

Effect of Perceived Stress and School Adjustment among Boarding Middle School Students in China: The Parallel Mediating Role of Parent-Child Relationship and Peer Relationship

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Abstract

Boarding middle school students often encounter numerous challenges that can contribute to their school maladjustment. This study seeks to explore the intermediary influence of parent-child and peer relationships on the connection between perceived stress and school adjustment among Chinese boarding middle school students. Using a multi-stage cluster sampling method, involving a sample of 818 Chinese boarding junior high school students. Various questionnaires, including the Chinese Perceived Stress Scale, the School Attitudes Scale, the Friendship Quality Scale, and the Closeness to Parents Scale were used to collect data on perceived stress, school adjustment, and relationships with parents and peers. Smart-pls 3.2.9 was utilized for data analysis. The results demonstrate a significant negative impact of perceived stress on the school adjustment of boarding junior high school students. Moreover, the findings underscore the crucial mediating role played by parent-child and peer relationships in connecting perceived stress and school adjustment within this specific student population. By elucidating these mediating mechanisms, this study contributes to the growing literature on adolescent school adjustment and provides valuable implications for educators, policymakers, and mental health professionals seeking to enhance the well-being of boarding students.

Keywords: Boarding Students, Perceived Stress, School Adjustment, Parent-Child Relationship, Peer Relationship

Introduction

The number of boarding students varies across countries, regions, and schools worldwide, but the number is quite significant in some regions and schools. According to the Ministry of Education, in China, 2011 the overall boarding rate was 52.88% for rural middle school students and 62.36% for junior high school students. By the end of 2016, 26.082 million rural (including township) boarding students were in compulsory education, accounting for 27.5% of all rural students. There were 9.425 million rural elementary school boarding students, with a boarding rate of 14.2%, and 16.657 million rural junior high school boarding students, with an accommodation rate of 58.7% (MOE of PRC, 2017). With the rapid increase in boarding students, this group is receiving increasing attention from society.

Boarding secondary students, as a special group of students, face a range of problems when dealing with school adjustment. Boarding students usually leave home at an earlier age, live alone in a school environment, and face multiple stressors such as academic, interpersonal, and self-management issues. These stressors may negatively affect their school adjustment. Kanga (2017) found that students in boarding schools are more likely to experience school maladjustment. This may be because boarding students face greater challenges in living and learning, including independent living, new learning environments, and social pressure. They must adapt to a new lifestyle and learning environment, which may lead to poor performance in school (Kanga et al., 2015).

School maladjustment has several consequences. First, school maladjustment may affect students' academic performance (Lakhani et al., 2017). Boarding students may experience academic difficulties in school due to a lack of family support and supervision, which may affect their academic performance and achievement. Second, school maladjustment may affect students' social and emotional well-being (Shoshani & Slone, 2013). Boarding students may face problems interacting with their peers and teachers and may feel lonely, anxious, depressed, or have other emotional problems that negatively affect their mental health. Therefore, it is crucial to study boarding students' school adjustment problems. Understanding the relevant influencing factors, mechanisms, and intervention strategies can support, assist, and promote better adjustment and development for boarding students.

Boarding students typically face many stressors in the school environment, such as academic, interpersonal, and self-management stresses (Wahab et al., 2013). Research has focused on how their perceived stress affects their school adjustment. There is a strong relationship between perceived stress and adolescent adjustment (Hampel & Petermann, 2006). High levels of perceived stress may make school life more difficult and challenging for adolescents, thus affecting the quality of their school adjustment (Zhang et al., 2019). For example, when students perceive higher levels of academic stress, they may experience academic anxiety, affecting their academic achievement and performance (Akgun & Ciarrochi, 2003).

Additionally, interpersonal and self-management stress may negatively affect students' adjustment (Lantagne et al., 2018). Therefore, understanding boarding students' perceptions of stress is important for an in-depth investigation of their school adjustment problems. However, past studies have not examined the mechanism of perceived stress on school adjustment with boarding students as the research target, this study attempts to bridge this gap that exists.

Parent–child relationships significantly impact boarding students' school adjustment. Parent–child closeness, support, and supervision promote students' school adjustment and psychological well-being (Simons-Morton & Crump, 2003). Particularly in the case of residential students, the quality of the parent–child relationship may have a more significant impact on students' school adjustment (Zhang et al., 2021). Past research has found that parental roles and behaviors significantly impact students' school adjustment. For example, parental support and involvement can help students better adjust to school life (Ratelle et al., 2017). Parental supervision and regulation can promote student learning and achievement (Muller, 2018). Also, the level of parental involvement, closeness, and parenting style may have different effects on students' school adjustment (Bronstein et al., 1996). Although past research has explored the effects of parental roles and behaviors on students' school adjustment, relatively little research has been conducted on residential students.

Furthermore, although past research has explored the relationship between peer relationships and school adjustment, there is a research gap regarding the mediating role of parent–child relationships and peer relationships in boarding students' perceptions of stress and school adjustment. This study addresses this research gap by exploring the mediating role of parent–child relationships on boarding students' perceptions of stress and school adjustment. This will contribute to a more comprehensive understanding of boarding students' school adjustment process and provide schools and families with practical intervention and support strategies to promote the healthy development and school adjustment of boarding students.

