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The Chain Mediating Roles of Academic Stress and Emotional Intelligence in the Relationship Between Parental Mental Health and Adolescent Emotional and Behavioral Problems

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Abstract

Introduction:

This study is designed to explore the chain mediation role of academic pressure and emotional intelligence in the connection between parental mental health and the emotional and behavioral problems among adolescents. Understanding this topic is essential for developing interventions that enhance adolescent well-being by addressing the root causes of their Emotional and behavioral problems.

Methods

This study employed a cross-sectional design and randomly selected 1843 primary and secondary school students from four primary schools and eight secondary schools in China, to participate in a self-administered questionnaire survey. The bootstrap method was used to investigate the chain-mediated effect of academic stress and emotional intelligence: the relationship between parental mental health and adolescents' Emotional and behavioral problems. The sample included female (41.5%) and male (58.5%) students, with ages ranging from 8 to 20 years (Mean = 13.86, SD = 2.62).

Results

The mean score of EBPs was 12.79 (SD = 5.71).After controlling for gender and grade, the results of the chain mediation effect analysis indicate that parents' mental health not only directly impacts adolescents'EBPs, but also exerts an influence through the following three indirect paths: the mediating effect of academic pressure (a1b1 = 0.0055,BCa95%CI:0.0005,0.0113) and emotional intelligence (a2b2 = 0.0945, BCa95%CI:0.0723, 0.1171), the chain mediating effect of academic pressure and emotional intelligence (a1d21b2 + a2d12b1=0.0022, BCa95%CI:0.002, 0.0046).

Conclusion

Academic stress and emotional intelligence had a chain mediation effect on the influence chain of parental mental health and adolescents'EPBs. Therefore, to promote adolescents' mental health, we need to improve parents' mental health, alleviate academic stress in adolescents, and enhance adolescent emotional intelligence. This study provides us with a new perspective to understand and promote healthy psychological behavior in adolescents.

1.Introduction

Emotional and behavioral problems (EBPs) are common psychological concerns during adolescence. EBPs refer to interpersonal difficulties, unhappiness, depression, various physiological symptoms, and fear caused by unknown reasons, which manifests as inappropriate emotions and behaviors (Jordan & Troth, 2020). According to the latest national mental health survey, at least 30 million children and adolescents under 17 years old in China face EBPs (Blakemore, 2019). Some studies have shown that the prevalence of EBPs in children varies from 7.1% to 53.0% (Cocker et al., 2018; Kohn et al., 2001; Wichstrøm et al., 2012). In China, the prevalence of EBPs in adolescents is 16.7%, posing a serious public health challenge (Bera et al., 2022; Cui et al., 2021). Children with behavioral problems during preschool ages may have difficulty changing their behavior in the future and may develop functional impairments that negatively affect their relationships with peers, self-development, academic achievement, and family functioning (Yang et al., 2022) Without a well-timed intervention, adolescents may develop psychological disorders (Colizzi et al., 2020). Previous studies suggest that EBPs among adolescents are influenced by multiple factors such as individual, family, social, and environmental factors (Fergusson et al., 1995; Merikangas, 2005).

The family systems theory considers the family as a unified entity, a system in itself, with each family member being an integral part of this system. The interactions among members are continuous and any psychological issue faced by one member resonates with the others, affecting the entire system (Pratt & Skelton, 2018). From a theoretical perspective, the family, being the smallest social unit in our society, harbors an emotional connection between parents and adolescents. This connection implies that the mental health of parents can subtly and profoundly impact their children's psychological well-being. This influence often results in a striking similarity between the mental health conditions of parents and their children, manifesting as a characteristic pattern in the family (Buist et al., 2013; Stein et al., 2014). Examining the interplay between adolescents' EBPs and their parents is crucial. This is because the mental well-being or decline of one family member can significantly impact the psychological health and overall functioning of the rest of the family (Eckshtain et al., 2019). Furthermore, studies have shown that the adverse impact of parental mental health on adolescent mental health has intergenerational transferability (Risi et al., 2021). This intergenerational impact can even serve as a predictor for the onset, severity, and duration of emotional disorders in young individuals. From another perspective, genetic factors are instrumental in the propagation of risk associated with mental health disorders. The existence of mental illness in parents emerges as a paramount risk factor influencing the onset of mental health complications in adolescents. In summary, the mental health of parents is a direct and important factor that affects the mental health of young people, both in how they feel and how they

behave (Speyer et al., 2022). Additionally, the treatment of parental mental health is also associated with the improvement of symptoms and functioning of adolescents with mental health problems (Costello & Maughan, 2015; Lee et al., 2020). Improving the mental health of parents could even be an important approach to alleviating the academic pressure faced by adolescents (Liverpool et al., 2021).

With the rapid economic growth and fierce social competition in recent years, Chinese adolescents are facing increasing academic pressure. Academic stress is a common and complex phenomenon that is influenced by various factors, such as personal characteristics, family background, educational environment, and socio-cultural context (Barbayannis et al., 2022). Studies indicate that academic pressure can affect the physical, mental, and behavioral aspects, as well as the scholastic performance of students, from elementary to university levels (Pascoe et al., 2020). The majority of scholars express concern over the growing academic stress experienced by primary and middle school students. There has been a gradual increase in the academic stress levels of Chinese primary and middle school students(Benoit & Gabola, 2021). It is even suggested that academic stress poses a significant threat to the psychological well-being of primary and secondary school students (Ebrahimi, 2013). Over recent years, China has been proactively enforcing the “double reduction policy” aimed at alleviating the academic workload and after-school tutoring for students. Yet, the issue of high academic stress levels among students still persists, largely due to entrenched traditional viewpoints and outdated educational philosophies. It is imperative that we actively research this issue and propose effective solutions (Barbayannis et al., 2022).

