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Parent-Child Attachment and Middle School Students' Depression: The Mediating Role of Intolerance of Uncertainty and Moderation of Emotion Regulation

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Abstract

This study aims to investigate the mediating role of Intolerance of uncertainty and moderating role of emotional regulation in the effect of parent-child attachment on middle school students' depression. A total of 450 questionnaires were distributed, and 400 valid questionnaires were collected, with an effective rate of 88.8%. Mplus7.4 was used to test for common method bias, SPSS 25.0 was used to perform descriptive statistics, reliability analysis, and correlation analysis on the data, and Model 4 in the SPSS macro PROCESS program was used to test the mediation effect, and Model 14 was used to test the moderation effect. The results show that intolerance of uncertainty partially mediates the relationship between parent-child attachment and students' depression. Results show that emotion regulation plays a moderating role in the relationship between intolerance of uncertainty and depression.

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INTRODUCTION

Depression is a common mental health problem during this period, mainly manifested by low mood, slow thinking, decreased interest, physical discomfort (Dugyala& Poyrazli, 2021). Adolescent depression has become a mental health problem that cannot be ignored. The family is the soil for adolescents to learn and grow, and has an important impact on the mental health development of adolescents. Parent-child attachment is a special emotional bond established between a child and the primary caregiver (Ali et al., 2021).

According to attachment theory, a safe and warm parent-child relationship is crucial to the mental health of adolescents (Ferreira et al., 2024). Some studies have shown that insecure parent-child attachment between parents and children may be one of the main causes of depression in adolescents, and adolescents with secure attachment are less at risk of developing depressive symptoms (Spruit et al., 2020; Iwanski et al., 2021). These research results illustrate that high-quality parent-child attachment is one of the predictors of depression in adolescents.

In addition to family environmental factors, adolescent depression is also affected by individual factors (Zhou et al., 2021). Incorrect cognitive evaluation of life events in adolescents is also a major cause of depression. Intolerance of uncertainty reflects an individual's cognitive bias in perceiving, interpreting, and reacting to uncertain situations or events (Carnahan et al., 2022). Prior research has confirmed that intolerance of uncertainty is significantly related to depression and can predict the level of depression in adolescents (Andrews et al., 2023).

Intolerance of uncertainty is also related to individual attachment styles. Research has found that individuals who have experienced secure attachment in early childhood show more active exploration characteristics in the face of uncertain environments and are less intolerant of uncertainty; conversely, individuals who have experienced insecure attachment are less able to tolerate uncertainty in uncertain environments. Being more in a passive state, tending to view uncertainty as stress, their intolerance of uncertainty is higher (Yildiz & Iskender, 2021).

In a longitudinal study, Zdebik et al. (2018) found that ambivalent and disorganized attachment styles are risk factors for individuals to develop high intolerance of uncertainty, and the findings indicate that these insecure attachment styles in childhood can predict individual Intolerable levels of uncertainty in adulthood 15 years later.

Emotion regulation refers to an individual's ability to identify and adjust emotion regulation strategies to adapt to specific situational needs (Aydın & Ünlü Kaynakçı, 2022; Specker et al., 2024). This ability to flexibly choose strategies can help individuals release negative emotions to achieve the purpose of readaptation (Kamel,2018; Saad & Omaima, 2020). Studies have found that individuals with high emotion regulation can better cope with stress (Galatzer-Levy et al., 2012) and reduce the clinical manifestations of most depressive symptoms (Gao et al., 2013), while people with impaired emotion regulation show higher levels of depression (Chen & Bonanno, 2021).

Emotion regulation can not only enable individuals to reduce negative emotions in response to stress challenges, but also protect individuals when risk factors appear. For example, Bonanno et al. (2011) found that college students with high flexibility had lower levels of stress after trauma exposure. In contrast, college students with low flexibility were more stressed under conditions of high trauma exposure. Individual differences in cognition have different effects on emotion regulation. According to uncertainty reinforcement theory, individuals who cannot tolerate higher levels of uncertainty will regard upcoming events as stressful and negative, and have stronger unpleasant emotions. At the same time, they tend to adopt maladaptive strategies, such as avoidance and withdrawal, to avoid or control their emotional experiences (Kamel, 2018).

