
Association between parental marital conflict and Internet addiction: A moderated mediation analysis

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Highlights

- The effect of parental marital conflict on Internet addiction was mediated by depression and anxiety.
- Peer attachment moderated the association between parental conflict and depression/anxiety.
- A moderated mediation analysis may provide a better understanding of the mechanism underlying association between parental marital conflict and Internet addiction.

Abstract

Background: The effect of parental marital conflict on Internet addiction has been well-established; however, little is known regarding the underlying mechanism of this effect. The aim of this study was to explore the mediating effect of depression and anxiety, as well as the role of peer attachment as a moderator in this relation between parental marital conflict and Internet addiction.

Methods: The moderated mediation analysis was tested using data from a cross-sectional sample of 2259 high school students who completed questionnaires regarding marital conflict, depression, anxiety, peer attachment and Internet addiction.

Results: The results indicated that the effect of parental marital conflict on Internet addiction was mediated by depression and anxiety. In addition, peer attachment moderated the association between parental marital conflict and depression/anxiety.

Conclusions: This study helps to elucidate the mechanism underlying the association between parental marital conflict and Internet addiction.

Keywords: parental marital conflict; depression; anxiety; peer attachment; Internet addiction; moderated mediation analysis

1. Introduction

In the era of modern technology, the Internet has become an essential component of our daily life. As of December 2017, the number of Internet users reached 772 million in China, the largest proportion of which was the student group, accounting for 25.4% (China Internet Network Information Center, 2018). Excessive or problematic use of the Internet has been a worldwide phenomenon and is increasingly common in adolescents. Internet addiction (IA) is described as an impulse control problem with an inability to control Internet use that results in a deleterious influence on major life domains (Young, 1998). Internet addiction was significantly associated with numerous negative influences, such as psychological problems, physical problems, poor sleep quality and academic performance (Bener, 2017, Kim et al., 2017, Ko et al., 2012, Upadhayay and Guragain, 2017). However, Internet addiction in adolescents did not bring sufficient attention to the school and family.

Family is the major living environment holding an important influence over the socialization of children (Lovelandcherry, 2000). A poor family environment may reduce adolescents' sense of security and may significantly increase the risk of individuals' psychological and behavioral problems. The family system theory (Ackerman, 1984, Bowen, 1966) considers family to be a basic emotional unit that has the quality of maintaining the homeostasis of the system. It may be easy to disrupt the system if parents have conflicts with each other. When children perceive the system instability brought about by parental marital conflict, they may engage in problematic behavior. Consistent with this theory, several empirical studies found that parental marital conflict could contribute to Internet addiction (Wu et al., 2016, Yang et al., 2016). A prospective investigation revealed that parental marital conflict was the greatest predictor of Internet addiction (Ko et al., 2015).

While the association between parental marital conflict and Internet addiction has been confirmed by relevant studies, the mediating (how to influence) and moderating (when the influence is more significant) mechanisms underlying this association warrant further investigation.

A line of theory and empirical studies showed that perceptions of interparental conflict have adverse effects on children's psychological well-being. Exposure to parental marital conflict leaves children in an emotionally unpleasant family environment, which children are more susceptible to perceive as they become older (Turner and Barrett, 1998). Parental marital conflict, as an important stressor in the lives of children, is one of the most powerful correlates of an individual's mental health problems (Hayatbakhsh et al., 2013). According to the cognitive-contextual framework (Grych and Fincham, 1990), the appraisal of meaning of parental marital conflict is correlated to how children function. This theory states that children make cognitive appraisal, ascription of blame and expectations regarding the coping efficacy. Children who blame themselves for parental conflict may exhibit depression, while children who perceive the conflict as a threat to the appraisal of being

may suffer from anxiety. The emotional security hypothesis (Davies and Cummings, 1994) indicated that the constant parental conflict could lead to a child's sense of emotional insecurity. Not only a long-term negative emotional state but also the inappropriate parental conflict ascription of blame will increase the risk of mental health problems, such as depression and anxiety. In addition, a systematic review demonstrated that depression is one of the most important co-morbid disorders with Internet addiction (Carli et al., 2013). Several studies reported depression as a causal factor predicting IA in the follow-up period (Bin et al., 2013, Ko et al., 2009). A longitudinal study found stability in the relationship between anxiety and IA over time (Stavropoulos et al., 2017). Both depression and anxiety were significantly associated with IA (Kim et al., 2016). Individuals with negative feelings may use the Internet as a self-medication measure to cope with mental health problems (Khantzian, 1991, Lai et al., 2015). When the Internet user experiences the relief of depression and anxiety temporarily, he is vulnerable to addiction (Bozkurt et al., 2013). Thus, we proposed the following hypothesis:

Hypothesis 1: Depression and anxiety would mediate the association between parental marital conflict and Internet addiction. Specifically, parental marital conflict would be positively associated with depression and anxiety, which would, in turn, be positively associated to Internet addiction.