Positive psychology posits that nurturing an individual's positive traits and abilities can pave the way for a more fulfilling life and improved mental and physical health (Benoit & Gabola, 2021).Within the realm of positive psychology, emotional intelligence is recognized as a key attribute and strength that can significantly contribute to an individual's happiness and emotional well-being. Emotional intelligence refers to the ability to identify and regulate one's own emotions, recognize the emotions of others and empathize with them, and use these skills to communicate effectively to build healthy and productive relationships with others (Lane, 2019). People with high emotional intelligence have better mental health (Jiménez-Picón et al., 2021). A higher level of emotional intelligence serves as a safeguard for an individual's mental health (Jacobs & Wollny, 2022).

Parental mental health can detrimentally impact the quality and stability of parent-child relationships, subsequently influencing the emotional, cognitive, social, and behavioral development of adolescents (Pierce et al., 2020). According to the ecological systems theory (Maltby et al., 2019), adolescent development is affected by multiple levels of environmental influences, from the immediate surroundings (e.g., family) to broad societal structures (e.g., culture). Therefore, parental mental health can be seen as a risk factor that affects the microsystem (the most immediate environment of the child) and the mesosystem (the interconnection between the microsystems) (Robledo et al., 2022). Previous research has shown significant correlation between parental mental health problems and adolescents' EBPs (Chandler et al., 2016; Totsika et al., 2011). This finding is underlined by the Cognitive Appraisal Model of Stress (Ursin & Eriksen, 2010), which states that stress is a result of the perceived imbalance between the demands of a situation and the resources available to cope with it. Therefore factors such as parental expectations (Ali et al., n.d.), parenting styles (Nguyen, 2008), and parental involvement (Xiong et al., 2021) could potentially trigger academic stress in adolescents. Moreover, extensive research indicates that academic stress can negatively affect the emotional intelligence of adolescents (Ebrahimi, 2013), which is the ability to perceive, understand, and manage emotions. In essence, adolescents with high emotional intelligence are capable of fostering healthy social relationships, mitigating stress and frustration arising from challenges they encounter, comprehending the emotions of others, and averting or reducing destructive behaviors (Usha & Solomon, 2022). Conversely, adolescents with low emotional intelligence may have difficulties in these aspects, which can increase their risk of adolescents' EBPs (Huang et al., 2020). Presently, while there are studies examining the pairwise correlation of these four variables, the pathway mechanism within the adolescent demographic remains unclear. Therefore, this study proposes that parental mental health problems can indirectly influence adolescents EBPs through the mediating effects of academic stress and emotional intelligence.

Thus, the following four hypotheses in our study were developed:

H1: Parental mental health has a significantly positive effect on children' s EBPs.

H2: Academic pressure has a significantly negative effect on children' s EBPs.

H3: There is a significantly positive correlation between emotional intelligence and children' s EBPs.

H4: In the chain of influence between parental mental health and children' s EBPs, learning stress and emotional intelligence exhibit a chain mediation effect.

2. Materials and Methods

2.1 Sample and procedure

This study used random sampling to select 12 primary and secondary schools in Shenyang, China. Firstly, elementary grades 4–6, as well as all grades in junior and senior high school were selected. Then, half of the classes were randomly chosen within each grade, and half of the students

were randomly selected in each class under the condition of maintaining a balanced gender ratio. The survey was conducted using a questionnaire, which was divided into two sections to be filled out by students and parents respectively. In this survey, a total of 2250 questionnaires were distributed. 2100 were received in return, of which 1843 were valid. The effective response rate was 87.76%. The sample included female (41.5%) and male (58.5%) students, with ages ranging from 8 to 20 years (Mean = 13.86, SD = 2.62).

2.2 Ethics statement

The study design and data collection procedures were approved by the ethics Committee on Human Experimentation of XX University[2025-036]. Before the survey, each participant and their parents/legal guardians signed an informed consent form. This form clarified the study intent, procedure, potential risks, and benefits. Consent was then secured. The surveys were anonymous, ensuring strict confidentiality of participants' personal information, with no disclosure to third parties. Participation was completely voluntary, with participants free to discontinue or withdraw at any point without penalty or detriment.

2.3 Measures

2.2.1 Strengths and Difficulties Questionnaire(SDQ)

The present study employed the Strengths and Difficulties Questionnaire (SDQ) (R. Goodman, 1997; Yang et al., 2022) as a tool to assess EBPs faced by adolescents. This instrument comprises 25 items and five dimensions: emotional symptoms, conduct problems, hyperactivity, peer problems, and prosocial behaviors. The response for each item was scored on a 3-point Likert scale (0 = not true, 1 = true, 2 = completely true). The total difficulty score is the sum of the first four factors, ranging from 0 to 40. It should be noted that, except for the prosocial behavior dimension, a higher score in the remaining four dimensions is indicative of more severe mental health issues. The existing research shows that the SDQ questionnaire has been widely used in children and adolescents with good reliability and validity (Dickey & Blumberg, 2004; Essau et al., 2012). The Cronbach's α for this scale in our population was 0.79.

2.2.2 The Bar-On Emotional Quotient Inventory: Youth Version (EQ-i: YV)

The Bar-On Emotional Quotient Inventory: Youth Version (EQ-i: YV) (Davis & Wigelsworth, 2018) serves as a comprehensive tool for evaluating emotional intelligence in adolescents. This inventory is composed of 60 items, which are designed to assess four key dimensions: intrapersonal dynamics, interpersonal interactions, adaptability, and stress management strategies. The questionnaire incorporates a 4-point Likert scale (1 = almost never, 2 = rarely, 3 = sometimes, 4 = almost always), and includes both positively and negatively phrased items. The reliability and validity of the questionnaire in China are well-established (Esnaola et al., 2016), consistent with international research findings (Esnaola et al., 2016; Navarro-Roldán et al., 2023).The Cronbach's α for this scale in our population was 0.78.