Peer relationships also significantly impact boarding students' school adjustment by affecting their social interactions, emotional state, and choice of adjustment strategies in school (Buhs, 2005). Good peer relationships positively impact students' school adjustment by providing students with emotional support, social interactions, and social identity that help them adjust better to school life. For example, close friendships with peers can increase students' emotional security and well-being, facilitating their school adjustment (Erath et al., 2008). Supportive and positive interactions in peer relationships help boarding students resolve problems and difficulties in school life and improve their adjustment ability.

Overall, boarding secondary school students' school adjustment problems are influenced by several factors, among which perceived stress, parent–child relationships, and peer relationships play an important role. A high level of perceived stress may negatively impact boarding students' school adjustment. In contrast, good parent–child and peer relationships may positively impact their school adjustment. An in-depth understanding of the effects of perceived stress, parent–child relationships, and peer relationships on school adjustment can help elucidate boarding students' adjustment dilemmas in the school setting and provide a theoretical basis for implementing targeted interventions and support measures.

Goal of the Study

The present study examined the effects of perceived stress on boarding middle school students' school adjustment, considering the parallel mediating effects of parent-child and peer relationships. Figure 1 shows the parallel mediation model hypothesized in this study. The following hypotheses were tested in this study:

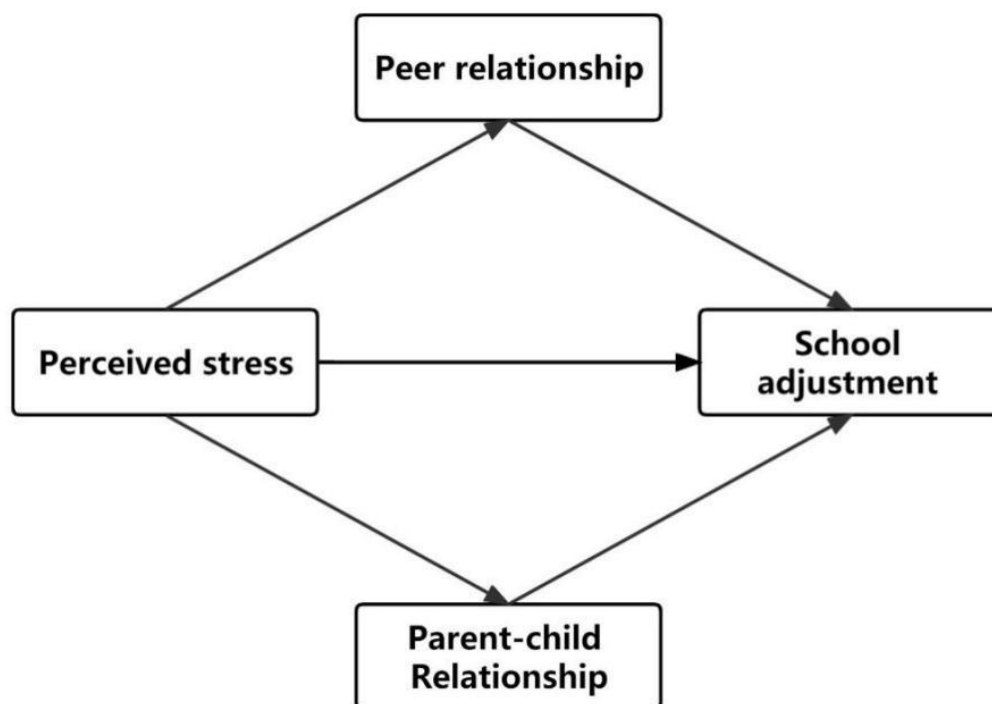


Figure 1 Hypothesised parallel mediation model

Hypothesis 1: Boarding secondary school students' perceived stress has a significant negative predictive effect on school adjustment.

Hypothesis 2: Parent–child relationships mediate between perceived stress and school adjustment among boarding secondary school students.

Hypothesis 3: Peer relationships mediate between perceived stress and school adjustment among boarding secondary school students.

Method

Participants

The sample that participated in this study included students from four rural boarding middle schools in Guangxi province, China. The study utilized multilayer cluster sampling to randomly select 818 boarding students from these school subgroups (grades 7-9) as the study population. The sample comprised 357 male students (45.8%) and 443 female students (54.2%), covering different grades and age groups.

Measures

The study used four validated scales: the Chinese Perceived Stress Scale (CPSS) ((Yang & Huang, 2003)), the Closenessto Parents Scale ((Buchanan et al., 1991)), and the Friendship Quality Scale (Zhou et al., 2006), and the School Attitudes Scale (Zou et al., 2007). In addition, demographic information were collected.

Chinese Perceived Stress Scale (CPSS)

The Chinese Perceived Stress Scale (CPSS) is a 14-item self-report scale that assesses participants' perceived stressful situations over a one-month period on two dimensions: feelings of tension and feelings of loss of control. The scale utilizes a 5-point Likert scale ranging from 1 = never to 5 = always. Sample items include "I was upset that something

unexpected had happened", "I feel like I have no control over the important things in my life". In this study, the scale scores showed good reliability with a Cronbach's alpha of 0.79

Closeness to Parents Scale

This study utilized the Closeness to Parents Scale to measure the parent-child relationship. The questionnaire comprises nine items, each rated on a 5-point scale from 1 (strongly disagree) to 5 (strongly agree). Participants responded separately regarding their relationships with their father and mother. Average scores for the father and mother dimensions were calculated, with higher scores indicating a higher quality of the relationship with the respective parent. Sample items include "How well does your dad (mom) know what you really like?" and "How comfortable and natural did you feel when you showed your emotions to your dad (mom)?" In this study, the Cronbach's alpha coefficients for the father-child and mother-child relationship dimensions were 0.92 and 0.93.