During adolescence, children generally experience a transition from depending on parents to depending on peers (Raja et al., 1992). With the increase in age, adolescents spend more time with their peers; therefore, peers become another environmental factor influencing their development. Individuals with a high level of secure attachment are less inclined to observe stressors and are more prone to seek coping styles against stress actively (Seiffge-Krenke, 2006). Therefore, securely peer attached adolescents might be less influenced by parental marital conflict. A meta-analysis indicated that insecure peer attachment increased an individual's vulnerability to suffer from depression and anxiety (Gorrese, 2015). Compared with a high level of peer attachment, adolescents with a low level of peer attachment are more likely to lack emotional support and will be more likely to experience depression and anxiety. Peer attachment was found to be a moderator in the relationship between exposure to violence and internalizing problems (Salzinger et al., 2011). A multiple mediation model found that good peer relationships may relieve depression of elementary school students, ultimately leading to a low level of Internet addiction (Zhou et al., 2017). Insecure peer attachment may amplify the negative influence of parental marital conflict on IA; however, the relevant empirical studies are relatively scarce. The present study will verify the following hypothesis:

Hypothesis 2: Peer attachment would moderate the indirect association between parental marital conflict and Internet addiction via depression/anxiety. Specifically, the indirect association between parental marital conflict and Internet addiction would be stronger for high school students with lower peer attachment than for those higher in peer attachment (Fig. 1).

2. Methods

2.1. Participants

Participants were students recruited using the convenient method from a senior high school in Jilin Province, China. The well-trained data collector guided participants to complete paper questionnaires in the classroom. A total of 2378 students participated in this study; however, 2259 questionnaires were collected after excluding incomplete ones. The cross-sectional study was conducted from October to November 2017. This study has received approval from the Research Ethical Committee of Jilin University. We obtained verbal consent from school administrators and students before data collection.

2.2. Instruments

2.2.1. Children's perceptions of interparental conflict (CPIC)

Parental marital conflict was assessed using the Chinese version of children's perceptions of interparental conflict (CPIC) (Chi and Xin, 2003). The CPIC scale was developed originally by Grych et al. (1992). We only adopted the characters of conflict subscale, which contained 19 items and three dimensions, including conflict frequency (6 items), conflict intensity (7 items), and conflict resolution (6 items). Items were rated on a 4-point scale extending from 1 (never) to 4 (always). The higher scores represented the higher level of conflict. In this study, the Cronbach's α for the subscale of characters of conflict was 0.91.

2.2.2. Depression, anxiety, stress scale (DASS-21)

The Chinese version of DASS-21, a revision based on the version by Lovibond and Lovibond (1995), was used to measure the level of depression, anxiety and stress over the previous week (Gong et al., 2010). This questionnaire comprises three subscales and each domain consists seven items. We adopted the depression subscale and anxiety subscale, which were answered on a 4-point Likert scale from 0 (did not apply to me at all) to 3 (applied to me very much or most of the time). Higher scores revealed more severe mental health symptoms. In this study, the Cronbach's α for depression subscale and anxiety subscale were 0.86 and 0.79, respectively.

2.2.3. Inventory of parent and peer attachment (IPPA)

Peer attachment was assessed using a subscale from the inventory of parent and peer attachment (IPPA), comprising 25 items (Armsden and Greenberg, 1987). This inventory had three subscales, including trust (10 items), communication (9 items), and alienation (6 items). Each item was scored on a five-point Likert scale (1 = almost never true, 5 = almost always true), with higher scores indicating more secure peer attachment. In this study, the Cronbach's α for peer attachment was 0.93.

2.2.4. Young's diagnostic questionnaire (YDQ)

Internet addiction was assessed using YDQ, which was composed of eight yes (1)/no (0) questions (Young, 1998). The total scores ranged from 0 to 8 with higher scores indicating a higher severity of Internet addiction. Respondents who answered yes to more than 4 questions were classified as Internet addicts. In this study, the Cronbach's α was 0.76.