2.2.3 Symptom checklist-90(SCL-90)

The Symptom Checklist-90 (SCL-90)(Zhou et al., 2021) is a self-administered instrument designed to assess the psychological health of parents. This comprehensive tool encompasses 90 items, which are systematically arranged into nine distinct subscales: somatization, obsessive-compulsive tendencies, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. The questionnaire utilizes a 5-point response scale (0 = not at all, 1 = mild, 2 = moderate, 3 = severe, 4 = extremely). A higher score in any given domain indicates a poorer state of psychological well-being. The reliability and validity of the questionnaire have been well-established (Derogatis & Unger, 2010; Gomez et al., 2021). The Cronbach's α for this scale in our population was 0.86.

2.2.4 Sociodemographic characteristics

Sociodemographic characteristics include academic stress(1 = no, 2 = yes), gender, and school level.

2.3 Statistical analysis

Statistical analysis in this study was performed using IBM SPSS for Windows (Ver. 26.0). To address potential common method bias, Harmans single-factor analysis (Yu & Zhao, 2023) was employed. The exploratory factor analysis revealed the maximum factor variance explained was 31.25% (less than 40%). Hence, this study did not exhibit significant common method bias. T-tests and analysis of variance were explored to delineate differences in adolescents' EBPs across groups. Subsequently, gender and school level were controlled for, and partial correlation and regression analyses were conducted to evaluate the direct effects of parental mental health, academic stress, and emotional intelligence on adolescents' EBPs. The PROCESS macro in SPSS (Igartua & Hayes, 2021), developed by Preacher and Hayes, was then utilized to analyze the mediation effect via the bootstrap method. The model comprises parental mental health, academic stress, emotional intelligence, and adolescents' EBPs. Bootstrap samples were set at 5000, applying a bias-corrected method based on Mean and SD from Mean for the 95% confidence interval, there was a significant mediation when BCa 95% CIs did not include 0.

3. Results

3.1 Sociodemographic characteristics of the participants

The independent samples t-test for gender and the multi-way ANOVA for school level are summarized (Table 1). Significant gender differences were observed in parental mental health and adolescents' EBPs ($P < 0.05$). However, no significant gender differences were found in academic stress and emotional intelligence ($P > 0.05$). Notably, male students exhibited higher levels of children's EBPs. Across different school level (from elementary to high school), significant school level differences were observed in parental mental health, academic stress, emotional intelligence, and children's EBPs ($P < 0.05$). Specifically, participants reported academic stress and emotional intelligence decreased progressively from elementary to high school.

3.2 Correlation and Regression between Study Variables

To mitigate the influence of demographic variables, the data were standardized, and partial correlations were conducted while controlling for gender and school levels (Table 2). The following associations were observed: Parental mental health exhibited a negative correlation with academic stress, and emotional intelligence, and a positive correlation with children's EBPs. ($P < 0.05$). Academic stress showed a negative correlation with emotional intelligence($P < 0.01$) and children' s EBPs. ($P < 0.01$). Emotional intelligence was negatively correlated with children' s EBPs. ($P < 0.01$).

We conducted three groups of regression analysis using the forced entry method with parental mental health, academic stress, and emotional intelligence as independent variables and adolescents' EBPs as dependent variables (Table 3). The results showed that parental mental health [$F(1,1939) = 194.362$, $\beta = 0.301$] and academic stress [$F(1,1939) = 76.976$, $\beta = 0.193$] had a significant negative effect on children' s EBPs ($P < 0.001$), while and emotional intelligence [$F(1,1939) = 809.010$, β=-0.542] had significant positive effects on children' s EBPs ($P < 0.001$).

3.3 Mediating Effects of academic pressure and emotional intelligence

In this study, all variables were standardized prior to testing. We employed Model 6 of the PROCESS macro program in SPSS 26.0, developed by Hayes, to examine the mediation effect with 5000 resamples and a 95% confidence interval (Table 4). Parental mental health exhibited a significant direct effect on adolescents' EBPs (c = 0.1911 BCa95%CI:0.0026,0.0149). Parental mental health indirectly affected adolescents' EBPs through academic pressure (a1×b1 = 0.006, BCa95%CI:0.001, 0.011). Parental mental health also indirectly influenced adolescents' EBPs through emotional intelligence (a2×b2 = 0.096, BCa95%CI:0.072, 0.117). Parental mental health had an indirect effect on adolescents' EBPs through both academic stress and emotional intelligence (a1d21b2 + a2d12b1=0.002, BCa95%CI:0.002, 0.005). All paths did not include 0 in the 95% confidence interval (Table 5, Fig. 1). These results establish the hypothesis model, indicating a chain mediation effect. This suggests that parental mental health can directly and indirectly (through academic pressure and emotional intelligence) influence adolescent' EBPs.

4. Discussion

This study aimed to explore the correlation between parental mental health, academic stress, emotional intelligence, and adolescents' EBPs in Shenyang, Liaoning Province, China. Most previous studies have examined these four variables from the perspective of disease and psychopathology. The mechanisms among these variables need further research from a positive perspective. The meaningful results and implications of this study are as follows:

Partial correlation analysis and regression analysis controlling for gender and school level showed that parental mental health had a positive effect on adolescent's EBPs, while academic pressure and emotional intelligence have a significant negative effect on adolescent's EBPs. The bootstrap method confirmed that there was a significant chain mediation effect of academic pressure and emotional intelligence when parental mental health affected adolescent mental health.

The results supported hypothesis H1, that is, parental mental health positively influenced adolescent's EBPs, which was consistent with previous findings (Kamis, 2021). According to family system theory, there was a mutual connection between parents and adolescents. The psychological health of fathers and mothers can directly lead to changes in the family environment where adolescents live. A psychologically healthy father or mother can protect adolescents by providing healthy behaviors, cognition, emotions, and interpersonal relationships as examples, and allow adolescents to receive known signals that promote psychological health development from at least one parent (S. H. Goodman et al., 2011). Similarly, once one or both parents had psychological problems, it is likely to have adverse effects on the family environment in which adolescents are located. Adolescents under a negative family environment might constantly receive negative psychological clues from their parents. Under the continuous influence of their parents' mental health issues, the psychological state of adolescents may gradually lean towards the same issues their parents face, potentially leading to the emergence of their own mental health problems. According to previous research results, adolescents with parents who had psychological issues are two to three times more likely to develop mental health problems compared to those whose parents do not have such issues, and this risk increased with the severity of parental psychological problems (van Santvoort et al., 2015).