Friendship Quality Scale

The Friendship Quality Scale is an 18-item self-report instrument designed to assess the quality of both positive and negative aspects of friendships. This scale evaluates six dimensions: affirmation and care, help and guidance, companionship and recreation, intimate disclosure and communication, conflict resolution strategies, and conflict and betrayal. It employs a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Sample items include "This friend and I always play together at recess," "We often get angry with each other," and "We talk together about things that make us sad." In this study, the scale demonstrated excellent reliability, with a Cronbach's alpha of 0.90.

School Attitudes Scale

This study employed the School Attitude Scale to assess students' adjustment to school by measuring their levels of school liking and avoidance. The scale consists of 13 items, rated on a 5-point scale from 1 (strongly agree) to 5 (strongly disagree). Sample items include "I feel happy at school" and "I wish I didn't have to go to school." The average score for each item was calculated to represent the participants' levels of school liking and avoidance. Higher overall scores indicate stronger attitudes in the respective direction. The scale demonstrated high reliability and validity, with a Cronbach's alpha of 0.899 in this study.

Data Processing

The collected research data were processed and analyzed utilizing the statistical software Smart-pls 3.2.9. Smart-pls 3.2.9 SEM statistically analyzed the research data to explore the relationship between perceived stress, parent-child relationships, peer relationships, and school adjustment and their mediating role. The research data were analyzed to draw appropriate conclusions, and the findings were interpreted and discussed to answer the research questions and test the research hypotheses.

Results

Measurement Model

The measurement model was analyzed before the structural analysis and consisted of internal consistency and construct validity. First, internal consistency was tested for measurement

models using factor loadings, Cronbach's alpha, average variance extraction (AVE), and composite reliability that met the inclusion criteria (Hair Jr et al., 2021), as shown in Table 1. The factor loadings values of 0.50–0.70 are acceptable (Chin, 1998). The AVE must be greater than 0.5. Hair et al. (2017) proposed removing items with loading values less than 0.40. Therefore, one item for perceived stress, two for parent-child relationships, and one for school adjustment were removed from the present model because the value of AVE was lower than the standard criterion.

On the contrary, Hair et al. (2017) suggested that items with values between 0.40 and 0.70 not be deleted if CR or AVE values were unaffected. As can be seen in Table 1, the values of all the items measured in this study were within the standard guidelines. Items with factor loadings below 0.70 were not deleted because the AVE and CR for all constructs in this study passed acceptable values. Cronbach's alpha and composite reliability assessed the internal reliability. Cronbach's alpha of these four scales were: perceived stress (0.798), parent-child relationship (0.722), peer relationship (0.900), and school adjustment (0.747), and the reliability was sufficient according to the recommended threshold. The composite reliability of these four scales was: perceived stress (0.908), parent-child relationship (0.878), peer relationship (0.923), and school adjustment (0.888), and the reliability was sufficient according to the recommended threshold value of greater than 0.7. This indicates that the reliability and all indicators were above 0.70 (Hair et al., 2017).

Secondly, construct validity includes convergent and discriminant validity (Sekaran & Bougie, 2016). Hair Jr et al. (2021) concluded that convergent validity exists when AVE values are equal to or greater than 0.50 and factor loading values are equal to or greater than 0.70. According to the results in Table 1, the AVE and factor loading values meet the mentioned criteria. Thus, these scales have sufficient convergent validity. Furthermore, the discriminant validity of this study was assessed utilizing the Fornell-Larcker criterion. Hair Jr et al. (2021) disclosed that the square root of a construct's AVE should be greater than its related constructs to obtain sufficient discriminant validity. Interestingly, the diagonal values are more significant than those of the relevant columns and rows to satisfy the discriminant validity (See Table 2).

Table 1

Factor loadings, reliability and validity analysis

Variables	Factor loadings	Cronbach's Alpha	Composite Reliability	AVE
PCR 1	0.732	0.722	0.878	0.783
PCR 2	0.747			
PCR 3	0.678			
PCR 4	0.749			
PCR 5	0.760			
PCR 6	0.733			
PCR 8	0.752			
PCR 9	0.799			
PCR 10	0.748			
PCR 11	0.800			
PCR 12	0.768			
PCR 13	0.810			
PCR 14	0.799			
PCR 15	0.796			
PCR 17	0.761			
PCR 18	0.852			
SA 1	0.723	0.747	0.888	0.798
SA 2	0.788			
SA 3	0.728			
SA 4	0.729			
SA 5	0.769			
SA 6	0.788			
SA 7	0.773			
SA 8	0.803			
SA 9	0.776			
SA 10	0.787			
SA 11	0.831			
SA 12	0.810			
PS 1	0.793	0.798	0.908	0.832
PS 2	0.820			
PS 3	0.775			
PS 4	0.759			
PS 5	0.787			
PS 6	0.763			
PS 7	0.720			
PS 8	0.669			
PS 9	0.745			
PS 10	0.675			
PS 11	0.749			
PS 13	0.665			
PS 14	0.773			

PR 1	0.786	0.900	0.923	0.668
PR 2	0.789			
PR 3	0.758			
PR 4	0.820			
PR 5	0.818			
PR 6	0.815			
PR 7	0.837			
PR 8	0.844			
PR 9	0.842			
PR 10	0.855			
PR 11	0.792			
PR 12	0.851			
PR 13	0.826			
PR 14	0.790			
PR 15	0.742			
PR 16	0.831			
PR 17	0.840			
PR 18	0.781			

Abbreviations: PCR, parent–child relationship; SA, school adjustment; PS, perceived stress; PR, peer relationship.