This extreme emotional feeling and limited regulatory ability reflect that individuals with high intolerance to uncertainty cannot regulate emotions adaptively, that is, they have poor ability to flexibly choose strategies according to the situation. Zhang (2019) found that intolerance to uncertainty can significantly negatively predict adults' emotion regulation, which in turn affects the negative emotions they experience in subsequent tasks. It can be inferred that individuals with high emotion regulation can flexibly choose and adjust strategies according to different situations, and they have relatively less depression caused by intolerance to uncertainty; while individuals with low emotion regulation, because they cannot flexibly choose effective regulation strategies, they may cause more depression due to intolerance to uncertainty.

Based on the above research, this study aims to investigate the mediating role of Intolerance of uncertainty and moderating role of emotional regulation in the effect of parent-child attachment on middle school students' depression.

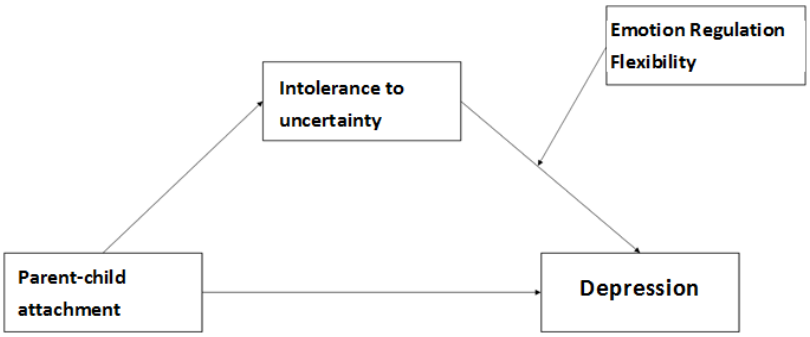
This study constructed a moderated mediation model to examine the impact of parent-child attachment on adolescent depression, as well as the mediating role of intolerance of uncertainty and the moderating role of emotion regulation (See Figure 1).

HYPOTHESES

H1: Intolerance to uncertainty mediates the relationship between parent-child attachment and adolescent depression.

H2: Emotion regulation moderates the relationship between intolerance to uncertainty and adolescent depression.

Figure 1. *Proposed Model for The Impact of Parent-Child Attachment On Students Depression*



METHODS

SAMPLE

A random sampling method was adopted, and paper questionnaires were distributed in 3 middle schools in Cairo City. A total of 450 questionnaires were distributed, and 400 valid questionnaires were collected, with an effective rate of 88.8%. Students were aged between 13 and 15 years old (M = 14.00, SD = 1.60). They were in middle school. All speak Arabic language, with normal IQ. Among them, there were 180 boys (45%) and 220 girls (55%) (See Table 1).

Table1. *Demographic Characteristics of Participants in the Study*

	Variable	N	%
Gender	Male	180	45
	Female	220	55
Parent Age	25-29	200	50
	30-35	120	30
	36-40	80	20
Education status	Primary school	100	25
	Middle school	100	25
	Graduate	200	50
Number of siblings	1	100	25
	2	80	20
	3	120	30
	more than 3	100	25

MEASUREMENT TOOLS

Parent-Child Attachment Scale (Yin et al., 2021). This scale encompassed three sub-scales of mother-child attachment, father-child attachment, and peer attachment. Each sub-scale contained 10 questions measuring three dimensions (trust, communication, and alienation). A five-point scale from 1 (never) to 5 (always) was employed. Higher scores indicated the higher quality of attachment. Two subscales of mother-child attachment and father-child attachment were selected. The Scale was translated into Arabic. The translation was performed independently by two assistant professors in English department. The two translations were compared. Subsequently, a third assistant professor in English department translated the Arabic version back into English to confirm equivalence with the original. The scale has internal reliability of r=. 91 and test-retest reliability of .75.