Our results also supported hypothesis H2: academic stress had a significant negative impact on adolescents' EBPs, which was consistent with previous research (Yu & Zhao, 2023). The Cognitive Appraisal Model of Stress (Kim & Duda, 2003) assumes that individuals' perception of stressors and self-assessment of coping abilities affect their stress responses. We applied this model to adolescents, who were particularly vulnerable during their developmental journey (Santomauro et al., 2021). We argued that academic stress, one of the major stressors for this group, might trigger stress responses when it exceeds their coping capacity. These responses may manifest as EBPs, and other mental health

issues. The results showed that perceiving higher academic stress is a risk factor for greater adolescents' EBPs. According to the fluency theory, the cognitive experience of the subject could act as an information cue and determine subsequent behavior(Yu & Zhao, 2023). High academic stress, as a negative emotional experience triggered by a social situation, would affect adolescent mental health behavior if it was perceived for a long time but no measures were taken to intervene (Barbayannis et al., 2022; García-Martínez et al., 2021).

Moreover, the results supported hypothesis H3: Emotional intelligence had a significant negative impact on adolescents' EBPs, which was consistent with previous research(Ruiz-Aranda et al., 2012). Research shows that emotional intelligence has a significant negative impact on adolescent psychological behavior (Abdullah et al., 2004). The self-determination theory (Reeve, 2012) posited that human motivation and behavior were largely driven by internal needs and emotions. Emotional intelligence, as the ability of individuals to recognize and understand their own and others' emotional states played a crucial role.This ability was regarded as a key factor in helping individuals better understand and cope with challenges and stress in the environment, thus better adapting to and dealing with various situations in life. Moreover, emotional intelligence might have a negative impact on their EBPs for adolescents. Within the framework of the self-determination theory, emotional intelligence may influence adolescents' self-determined behaviors(O'Connor & Dvorak, 2001)(Reeve, 2012). If adolescents had relatively low emotional intelligence, they might not accurately identify and understand their own emotional states. This might lead to them not being able to respond appropriately when facing challenges and stress. This situation might result in the manifestation of EBPs. In recent years, many studies had shown that applying the principles of positive psychology to the field of education could improve students' academic achievement and happiness (Seligman et al., 2009). According to the personality-environment interaction theory individuals with certain characteristics were more inclined to give positive feedback to positive events in the environment, which generated positive emotions and forms a virtuous circle of positive emotions. Emotional intelligence is an important component of positive psychology. Currently, relevant courses to improve emotional intelligence were being conducted abroad to improve the healthy psychological behavior of adolescents (Shao, 2021).

The analysis substantiates that Hypothesis H4 was not rejected, indicating that academic stress and emotional intelligence had a chain mediation effect on the influence chain of parental mental health and adolescents' EBPs. Specifically, parental mental well-being fostered healthy psychological behavior among adolescents by mitigating adolescent academic pressure and augmenting adolescent emotional intelligence. By the Ecological Systems Theory (Robledo et al., 2022) and Cognitive Stress Theory (Pacella et al., 2017), the mental health status of parents was not merely an essential microsystem factor impacting adolescent development, but also a crucial resource influencing adolescents' capacity to manage learning pressure and regulate emotions. In a familial environment characterized by robust mental health conditions, parents were often capable for providing adolescents with an abundance of emotional support, constructive feedback, and reasonable expectations. These elements contributed to the reduction of adolescents' academic stress and the enhancement of their self-confidence and self-esteem. Concurrently, such a familial environment could also afford adolescents with a plethora of opportunities for emotional education, emotional expression, and emotional regulation, thereby elevating adolescents' emotional intelligence and bolstering their capacity to recognize, comprehend, and manage emotions. These capabilities were instrumental for adolescents to adopt more proactive psychological behavior strategies (such as seeking help, problem-solving, positive thinking, etc.) when confronted with various life challenges and difficulties, thereby improving the level of adolescent healthy psychological behavior.

This study has several limitations and areas that require improvement. Firstly, the cross-sectional design of this study means that all variables were gathered through self-report, which could inevitably introduce recall bias and common method bias, potentially affecting the accuracy and completeness of the collected data.To mitigate potential common method biases, we implemented procedural controls such as anonymous completion and reverse scoring, and also utilized Harmans single-factor analysis. Secondly, the study participants were limited to primary and middle school students, which calls for further exploration and validation of the results on a broader scale in future research. Thirdly, while this study examined the correlation between parental mental health, academic stress, emotional intelligence, and adolescent emotional and behavioral problems through cross-sectional research, it could not uncover the causal mechanisms among them. Therefore, future research should conduct longitudinal studies for further clarification.

The conclusion drawn from this cross-sectional study is that academic stress and emotional intelligence have a chain mediation effect in the influence of parents' mental health on adolescents' EBPs. This finding emphasizes the importance of parents' mental health, academic stress, and emotional intelligence in the development of healthy psychological behavior in adolescents. Therefore, to promote adolescents' mental health, we need to improve parents' mental health, alleviate academic stress in adolescents, and enhance their emotional intelligence. This provides us with a new perspective to understand and promote healthy psychological behavior in adolescents.

Declarations

Date availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Authors' contributions

Jiana Wang completed the framework design, and organizing and implementing of the entire research. She also participated in writing paper.

Cong Yang carried out data analysis and wrote the paper.

Yunjie Hong, Lin Feng and Nana Meng provided help with the analysis, interpretation and writing.

Jing Zhang,Kristin Sznajder provided help with the data collection and interpretation. All authors read and approved the final manuscript.

Ye Liu provided help in the data collection.

Pin Yao participated designing the research and provided the financial support.