Table 2

Fornell-Larcker criterion

Variables	Parent–child relationship	Peer relationship	Perceived stress	School adjustment
Parent–child relationship	0.885			
Peer relationship	-0.089	0.817		
Perceived stress	0.127	-0.540	0.912	
School adjustment	-0.249	0.461	-0.488	0.893

Hypothesis Test

Testing Direct Relationship between Perceived Stress and School Adjustment

After testing the direct relationship between perceived stress and school adjustment, the results revealed a significant negative direct relationship between them ($\beta = -0.317$, $p < 0.001$) (see Table 3). The higher the perceived stress of boarding students, the lower their level of school adjustment. Therefore, Hypothesis 1 of this study is supported.

Table 3

Results from the structural mediation model.

Mediators	Type	Relationship	β	t values	p values	Mediation Type	Per cent
Parent-child relationship in "Perceived stress → School adjustment."	Indirect effects	PS→PCR→SA	-0.023	2.872	0.004	Partial Mediation	6.76%
	Direct effects	PS→PCR	0.127	3.525	0.000		
		PCR→SA	-0.185	5.628	0.000		
		PS→SA	-0.317	8.975	0.000		
Peer relationship in "Perceived stress → School adjustment."	Indirect effects	PS→PR→SA	-0.148	7.511	0.000	Partial Mediation	31.82%
	Direct effects	PS→PR	-0.540	21.246	0.000		
		PR→SA	0.273	7.624	0.000		
		PS→SA	-0.317	8.975	0.000		

Abbreviations: PCR, parent-child relationship; SA, school adjustment; PS, perceived stress; PR, peer relationship.

Testing the Mediating Role of Parent-Child Relationships and Peer Relationships

Path analysis in SEM was utilized to investigate the mediating role of parent-child and peer relationships in the association between perceived stress and school adjustment. To verify the significance of this mediating role, a statistical test was conducted using Bootstrap methods to assess direct and indirect effects. The significance criterion employed in this study followed a rule-of-thumb guide, whereby a non-significant effect is indicated when zero falls within the 95% confidence interval (CI). Conversely, a significant association is established when zero does not fall within the 95% CI, as determined by the p-value. A mediation analysis was performed to examine the mediating role of parent-child and peer relationships in the relationship between perceived stress and school adjustment. The results of the mediation tests are presented in Table 3 and Figure 2. These findings demonstrate that parent-child relationships mediate between perceived stress and school adjustment, as the path "perceived stress → parent-child relationship → school adjustment" falls within the 95% CI and yields a significant p-value. Furthermore, this study sought to ascertain whether the mediating effect was partially or fully mediated. Partial mediation occurs when the coefficient of the direct path from the independent variable to the dependent variable is significant, whereas full mediation occurs when it is not. In this case, parent-child relationships were found to mediate the relationship between perceived stress and school adjustment partially, given that the direct path coefficient of "perceived stress → school adjustment" was significant. Specifically, the indirect effect of perceived stress on school adjustment was transmitted through parent-child relationships (indirect effect $\beta = -0.317$, $p < 0.001$), indicating that parent-child relationships serve as a buffer against perceived stress and its impact on school adjustment. Consequently, Hypothesis 2 is supported.

Similarly, the findings demonstrate that peer relationships partially mediate between perceived stress and school adaptation. It is worth noting that the path "perceived stress → peer relationship → school adjustment" falls within the 95% confidence interval, indicating statistical significance. Notably, the indirect impact of perceived stress on school adjustment was transmitted through peer relationships (indirect effect $\beta = -0.148$, $p < 0.001$), proving that peer relationships mediate between perceived stress and school adjustment. Thus, Hypothesis 3 receives support. Table 3 and Figure 2 present the results of the intermediary effect analysis for reference.

