critique of internet addiction research: towards a model of compensatory internet use. Comput Hum Behav. 2014;31:351-54.
68. Xiao W, Zhou H, Li X, Lin X. Why are individuals with alexithymia symptoms more likely to have Mobile phone addiction? The multiple mediating roles of Social Interaction Anxiousness and Boredom Proneness. Psychol Res Behav Manag. 2021;14:1631–41.
69. Leweke F, Leichsenring F, Kruse J, Hermes S. Is alexithymia associated with specific mental disorders? Psychopathology. 2012;45(1):22–8.
70. Bamonti PM, Heisel MJ, Topciu RA, Franus N, Talbot NL, Duberstein PR. Association of alexithymia and depression symptom severity in adults aged 50 years and older. Am J Geriatr Psychiatry. 2010;18(1):51–6.
71. Son SH, Jo H, Rim HD, Kim JH, Kim HW, Bae GY, Lee SJ. A comparative study on Alexithymia in Depressive, Somatoform, anxiety, and psychotic disorders among koreans. Psychiatry Investig. 2012;9(4):325–31.
72. Wang X, Li HC, Zhang L. Correlation between theory of mind and empathy among alexithymia college students. Chin J School Health. 2017;38(05):693–95.
73. Feng M, Liu Y, Kong QW. Relation of suicide ideation to shame, alexithymia and perceived social support in college students from Gansu Province. Chin Mental Health J. 2016;30(01):53–57.

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