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Declarations of interest

none

Ethical statement

The study design and data collection procedures were approved by the ethics Committee on Human Experimentation of XX University[name: Application Form for Ethical Review of Biomedical Research Involving Human Subjects of XX University, Ethics approval number: NBU-2025-036]. All methods were performed in accordance with the relevant guidelines and regulations as stated in the ethics declaration.

References

1. Abdullah MC, Elias H, Mahyuddin R, Uli J. Emotional intelligence and academic achievement among Malaysian secondary students. Pakistan J Psychol Res. 2004;19(3–4):105–21.
2. Ali NM, Nowshad NA, Mansoor KM, Ibnouf RA, Albehiery RM, Carrick FR, Abdulrahman M, PSYCHOLOGICAL STRESS AMONG ADOLESCENTS IN UNITED ARAB EMIRATES. (n.d.). PERCEIVED ACADEMIC AND : ROLE OF GENDER, AGE, DEPRESSION, AND HIGH EXPECTATION OF PARENTS. Psychiatria Danubina, 31.
3. Barbayannis G, Bandari M, Zheng X, Baquerizo H, Pecor KW, Ming X. (2022). Academic Stress and Mental Well-Being in College Students: Correlations, Affected Groups, and COVID-19. Frontiers in Psychology, 13, 886344. https://doi.org/10/gqmxpn.
4. Benoit V, Gabola P. (2021). Effects of Positive Psychology Interventions on the Well-Being of Young Children: A Systematic Literature Review. International Journal of Environmental Research and Public Health, 18(22), 12065. https://doi.org/10/gn3kks.
5. Bera L, Souchon M, Ladsous A, Colin V, Lopez-Castroman J. (2022). Emotional and Behavioral Impact of the COVID-19 Epidemic in Adolescents. Current Psychiatry Reports, 24(1), 37–46. https://doi.org/10/gtc9ws.
6. Blakemore S-J. (2019). Adolescence and mental health. The Lancet, 393(10185), 2030–2031. https://doi.org/10/ghxjbs.
7. Buist KL, Deković M, Prinzie P. (2013). Sibling relationship quality and psychopathology of children and adolescents: A meta-analysis. Clinical Psychology Review, 33(1), 97–106. https://doi.org/10/f4k24b.
8. Chandler S, Howlin P, Simonoff E, O'Sullivan T, Tseng E, Kennedy J, Charman T, Baird G. (2016). Emotional and behavioural problems in young children with autism spectrum disorder. Developmental Medicine and Child Neurology, 58(2), 202–208. https://doi.org/10/ggk48x.
9. Cocker C, Minnis H, Sweeting H. (2018). Potential value of the current mental health monitoring of children in state care in England. BJPsych Open, 4(6), 486–491. https://doi.org/10/gtc9wc.
10. Colizzi M, Lasalvia A, Ruggeri M. (2020). Prevention and early intervention in youth mental health: is it time for a multidisciplinary and trans-diagnostic model for care? International Journal of Mental Health Systems, 14(1), 23. https://doi.org/10/gpjjk9.
11. Costello EJ, Maughan B. (2015). Annual Research Review: Optimal outcomes of child and adolescent mental illness. Journal of Child Psychology and Psychiatry, and Allied Disciplines, 56(3), 324–341. https://doi.org/10/f8dp22.
12. Cui Y, Li F, Leckman JF, Guo L, Ke X, Liu J, Zheng Y, Li Y. (2021). The prevalence of behavioral and emotional problems among Chinese school children and adolescents aged 6–16: a national survey. European Child & Adolescent Psychiatry, 30(2), 233–241. https://doi.org/10/gnvm67.
13. Davis SK, Wigelsworth M. (2018). Structural and Predictive Properties of the Emotional Quotient Inventory Youth Version-Short Form (EQ-i:YV[S]). Journal of Personality Assessment, 100(2), 197–206. https://doi.org/10/gmh4fz.