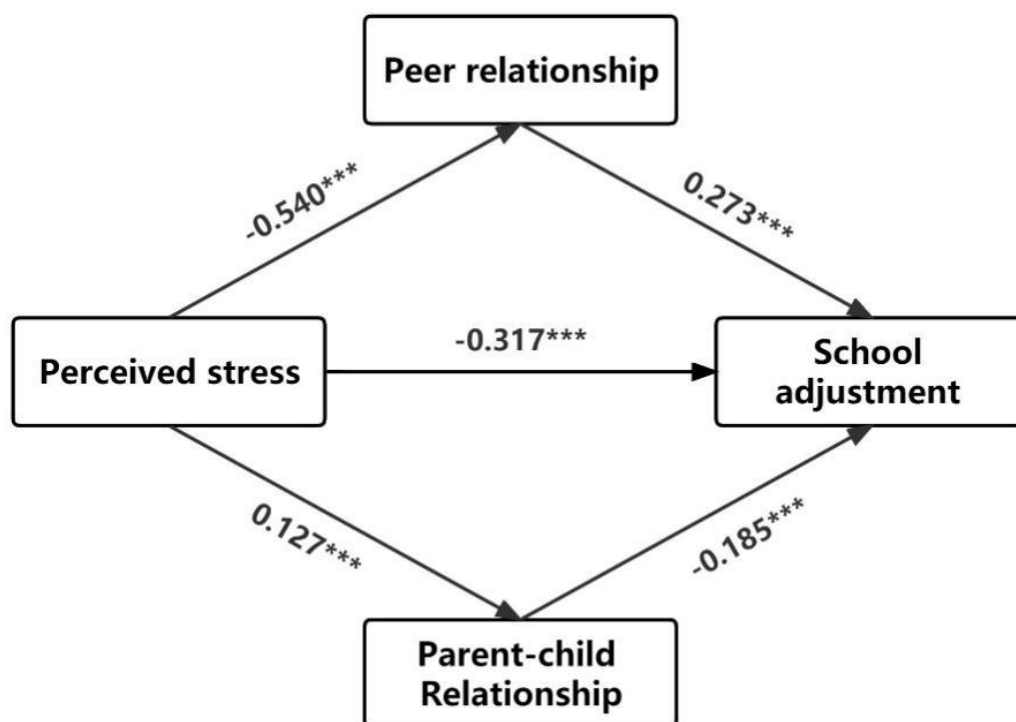


Figure 2 Modelling the mediating effect of parent–child and peer relationships between stress perception and school adjustment.

Discussion

This study found that boarding students' perceived stress was a significant negative predictor of school adjustment, implying that stress in the school environment may negatively affect boarding students' school adjustment. The stronger the boarding students' perceived stress in the school environment, the lower their level of school adjustment. Boarding students may feel more anxious, depressed, or unable to respond effectively when faced with challenges and dilemmas in the school environment, which may negatively affect their school adjustment. The results of this study are consistent with past research. Previous research has also found a negative association between perceived stress and school adjustment. For example, Zhang et al. (2019) found a negative association between middle school students' perceptions of stress in the school environment and their school adjustment in their studies. The significant negative prediction of boarding students' perceived stress on school adjustment may be due to the negative impact of stress on their psychological and physical health, which may affect their school adjustment. Boarding students may often face stress in the school environment, such as academic stress, social stress, and pressure to adapt to new

environments, which may lead them to negative emotional experiences such as anxiety, depression, and mood swings, thus negatively affecting school adjustment (Mander et al., 2015). Stress may also negatively affect their cognitive functioning and learning ability, reducing their concentration and memory and affecting their academic performance and achievement (Pascoe et al., 2020). These adverse effects may lead to difficulties in school adjustment for boarding students, thus presenting the result that perceived stress has a significant negative prediction on school adjustment.

Stress and coping theory explain the significant negative prediction of perceived stress on school adjustment among boarding secondary school students. According to stress and coping theory, perceived stress influences the adaptation process of individuals (Lazarus & Folkman, 1984). When faced with stress, they respond with coping strategies to reduce or resolve it. However, different coping strategies may have different effects on adaptation. In the context of residential students, perceived stress may trigger a range of coping strategies such as emotional regulation, problem-solving, and social support. However, if residential students do not have effective coping strategies or adequate resources to cope with stress, they may feel unable to cope, leading to negative school adjustment outcomes.

Another important finding of this study is that the parent–child relationship of boarding secondary school students mediates the relationship between their perceived stress and school adjustment. This implies that the relationship between boarding students and their parents may impact their perceptions of stress, affecting their school adjustment. The results of this study are consistent with past research and support the idea that parent–child relationships affect school adjustment (Lan et al., 2019). The mediating role of parent–child relationships between boarding students' perceptions of stress and school adjustment may be due to the important role that parent–child relationships play in boarding students' lives. These relationships may mediate the relationship between boarding students' perceptions of stress and school adjustment in several ways. First, as the primary source of social support for boarding students outside of school, parent–child relationships play an important moderating role for boarding middle school students when they face school stress. Students with good parent–child relationships can better mitigate perceived school stress through positive interactions and support with their parents, leading to better adjustment to school life (Mulyadi et al., 2016). Second, parent–child relationships directly impact the emotional and mental health of boarding middle school students. Students with better parent–child relationships typically exhibit lower levels of anxiety and depression and may be more psychologically resilient and adaptive in the face of school stress (Tian et al., 2018). Finally, parent–child relationships influence boarding middle school students' perceptions and attitudes toward school stress by conveying family values, beliefs, and parenting styles. Students with better parent–child relationships may be more inclined to view school stress as a common life challenge rather than a burden and thus have more positive attitudes toward school adjustment (Haciomeroglu & Karanci, 2014).

Additionally, ecosystem theory suggests that individuals and their environment interact with each other and include different levels of the environment, such as microsystems, mesosystems, exosystems, and macrosystems (Bronfenbrenner, 1992). In the ecosystem of residential students, the parent–child relationship, as a part of the microsystem, interacts

with other environmental factors and impacts students' perceived stress and school adjustment.