Intolerance of uncertainty questionnaire (Tezi, 2022). The scale is a self-report 5-point Likert scale for adults ("1" is not suitable for me at all, "2" is slightly suitable for me, "3" is somewhat suitable for me, "4" is very suitable for me and "5" is completely suitable for me). It is a suitable scale. Item 1 of the scale is reverse coded. The total score that can be obtained from the scale varies between 12 and 60. Higher scores indicate higher intolerance of uncertainty. The internal consistency and validity and reliability of the Intolerance of Uncertainty Scale, which consists of 12 items, have been demonstrated. The scale has internal reliability of r=. 93 and test-retest reliability of .78.

Emotion Regulation Questionnaire (Huang et al., 2014). The scale has 10 items, divided into two dimensions: evaluation flexibility and expression flexibility. A 7-point scoring system is used, and the higher the total score, the better the emotion regulation. The Scale was translated into Arabic. The translation was performed independently by two assistant professors in English department. The two translations were compared. Subsequently, a third assistant professor in English department translated the Arabic version back into English to confirm equivalence with the original. The Cronbach's α coefficient of the scale in this study is 0.90.

Depression scale: The Center for Epidemiological Survey Depression Scale (CES-D; Radloff (1977) was used to measure the depression of adolescents. The scale is a single dimension with 20 items and a 4-point scoring system to assess the frequency of depression in the individual "in the past week". Some items were reverse-scored and added to other items to obtain the total score of the scale. The higher the total score, the higher the degree of depression. The Cronbach's α coefficient of the scale in this study was 0.90.

DATA ANALYSIS

Mplus7.4 was used to test for common method bias, SPSS 25.0 was used to perform descriptive statistics, reliability analysis, and correlation analysis on the data, and Model 4 in the SPSS macro PROCESS program (Hayes, 2013) was used to test the mediation effect, and Model 14 was used to test the moderation effect.

RESULTS

TESTING FOR COMMON BIAS

The data in this study come from subjects' self-reports, and there may be common method bias, so the test was conducted by controlling for unmeasured potential method factors. A two-factor model is established, and a method factor with all items as indicators is added to the original trait factor. If the trait factor model and the two-factor model are significantly different, it indicates the existence of serious common method bias. The results show: ΔCFI = 0.032, ΔTLI = 0.030, ΔRMSEA = 0.004, ΔSRMR = 0.015, the changes in CFI and TLI do not exceed 0.1, and the changes in RMSEA and SRMR do not exceed 0.05, indicating that there is no serious common method bias.

DESCRIPTIVE STATISTICS AND CORRELATION ANALYSIS

The results in Table 2 show that father-child attachment and mother-child attachment are significantly positively correlated with emotional regulation flexibility and significantly negatively correlated with intolerance of uncertainty and depression; intolerance of uncertainty is significantly negatively correlated with emotional regulation flexibility. , was significantly positively correlated with depression; emotional regulation flexibility was significantly negatively correlated with depression.

Table 2. *Descriptive Statistics and Correlation Analysis Results*

	M	*SD*	1	2	3	4	5
1 Father-child attachment	44.90	5.13	1				
2 Mother-son attachment	52.66	4.19	0.50***	1			
3 Intolerance of uncertainty	29.87	3.16	−0.29***	−0.30***	1		
4 Emotional regulation flexibility	48.30	4.20	0. 40***	0.37***	−0.30***	1	
5 Depression	21.55	4.88	−0.43***	−0.50***	0.54***	−0.39***	1

Note: ***p < 0.001.