14. Derogatis LR, Unger R. (2010). Symptom Checklist-90-Revised. In I. B. Weiner & W. E. Craighead, editors, The Corsini Encyclopedia of Psychology (1st ed., pp. 1–2). Wiley. https://doi.org/10.1002/9780470479216.corpsy0970
15. Dickey WC, Blumberg SJ. (2004). Revisiting the Factor Structure of the Strengths and Difficulties Questionnaire: United States, 2001. Journal of the American Academy of Child & Adolescent Psychiatry, 43(9), 1159–1167. https://doi.org/10/bjtmcg.
16. Ebrahimi A. The Relationship between Emotional Intelligence, Perceived Stress and Academic Performance among Iranian High School Students. Eur Online J Nat Social Sci. 2013;2(2s):509–22. https://european-science.com/eojnss/article/view/227.
17. Eckshtain D, Marchette LK, Schleider J, Evans S, Weisz JR. (2019). Parental Depressive Symptoms as a Predictor of Outcome in the Treatment of Child Internalizing and Externalizing Problems. Journal of Abnormal Child Psychology, 47(3), 459–474. https://doi.org/10/gp4dvm.
18. Esnaola I, Freeman J, Sarasa M, Fernández-Zabala A, Axpe I. (2016). Validity Evidence based on Internal Structure of Scores of the Emotional Quotient-Inventory: Youth Version Short (EQ-i: YV-S) in a Spanish Sample. The Spanish Journal of Psychology, 19, E12. https://doi.org/10/gtdbdm.
19. Essau CA, Olaya B, Anastassiou-Hadjicharalambous X, Pauli G, Gilvarry C, Bray D, O'callaghan J, Ollendick TH. (2012). Psychometric properties of the Strength and Difficulties Questionnaire from five European countries. International Journal of Methods in Psychiatric Research, 21(3), 232–245. https://doi.org/10/gd59gr.
20. Fergusson DM, Lynskey MT, Horwood LJ. (1995). The role of peer affiliations, social, family and individual factors in continuities in cigarette smoking between childhood and adolescence. Addiction, 90(5), 647–659. https://doi.org/10/bqwhmk.
21. García-Martínez I, Pérez-Navío E, Pérez-Ferra M, Quijano-López R. (2021). Relationship between Emotional Intelligence, Educational Achievement and Academic Stress of Pre-Service Teachers. Behavioral Sciences, 11(7), 95. https://doi.org/10/gqz6vd.
22. Gomez R, Stavropoulos V, Zarate D, Palikara O. (2021). Symptom Checklist-90-Revised: A structural examination in relation to family functioning. PLoS ONE, 16(3), e0247902. https://doi.org/10/grgdmx.
23. Goodman R. (1997). The Strengths and Difficulties Questionnaire: A Research Note. Journal of Child Psychology and Psychiatry, 38(5), 581–586. https://doi.org/10/b6bmr3.
24. Goodman SH, Rouse MH, Connell AM, Broth MR, Hall CM, Heyward D. (2011). Maternal Depression and Child Psychopathology: A Meta-Analytic Review. Clinical Child and Family Psychology Review, 14(1), 1–27. https://doi.org/10/d54k2s.
25. Huang C-C, Chen Y, Jin H, Stringham M, Liu C, Oliver C. (2020). Mindfulness, Life Skills, Resilience, and Emotional and Behavioral Problems for Gifted Low-Income Adolescents in China. Frontiers in Psychology, 11, 594. https://doi.org/10/gtdbbq.
26. Igartua J-J, Hayes AF. (2021). Mediation, Moderation, and Conditional Process Analysis: Concepts, Computations, and Some Common Confusions. The Spanish Journal of Psychology, 24, e49. https://doi.org/10/gnfpsz.
27. Jacobs I, Wollny A. (2022). Personal values, trait emotional intelligence, and mental health problems. Scandinavian Journal of Psychology, 63(2), 155–163. https://doi.org/10/gtc94j.
28. Jiménez-Picón N, Romero-Martín M, Ponce-Blandón JA, Ramirez-Baena L, Palomo-Lara JC, Gómez-Salgado J. (2021). The Relationship between Mindfulness and Emotional Intelligence as a Protective Factor for Healthcare Professionals: Systematic Review. International Journal of Environmental Research and Public Health, 18(10), 5491. https://doi.org/10/h29s.
29. Jordan PJ, Troth AC. (2020). Common method bias in applied settings: The dilemma of researching in organizations. Australian Journal of Management, 45(1), 3–14. https://doi.org/10/gqr7dq.
30. Kamis C. (2021). The Long-Term Impact of Parental Mental Health on Children's Distress Trajectories in Adulthood. Society and Mental Health, 11(1), 54–68. https://doi.org/10/ghpr5m.
31. Kim M-S, Duda JL. (2003). The Coping Process: Cognitive Appraisals of Stress, Coping Strategies, and Coping Effectiveness. The Sport Psychologist, 17(4), 406–425. https://doi.org/10/gtb7zc.
32. Kohn R, Levav I, Alterwain P, Ruocco G, Contera M, Grotta SD. (2001). Factores de riesgo de trastornos conductuales y emocionales en la niñez: estudio comunitario en el Uruguay. Revista Panamericana de Salud Pública, 9(4). https://doi.org/10/bj28hn.
33. Lee S-K, Sim J-H, Yoon C-G, Kim Y, Yoon J-H. (2020). Does suicidal ideation and depressive mood of parents affect their adolescent children's mental health? Journal of Affective Disorders, 274, 768–773. https://doi.org/10/grtzqw.
34. University LN, Dalian C, Shao S, INTERVENTION EFFECT OF DANCE THERAPY BASED ON THE SATIR MODEL ON THE MENTAL HEALTH OF ADOLESCENTS DURING THE COVID-19 EPIDEMIC. (2021). Psychiatria Danubina, 33(3), 411–417. https://doi.org/10/gpws2f.
35. Liverpool S, Pereira B, Hayes D, Wolpert M, Edbrooke-Childs J. (2021). A scoping review and assessment of essential elements of shared decision-making of parent-involved interventions in child and adolescent mental health. European Child & Adolescent Psychiatry, 30(9), 1319–1338. https://doi.org/10/ggsncz.
36. Maltby J, Day L, Flowe HD, Vostanis P, Chivers S. (2019). Psychological Trait Resilience Within Ecological Systems Theory: The Resilient Systems Scales. Journal of Personality Assessment, 101(1), 44–53. https://doi.org/10/gm44m5.