This study also found that peer relationships mediate the relationship between perceived stress and school adjustment in residential secondary school students. Peer relationships may bridge or mediate between boarding students' perceptions of stress and school adjustment. Boarding students' peer relationships may influence their perceptions of stress in school life and their school adjustment. Past research supports this conclusion. For example, Cattley (2004) found that peer relationships significantly influence students' psychological well-being and school adjustment.

The mediating role of peer relationships between boarding students' perceptions of stress and school adjustment may be due to the impact of peer relationships on boarding students' psychological and social support. Boarding students typically spend more time in school, and peer relationships become the primary social network in their daily lives. Positive peer relationships can provide emotional support, social support, and identity, reduce their perceptions of stress, and help them better adapt to the school environment (Gao et al., 2021; Yin et al., 2017). Peer relationships may also be critical to residential students' self-esteem and social comparison because peer relationships significantly impact adolescents' social identity and self-evaluation (Konstantoni, 2012). When boarding students face stress and adjustment difficulties in school, positive peer relationships can provide emotional support, help with problem-solving, and enhance self-efficacy, thereby reducing their perceptions of stress and facilitating better adjustment to the school environment.

Peer relationships impact boarding students' perceptions of stress and school adjustment through socialization and emotional regulation. Peer relationships help boarding students solve problems and cope with stress by sharing experiences and providing advice and emotional support. Peer relationships also influence boarding students' psychological well-being and school adjustment through emotional regulation and expression, influencing their perceptions of and ways of coping with stress in school (Abraham & Kerns, 2013).

An ecosystem theory perspective explains the role of peer relationships in mediating the relationship between boarding students' perceptions of stress and school adjustment. Ecosystem theory emphasizes the interactions and influences between individuals and their environment. In the context of boarding students, peer relationships act as a microsystem that interacts with the individual (boarding student) and other microsystems (such as family and school). Peer relationships may transform stress in the school environment into school adjustment by providing mechanisms such as emotional support, social identity, and self-evaluation and impact the psychological well-being and school adjustment of boarding students. Ecosystem theory emphasizes the mediating role between different systems. Peer relationships as microsystems may mediate between family (macrosystem) and school (mesosystem), influencing boarding students' perceived stress and school adjustment (Bronfenbrenner, 1992).

Conclusion

This study explores the relationship between boarding students' perceived stress and school adjustment and reveals three important findings. First, perceived stress has a significant

negative predictive effect on school adjustment, suggesting that boarding students may face difficulties in school adjustment when faced with stress in the school environment. Second, parent–child relationships mediate the relationship between boarding students’ perceived stress and school adjustment, emphasizing the important role of parent–child relationships in helping boarding students cope with school stress and facilitating school adjustment. Finally, peer relationships mediate the relationship between boarding students’ perceptions of stress and school adjustment, highlighting the positive role of peer relationships in promoting boarding students’ school adjustment and psychological well-being.

Limitations and Future Recommendations

However, there are some limitations to this study. First, this study employs a cross-sectional design and could not infer causal relationships. This study revealed how parent–child and peer relationships mediate the relationship between boarding students’ perceived stress and school adjustment. However, the causal relationship is undetermined. Future studies could use a longitudinal research design to explore causal relationships better.

Second, the sample of this study was limited to boarding students from a specific region and age group, so the findings may not be broadly generalizable. Future studies could expand the sample to include boarding students from different regions, age groups, and cultural backgrounds to verify the external validity of the findings.

Moreover, this study utilized a self-report questionnaire as a data collection tool, and self-report bias is possible. Boarding students’ responses may be influenced by subjective feelings, social expectations, and memory bias, which may affect the accuracy of the results. Future studies may use a multi-method research design that incorporates objective assessment tools such as physiological measures and behavioral observations to increase the reliability and validity of the findings.

This study only considered the mediating role of parent–child and peer relationships in the relationship between perceived stress and school adjustment among boarding students. Still, there may be other possible mediating variables that were not considered. Future research could explore other potential mediating variables, such as individual traits, psychological processes, and social support, to understand the relationship between boarding students’ perceived stress and school adjustment.

Finally, this study did not consider other possible influencing factors, such as gender, age, and family economic status, that may have impacted boarding students’ perceptions of stress and school adjustment. Future research could explore the role of these factors in boarding students’ perceptions of stress and school adjustment to more fully understand this relationship.

Overall, although this study found essential roles for perceived stress, parent–child relationships, and peer relationships in boarding students’ school adjustment, some limitations remain. Future research can further refine the study design, expand the sample size, and adopt a multi-method study to explore the relationship between perceived stress and school adjustment among boarding students. Future research can also consider other

potential influencing factors to provide more accurate and effective guidelines for practical interventions and support.

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Conflict of interest

The authors declare no conflicts of interest.

Ethical Approval

The study was carried out in compliance with the Helsinki Declaration and was authorised by the Ethics Committee of Sultan Idris Education University (protocol code 2022-0716-02 and 31 January 2023 of approval). Researchers followed standard procedures and guidelines concerning data collection, storage and usage that are common in human subjects research. In addition, informed consent from parents and/or legal guardians for study participation has been obtained and archived by corresponding authors.

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Informed Consent

The researcher obtained active informed consent from parents, and children were given the option to decline participation or refuse to answer any questions. If a child chose not to participate or declined to answer, they had the freedom to inform the researcher and discontinue their involvement.