TEST OF MODERATED MEDIATION EFFECTS

First, Model 4 in the PROCESS macro was used to test the mediating effect of intolerance of uncertainty between parent-child attachment and depression. The results show that father-child attachment has a negative predictive effect on intolerance of uncertainty (β = −0.28, t = − 9.66, p < 0.001), and intolerance of uncertainty has a positive predictive effect on depression. (β = 0.47, t = 20.06, p < 0.001), father-child attachment can significantly negatively predict depression (β = −0.37, t = −15.81, p < 0.001). The Bootstrap method test shows that the mediation should be −0.11, and the 95% confidence interval is [−0.14, −0.08], indicating that intolerance of uncertainty plays a partial mediating role between father-child attachment and depression, and the mediating effect accounts for 23.10% of the total effect. Mother-child attachment has a significant predictive effect on intolerance of uncertainty (β = −0.29, t = −10.12, p < 0.001), and intolerance of uncertainty has a significant predictive effect on depression (β = 0.43, t = 17.41, p < 0.001), mother-child attachment can directly predict depression (β = −0.38, t = −16.36, p < 0.001). The Bootstrap test showed that the mediating effect was −0.12, and the 95% confidence interval was [−0.15, −0.09], indicating that intolerance of uncertainty also played a partial mediating role between mother-child attachment and depression, and the mediating effect accounted for 23.29% of the total effect. Secondly, Model 14

was used to test the moderating effect of spirituality on emotion regulation. The results are shown in Table 3 and Table 4. The interaction term between emotion regulation and intolerance of uncertainty has a significant predictive effect on depression, indicating that emotion regulation plays a moderating role in the relationship between intolerance of uncertainty and depression.

Table 2. *Testing the Mediation with Father-Child Attachment as Independent Variable*

	Outcome variable: Intolerance of uncertainty			*Outcome variable: Depression*		
	β	*t*	95% CI	*β*	*t*	95% CI
Gender	−0.11	−2.11	[−0.23, 0.02]	0.18	4.01***	[0.07, 0.27]
Grade	0.02	0.28	[−0.02, 0.03]	−0.03	−3.02**	[−0.07, −0.01]
Father-child attachment	−0.28	−9.66***	[−0.32, −0.24]	−0.30	−13.00***	[−0.32, −0.20]
Intolerance of uncertainty				0.47	19.87***	[0.42, 0.47]
Emotion Regulation				−0.27	−10.13***	[−0.24, −0.17]
Interaction				−0.06	−3.12**	[−0.10, −0.02]
R2		0.06			0.44	
F		27.12***			170.11***	

Table 4. *Testing the Mediation with Mother-Child Attachment as Independent Variable*

	Outcome variable: Intolerance of uncertainty			*Outcome variable: Depression*		
	β	*t*	95% CI	*β*	*t*	95% CI
Gender	−0.08	−1.44	[−0.20, 0.05]	0.21	3.89***	[0.14, 0.28]
Grade	0.00	0.26	[−0.02, 0.03]	−0.05	−3.00**	[−0.07, −0.01]
Father-child attachment	−0.29	−10.12***	[−0.35, −0.24]	−0.34	−13.00***	[−0.37, −0.29]
Intolerance of uncertainty				0.43	17.41***	[0.37, 0.43]
Emotion Regulation				−0.24	−10.01***	[−0.28, −0.20]
Interaction				−0.05	−3.11**	[−0.10, −0.02]
R2		0.06			0.45	
F		25.77***			176.22***	

Figures 2 and 3 show the effect of emotional regulation flexibility, which was divided into high and low according to plus or minus one standard deviation for a simple slope test. In father-child attachment, when emotion regulation is low, intolerance of uncertainty has a significant positive predictive effect on depression (β = 0.48, t = 17.22, p < 0.001); when emotion regulation is high When, the predictive effect of intolerance of uncertainty on depression was significantly slowed down (β = 0.40, t = 11.66, p < 0.001). In mother-child attachment, when emotion regulation is low, uncertainty depression has a significant positive predictive effect (β = 0.45, t = 12.33, p < 0.001); when emotion regulation is high, the predictive effect of intolerance of uncertainty on depression was significantly slowed down (β = 0.35, t = 10.88, p < 0.001). The results all show that the impact of intolerance of uncertainty on depression will decrease as situational adjustment flexibility increases.