37. Merikangas KR. (2005). Vulnerability Factors for Anxiety Disorders in Children and Adolescents. Child and Adolescent Psychiatric Clinics of North America, 14(4), 649–679. https://doi.org/10/bwqvd8.
38. Navarro-Roldán CP, Mateus-Gómez S, Ruge B, C., Velez G. Validity and reliability of Spanish version of the EQ-i: YV[S] in Colombian children and youth. Int J Psychol Res. 2023;16(1):29–40. https://doi.org/10.21500/20112084.5677.
39. Nguyen PV. (2008). Perceptions of Vietnamese Fathers' Acculturation Levels, Parenting Styles, and Mental Health Outcomes in Vietnamese American Adolescent Immigrants. Social Work, 53(4), 337–346. https://doi.org/10/fx2wpx.
40. O'Connor BP, Dvorak T. (2001). Conditional associations between parental behavior and adolescent problems: A search for personality–environment interactions. Journal of Research in Personality, 35(1), 1–26. https://doi.org/10/cqcrh3.
41. Pacella D, Ponticorvo M, Gigliotta O, Miglino O. (2017). Basic emotions and adaptation. A computational and evolutionary model. PLOS ONE, 12(11), e0187463. https://doi.org/10/gckkwt.
42. Pascoe MC, Hetrick SE, Parker AG. (2020). The impact of stress on students in secondary school and higher education. International Journal of Adolescence and Youth, 25(1), 104–112. https://doi.org/10/gfzg95.
43. Pierce M, Hope HF, Kolade A, Gellatly J, Osam CS, Perchard R, Kosidou K, Dalman C, Morgan V, Di Prinzio P, Abel KM. (2020). Effects of parental mental illness on children's physical health: systematic review and meta-analysis. The British Journal of Psychiatry, 217(1), 354–363. https://doi.org/10/gh9p5k.
44. Pratt KJ, Skelton JA. (2018). Family Functioning and Childhood Obesity Treatment: A Family Systems Theory-Informed Approach. Academic Pediatrics, 18(6), 620–627. https://doi.org/10/gd29dd.
45. Reeve J. (2012). A Self-determination Theory Perspective on Student Engagement. In S. L. Christenson, A. L. Reschly, & C. Wylie, editors, Handbook of Research on Student Engagement (pp. 149–172). Springer US. https://doi.org/10.1007/978-1-4614-2018-7_7
46. Risi A, Pickard JA, Bird AL. (2021). The implications of parent mental health and wellbeing for parent-child attachment: A systematic review. PLoS ONE, 16(12), e0260891. https://doi.org/10/gtc9zc.
47. Robledo MV, Edwards MB, Bocarro JN, Behnke AO, Casper JM. (2022). Examination of Ecological Systems Contexts Within a Latino-Based Community Sport Youth Development Initiative. Frontiers in Sports and Active Living, 4, 869589. https://doi.org/10/gtc96v.
48. Ruiz-Aranda D, Castillo R, Salguero JM, Cabello R, Fernández-Berrocal P, Balluerka N. (2012). Short-and midterm effects of emotional intelligence training on adolescent mental health. Journal of Adolescent Health, 51(5), 462–467. https://doi.org/10/ghwf.
49. Santomauro DF, Herrera AMM, Shadid J, Zheng P, Ashbaugh C, Pigott DM, Abbafati C, Adolph C, Amlag JO, Aravkin AY, Bang-Jensen BL, Bertolacci GJ, Bloom SS, Castellano R, Castro E, Chakrabarti S, Chattopadhyay J, Cogen RM, Collins JK, Ferrari AJ. (2021). Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic. The Lancet, 398(10312), 1700–1712. https://doi.org/10/gm3qw3.
50. Seligman MEP, Ernst RM, Gillham J, Reivich K, Linkins M. (2009). Positive education: positive psychology and classroom interventions. Oxford Review of Education, 35(3), 293–311. https://doi.org/10/dpx3z7.
51. Speyer LG, Hall HA, Hang Y, Hughes C, Murray AL. (2022). Within-family relations of mental health problems across childhood and adolescence. Journal of Child Psychology and Psychiatry, 63(11), 1288–1296. https://doi.org/10/gr5mr4.
52. Stein A, Pearson RM, Goodman SH, Rapa E, Rahman A, McCallum M, Howard LM, Pariante CM. (2014). Effects of perinatal mental disorders on the fetus and child. The Lancet, 384(9956), 1800–1819. https://doi.org/10/f2wbbq.
53. Totsika V, Hastings RP, Emerson E, Lancaster GA, Berridge DM. (2011). A population-based investigation of behavioural and emotional problems and maternal mental health: associations with autism spectrum disorder and intellectual disability: ASD and intellectual disability. Journal of Child Psychology and Psychiatry, 52(1), 91–99. https://doi.org/10/fc9xrb.
54. Ursin H, Eriksen HR. (2010). Cognitive activation theory of stress (CATS). Neuroscience & Biobehavioral Reviews, 34(6), 877–881. https://doi.org/10/cd933j.
55. Usha S, Solomon DMD. (2022). Academic Stress and Emotional Intelligence of Late Adolescents Attending Online Classes. J Posit School Psychol, 2766–78. https://www.journalppw.com/index.php/jpsp/article/view/3743
56. van Santvoort F, Hosman CMH, Janssens JMAM, van Doesum KTM, Reupert A, van Loon LMA. (2015). The Impact of Various Parental Mental Disorders on Children's Diagnoses: A Systematic Review. Clinical Child and Family Psychology Review, 18(4), 281–299. https://doi.org/10/f7x9z3.
57. Wichstrøm L, Berg-Nielsen TS, Angold A, Egger HL, Solheim E, Sveen TH. (2012). Prevalence of psychiatric disorders in preschoolers. Journal of Child Psychology and Psychiatry, 53(6), 695–705. https://doi.org/10/fzjgx5.
58. Xiong Y, Qin X, Wang Q, Ren P. (2021). Parental Involvement in Adolescents' Learning and Academic Achievement: Cross-lagged Effect and Mediation of Academic Engagement. Journal of Youth and Adolescence, 50(9), 1811–1823. https://doi.org/10/gkkg8j.
59. Yang M, Qi H, Meng Z, Duan X, Zhang L. (2022). Destructive interparental conflict affects Chinese children's emotional and behavioral problems: Indirect pathways via parent–child attachment and emotional insecurity. Frontiers in Psychology, 13, 1024325. https://doi.org/10/gtdbc6.

60. Yu X, Zhao J. (2023). How rumination influences meaning in life among Chinese high school students: the mediating effects of perceived chronic social adversity and coping style. Frontiers in Public Health, 11, 1280961. https://doi.org/10/gtdbg4.
61. Zhou J, Yu J, Zhou Y, Qiu J. (2021). Study of item text in the Chinese Symptom Checklist-90.Medicine, 100(11), e24841. https://doi.org/10/gtdbd9.