Data Availability

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

References

- Abraham, M. M., & Kerns, K. A. (2013). *Positive and negative emotions and coping as mediators of mother-child attachment and peer relationships* [doi:10.1353/mpq.2013.0023]. Wayne State University Press.
- Akgun, S., & Ciarrochi, J. (2003, 2003/06/01). Learned Resourcefulness Moderates the Relationship Between Academic Stress and Academic Performance. *Educational psychology*, 23(3), 287-294. <https://doi.org/10.1080/0144341032000060129>
- Bronfenbrenner, U. (1992). Ecological systems theory. In *Six theories of child development: Revised formulations and current issues*. (pp. 187-249). Jessica Kingsley Publishers.
- Bronstein, P., Duncan, P., D'Ari, A., Pieniadz, J., Fitzgerald, M., Abrams, C. L., Frankowski, B., Franco, O., Hunt, C., & Oh Cha, S. Y. (1996). *Family and parenting behaviors predicting middle school adjustment: A longitudinal study* [doi:10.2307/585171]. Blackwell Publishing.
- Buchanan, C. M., Maccoby, E. E., & Dornbusch, S. M. (1991). Caught Between Parents: Adolescents' Experience in Divorced Homes. *Child Development*, 62(5), 1008-1029. <https://doi.org/10.1111/j.1467-8624.1991.tb01586.x>
- Buhs, E. S. (2005, 2005/11/01/). Peer rejection, negative peer treatment, and school adjustment: Self-concept and classroom engagement as mediating processes. *Journal of School Psychology*, 43(5), 407-424. <https://doi.org/https://doi.org/10.1016/j.jsp.2005.09.001>
- Cattley, G. (2004, 2004/01/01). The Impact of Teacher-Parent-Peer Support on Students' Well-being and Adjustment to the Middle Years of Schooling. *International Journal of Adolescence and Youth*, 11(4), 269-282. <https://doi.org/10.1080/02673843.2004.9747935>
- Chin, W. W. (1998). The partial least squares approach for structural equation modeling. *Modern methods for business research.*, 295(2), 295-336. (Methodology for business and management.)
- Erath, S. A., Flanagan, K. S., & Bierman, K. L. (2008). Early adolescent school adjustment: Associations with friendship and peer victimization. *Social Development*, 17(4), 853-870. <https://doi.org/10.1111/j.1467-9507.2008.00458.x>
- Gao, J.-L., Wang, L.-H., Yin, X.-Q., Hsieh, H.-F., Rost, D. H., Zimmerman, M. A., & Wang, J.-L. (2021, 2021/05/01). The promotive effects of peer support and active coping in relation to negative life events and depression in Chinese adolescents at boarding schools. *Current Psychology*, 40(5), 2251-2260. <https://doi.org/10.1007/s12144-019-0143-5>
- Haciomeroglu, B., & Karanci, A. N. (2014). Perceived Parental Rearing Behaviours, Responsibility Attitudes and Life Events as Predictors of Obsessive Compulsive Symptomatology: Test of a Cognitive Model. *Behavioural and Cognitive Psychotherapy*, 42(6), 641-652. <https://doi.org/10.1017/S1352465813000581>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., & Thiele, K. O. (2017, 2017/09/01). Mirror, mirror on the wall: a comparative evaluation of composite-based structural equation modeling methods. *Journal of the Academy of Marketing Science*, 45(5), 616-632. <https://doi.org/10.1007/s11747-017-0517-x>
- Hair Jr, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). *Partial least squares structural equation modeling (PLS-SEM) using R: A workbook*. Springer Nature.