Figure 2. *The Moderated Effect of Emotional Regulation Flexibility in Father-Child Attachment*

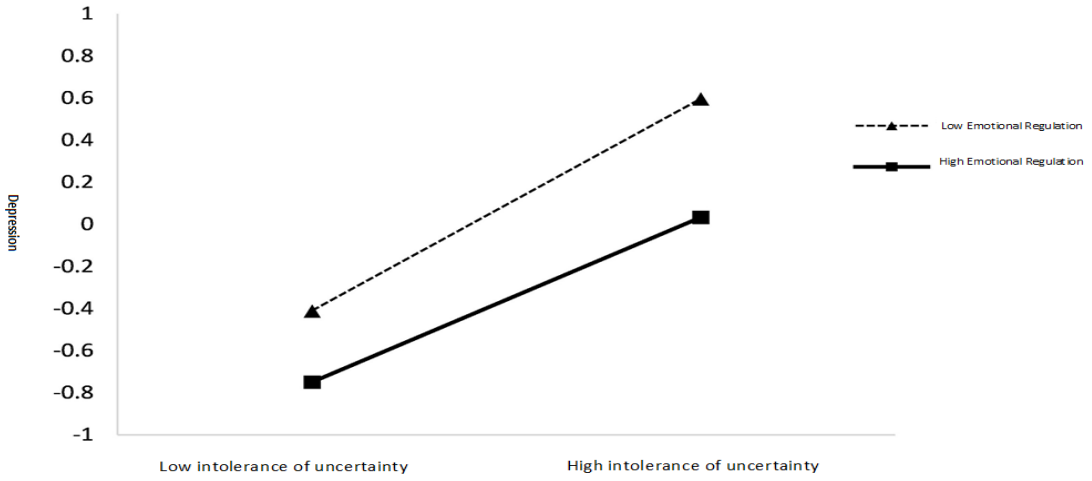
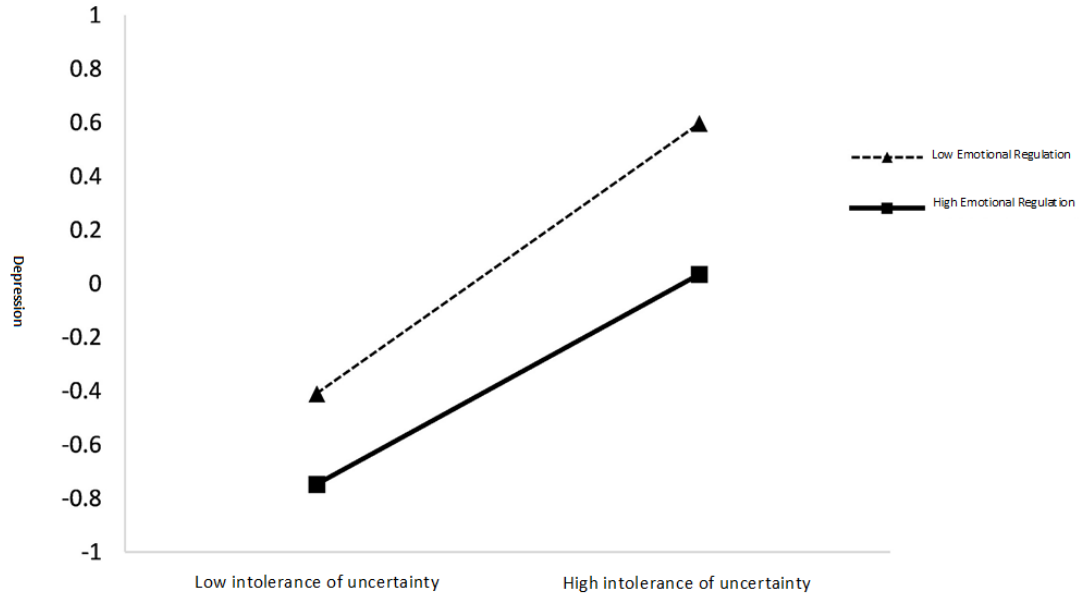