Tables

Table.1

Univariate analysis of gender and school level

		Parental mental health	Academic stress	Emotional intelligence	EBPs
Independent samples t-test	T	2.599	-0.341	-1.892	2.417
	P	0.009	0.753	0.059	0.016
Multi way ANOVA	T	4.828	60.144	8.023	16.058
	P	0.008	<0.001	<0.001	<0.001
Gender	Male	155.65±110.92	1.54±0.50	117.10±16.85	13.16±5.99
	Female	143.20±99.00	1.54±0.50	118.58±17.07	12.52±5.49
School level	Primary school	143.93±91.73	1.62±0.50	119.62±18.55	12.03±5.54
	Junior school	144.44±102.71	1.38±0.49	117.93±16.47	12.80±5.29
	High school	161.68±122.74	1.36±0.48	115.50±14.98	12.80±5.71

Note: EPPs=emotional and behavioral problems

Table.2

Partial correlation analysis of parental mental health, academic stress, Emotional intelligence, and EBPs

Control variable	Variable	Parental mental health	Academic stress	Emotional intelligence	EBPs
Gender & School level	Parental mental health	1	-0.053*	-0.2*	0.298**
	Academic stress		1	-0.1**	0.175**
	Emotional intelligence			1	-0.536**
	Children's EBPs				1

Note: EPPs=emotional and behavioral problems *P<0.05, **P<0.01

Table.3

Regression analysis of the effects of parental mental health, academic stress, and emotional intelligence on EBPs

Variable	EBPs					
	B	SE	β	T	F	Adjusted R^2
Parental mental health	0.017	0.001	0.301	13.941**	194.362**	0.090
academic stress	2.235	0.255	0.195	8.774**	76.976**	0.038
Emotional intelligence	-0.182	0.006	-0.542	-28.443**	809.01**	0.293

Note: EPPs=emotional and behavioral problems*P<0.05, **P<0.01

Table.4

Test of The Indirect Effects

Variable	Equation 1（Academic stress）				Equation 2（Emotional intelligence）				Equation3(EBPs)			
	β	SE	t	P	β	SE	t	P	β	SE	t	P
Parental mental health	0.048	0.022	2.145	0.0319	-0.196	0.022	-8.807	＜0.001	0.195	0.019	10.367	＜0.001
Academic stress					-0.094	0.023	-4.142	＜0.001	0.115	0.019	6.1225	＜0.001
Emotional intelligence									-0.483	0.019	-25.607	＜0.001
F	31.610			＜0.001	29.626			＜0.001	208.888			＜0.001

Note: EPPs=emotional and behavioral problems

Table.5

Bootstrap Test of The Indirect Effects

Effect	The path	Effect	BootSE	95%Confidence Intervals
Direct effect	X→Y	0.195	0.019	[0.158, 0.234]
Indirect effect	X→M1→Y	0.006	0.003	[0.001, 0.011]
Indirect effect	X→M2→Y	0.096	0.011	[0.072, 0.117]
Indirect effect	X→M1→M2→Y	0.002	0.001	[0.002, 0.005]
Total Indirect Effect of X on Y		0.102	0.012	[0.079, 0.126]
Total effect of X on Y		0.297	0.022	[0.255, 0.339]

Note: X=Parental mental health; Y=EPPs=emotional and behavioral problems;M1=Academic stress;M2=Emotional intelligence

Figures

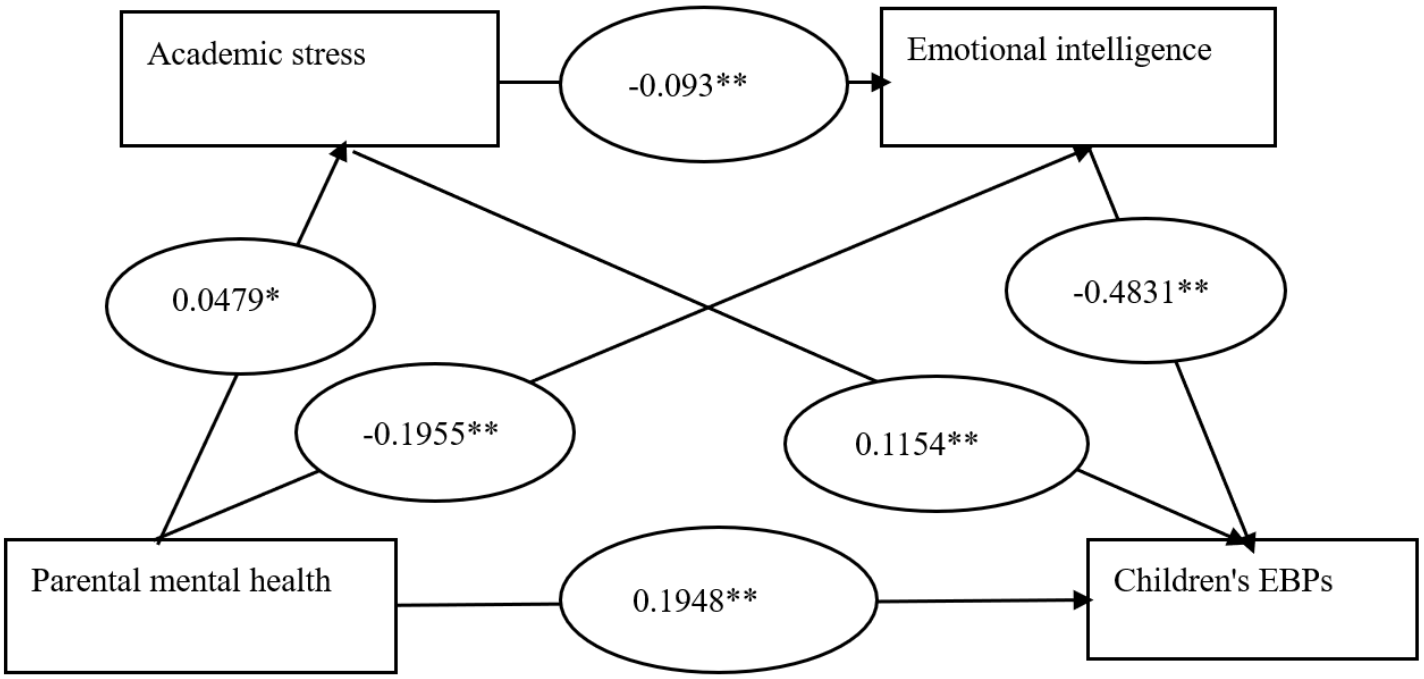


Figure 1

The Model of Moderated Chain Mediating Effect