- Hampel, P., & Petermann, F. (2006, 2006/04/01/). Perceived stress, coping, and adjustment in adolescents. *Journal of Adolescent Health*, 38(4), 409-415. <https://doi.org/https://doi.org/10.1016/j.jadohealth.2005.02.014>
- Kanga, B. M. (2017). Gender comparison in the effectiveness of guidance and counselling services in enhancing students' adjustment to school environment in boarding secondary schools in kenya. *International Journal of Advanced Engineering Research and Science (IJAERS)*, 4(3), 1-14. <https://doi.org/10.22161/ijaers.4.3.1>
- Kanga, B. M., Nyaga, V. K., Barchok, H. K. e., & Ngari, S. M. (2015). Effectiveness of Guidance and Counselling Services in Enhancing Students' Adjustment to School Social Environment in Public Boarding Secondary Schools in Kenya. *Research on Humanities and Social Sciences*, 5(16), 80-86. <https://www.iiste.org/Journals/index.php/RHSS/article/view/25168/25772>
- Konstantoni, K. (2012, 2012/08/01). Children's peer relationships and social identities: exploring cases of young children's agency and complex interdependencies from the Minority World. *Children's Geographies*, 10(3), 337-346. <https://doi.org/10.1080/14733285.2012.693382>
- Lakhani, P. K., Jain, K., & Chandel, P. K. (2017). School adjustment, motivation and academic achievement among students. *International Journal of Research in Social Sciences*, 7(10), 333-348.
- Lan, X., Scrimin, S., & Moscardino, U. (2019, 2019/02/01/). Perceived parental guan and school adjustment among Chinese early adolescents: The moderating role of interdependent self-construal. *Journal of adolescence*, 71, 18-27. <https://doi.org/https://doi.org/10.1016/j.adolescence.2018.12.003>
- Lantagne, A., Peterson, R. L., Kirkwood, M. W., Taylor, H. G., Stancin, T., Yeates, K. O., & Wade, S. L. (2018). Featured Article: Interpersonal Stressors and Resources as Predictors of Adolescent Adjustment Following Traumatic Brain Injury. *Journal of Pediatric Psychology*, 43(7), 703-712. <https://doi.org/10.1093/jpepsy/jsy020>
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer publishing company.
- Mander, D. J., Lester, L., & Cross, D. (2015). The social and emotional well-being and mental health implications for adolescents transitioning to secondary boarding school. *International Journal of Child and Adolescent Health*, 8(2), 131-140.
- MOE of PRC. (2017). *Reply of the Ministry of Education to the Proposal No. 3867 of the Fifth Session of the 12th National People's Congress*. http://www.moe.gov.cn/jyb_xxgk/xxgk_jyta/jyta_jijiaosi/201712/t20171219_321861.html
- Muller, C. (2018). Parent involvement and academic achievement: An analysis of family resources available to the child. In *Parents, their children, and schools* (pp. 77-114). Routledge.
- Mulyadi, S., Rahardjo, W., & Basuki, A. M. H. (2016, 2016/02/05/). The Role of Parent-child Relationship, Self-esteem, Academic Self-efficacy to Academic Stress. *Procedia - Social and Behavioral Sciences*, 217, 603-608. <https://doi.org/https://doi.org/10.1016/j.sbspro.2016.02.063>
- Pascoe, M. C., Hetrick, S. E., & Parker, A. G. (2020, 2020/12/31). 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/10.1080/02673843.2019.1596823>

- Ratelle, C. F., Duchesne, S., & Guay, F. (2017, 2017/01/01/). Predicting school adjustment from multiple perspectives on parental behaviors. *Journal of adolescence*, 54, 60-72. <https://doi.org/https://doi.org/10.1016/j.adolescence.2016.11.008>
- Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*. John Wiley & sons.
- Shoshani, A., & Slone, M. (2013, 2013/08/01). Middle School Transition from the Strengths Perspective: Young Adolescents' Character Strengths, Subjective Well-Being, and School Adjustment. *Journal of Happiness Studies*, 14(4), 1163-1181. <https://doi.org/10.1007/s10902-012-9374-y>
- Simons-Morton, B. G., & Crump, A. D. (2003). Association of parental involvement and social competence with school adjustment and engagement among sixth graders. *Journal of school health*, 73(3), 121-126. <https://doi.org/10.1111/j.1746-1561.2003.tb03586.x>
- Tian, L., Liu, L., & Shan, N. (2018, 2018-June-21). Parent-Child Relationships and Resilience Among Chinese Adolescents: The Mediating Role of Self-Esteem [Original Research]. *Frontiers in Psychology*, 9. <https://doi.org/10.3389/fpsyg.2018.01030>
- Wahab, S., Rahman, F. N. A., Wan Hasan, W. M. H., Zamani, I. Z., Arbaiei, N. C., Khor, S. L., & Nawi, A. M. (2013). Stressors in secondary boarding school students: Association with stress, anxiety and depressive symptoms. *Asia-Pacific Psychiatry*, 5, 82-89. <https://doi.org/10.1111/appy.12067>
- Yang, T., & Huang, H. (2003). An epidemiological study on stress among urban residents in social transition period. *Chinese Journal of Epidemiology*, 24(9), 11-15. <https://doi.org/10.3760/j.issn:0254-6450.2003.09.004>
- Yin, X.-Q., Wang, L.-H., Zhang, G.-D., Liang, X.-B., Li, J., Zimmerman, M. A., & Wang, J.-L. (2017, 2017/10/01/). The promotive effects of peer support and active coping on the relationship between bullying victimization and depression among chinese boarding students. *Psychiatry research*, 256, 59-65. <https://doi.org/https://doi.org/10.1016/j.psychres.2017.06.037>
- Zhang, Y.-Y., Wu, Y.-Y., Ye, Y.-D., Ye, H., & Xiong, M. (2021). Father involvement and school adjustment of rural boarding students: The Mediate Effect of Self-control and The Moderate Effect of Relative Deprivation. *Journal of Psychological Science*, 44(6), 1354. <https://doi.org/10.16719/j.cnki.1671-6981.20210610>
- Zhang, Y., Zhang, X., Zhang, L., & Guo, C. (2019, 2019-February-28). Executive Function and Resilience as Mediators of Adolescents' Perceived Stressful Life Events and School Adjustment [Original Research]. *Frontiers in Psychology*, 10. <https://doi.org/10.3389/fpsyg.2019.00446>
- Zhou, Z., Zhao, D., Sun, X., & Ding, X. (2006). Children's experiences with peers and loneliness: A two-year longitudinal study. *Acta Psychologica Sinica*, 38(05), 743-750. <https://journal.psych.ac.cn/acps/EN/Y2006/V38/I05/743>
- Zou, H., Qu, Z., & Ye, Y. (2007). The characteristics of teacher-student relationships and its relationship with school adjustment of students. *Psychological development and education*, 23(4), 77-82. <https://doi.org/10.3969/j.issn.1001-4918.2007.04.014>