Figure 3. *The Moderated Effect of Emotional Regulation Flexibility in Mother-Child Attachment*



DISCUSSION

THE MEDIATING ROLE OF INTOLERANCE OF UNCERTAINTY

Aligned with prior theoretical and empirical research (Carleton, 2016; Einstein, 2014; Hebert and Dugas, 2019; Sahib et al., 2023), the results show that intolerance of uncertainty partially mediates the relationship between parent-child attachment and students' depression. Parent-child attachment can not only directly predict students' depression, but also indirectly affect depression through the mediating effect of intolerance of uncertainty. Secure parent-child attachment will enable adolescents to explore the surrounding environment more confidently and adopt effective emotion regulation strategies when facing negative emotions. On the contrary, adolescents with insecure parent-child attachment are prone to form negative self-representations and representations of others, and adopt avoidance strategies. Destructive adjustment strategies, leading to negative emotions such as depression and anxiety (Eilert & Buchheim, 2023). The results of this

study once again confirm that high-quality parent-child attachment can reduce depressive symptoms in adolescents (Rodrigues et al., 2024).

In addition, results show that parent-child attachment significantly and negatively predicts intolerance of uncertainty, and intolerance of uncertainty significantly and positively predicts depression. Previous research has shown that individuals who experience secure attachment have lower levels of intolerance of uncertainty (Brown & Whiteside, 2008), while individuals who experience insecure attachment have higher levels of intolerance of uncertainty (Yüksel, 2014). Securely attached individuals regard the attachment object as a "safe base", have the motivation to actively explore when facing uncertain environments, and can adopt effective coping strategies to resolve uncertainty and reduce the resulting negativity.

On the contrary, individuals with insecure attachment are worried about their ability to effectively cope with uncertain environments, and are more eager to obtain certainty (Cooke et al., 2019). Therefore, they regard uncertainty as a threat and adopt avoidance, procrastination, and impulsive decision-making and other negative coping methods, which in turn leads to an increase in negative emotions (Yildiz & Iskender, 2021). The above results suggest that a safe and warm parent-child relationship can effectively reduce the level of intolerable uncertainty in adolescents and reduce the risk of depression in adolescents.

THE MODERATING ROLE OF EMOTIONAL REGULATION

Results show that emotion regulation plays a moderating role in the relationship between intolerance of uncertainty and depression. Among adolescents with low emotion regulation, the impact of intolerance of uncertainty on depression is stronger. With the level of emotion regulation, the impact of intolerance of uncertainty on adolescent depression was significantly reduced. On the one hand, the results of this study confirm that emotion regulation can serve as a protective factor for individual mental health. Previous research has found that emotional regulation affects an individual's environmental adaptability and mental health. High emotional regulation can enable college students to better cope with stress (Galatzer-Levy et al., 2012).

CONCLUSIONS

The results of this study suggest that adolescents' emotion regulation may play a protective role against the negative effects of intolerance of certainty. Therefore, parents and teachers need to cultivate adolescents' sensitivity to the environment, enrich their adaptive strategies for regulating emotions, and pay attention to their emotional states in a timely manner to improve their emotional regulation flexibility and promote healthy mental development.

LIMITATIONS

This study has some limitations. First, the study adopted a cross-sectional questionnaire survey method, so the causal relationship between variables cannot be directly confirmed. In the future, longitudinal follow-up research can be used to explore the causal relationship between variables. Second, the study only verified the mediating effect of intolerance of uncertainty and the moderating effect of emotional regulation flexibility. Future research can add more variables to the model to explore the impact mechanism of parent-child attachment on adolescent depression.

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