2.3. Data analysis

We conducted descriptive analysis and correlation analysis for the study variables. Multiple linear regression analysis via SPSS 18.0 and a PROCESS macro were used to assess the mediating effect of depression/anxiety and the moderating effect of peer attachment between parental marital conflict and Internet addiction. We calculated 95% bootstrap confidence intervals (CI) based on 5000 bootstrapped samples.

3. Results

3.1. Sample characteristic

The sample comprised 1,049 males (46.4%) and 1,210 (53.6%) females, with ages ranging from 12 to 19 (Mean = 15.99 years, $SD = 0.94$). There were 1,783 (78.9%) participants who were the only child in the family. The study included 882 (39.1%) students in grade one, 721 (31.9%) students in grade two and 656 (29.0%) students in grade three. Furthermore, a total of 804 (35.6%) participants reported the perceived family income was more than 9,000RMB per month followed by 6,001-9,000RMB 686 (30.4%), 3,001-6,000RMB 563 (24.9%) and less than 3,000RMB 206 (9.1%).

3.2. Preliminary analyses

Means, standard deviations and bivariate correlations for all study variables are presented in Table 1. As expected, parental marital conflict, depression and anxiety were positively correlated with Internet addiction. In contrast, peer attachment was negatively correlated with Internet addiction. In addition, parental marital conflict was positively correlated with depression and anxiety, while parental marital conflict was negatively correlated with peer attachment. Depression and anxiety were negatively correlated with peer attachment.

3.3. Testing for the mediation effect

To test the mediating effects, multiple linear regression analysis (Baron and Kenny, 1986) was used to examine whether depression and anxiety mediate the association between parental marital conflict and Internet addiction. In the first step, parental marital conflict was significantly associated with Internet addiction ($B=0.13$, $\beta=0.29$, $P<0.001$). In the second step, parental marital conflict was significantly associated with depression/anxiety ($B=0.34$, $\beta=0.34$, $P<0.001$ for depression and $B=0.31$, $\beta=0.32$, $P<0.001$ for anxiety). In the third step, when we controlled for parental marital

conflict, depression/anxiety were significantly associated with Internet addiction ($B=0.158$, $\beta=0.343$, $P<0.001$ for depression and $B=0.159$, $\beta=0.351$, $P<0.001$ for anxiety). The effect of parental marital conflict on Internet addiction was reduced, though it remained significant ($B=0.079$, $\beta=0.175$, $P<0.001$ for depression; and $B=0.082$, $\beta=0.182$, $P<0.001$ for anxiety).

In addition, we reconfirmed the indirect effect by employing the PROCESS macro (Model 4) in SPSS to perform the bootstrap method (Preacher and Hayes, 2008). We calculated 95% confident intervals (CI) based on a 5,000 bootstrap resampling. The indirect effects of parental marital conflict on Internet addiction through depression (95% CI= [0.044, 0.063]) and anxiety (95% CI= [0.041, 0.060]) were significant, as zero was not contained in the 95% CI. Thus, we confirmed that depression and anxiety mediated the association between parental marital conflict and Internet addiction.

3.4. Testing for the moderated mediation effect

According to the procedures for testing moderated mediation analysis (Baron and Kenny, 1986), all of the independent variables were mean centered to minimize multicollinearity. Table 2 displays the testing results. First, Model 1 was significant ($F=109.99$, $P<0.001$, $R^2=0.13$). Parental marital conflict was positively related to Internet addiction, whereas peer attachment was negatively related to Internet addiction. The interaction term between parental marital conflict and peer attachment was not related to Internet addiction, which indicated peer attachment did not moderate the association between parental marital conflict and Internet addiction. Second, Model 2 was significant totally ($F=188.03$, $P<0.001$, $R^2=0.20$ for depression; and $F=135.16$, $P<0.001$, $R^2=0.15$ for anxiety). Parental marital conflict was positively related to depression/anxiety, whereas peer attachment was negatively related to depression/anxiety. The interaction term between parental marital conflict and peer attachment was positively related to depression/anxiety, which indicated that peer attachment moderated the association between parental marital conflict and depression/anxiety. Finally, Model 3 was significant ($F=145.35$, $P<0.001$, $R^2=0.21$ for depression; and $F=154.31$, $P<0.001$, $R^2=0.22$ for anxiety). The interaction term between peer attachment and depression/anxiety was not related to Internet addiction, which explained that peer attachment did not moderate the association between depression/anxiety and Internet addiction. Simple slope analyses were utilized to demonstrate the significant interaction at 1 SD below the mean and 1 SD above the mean of peer attachment (See Fig. 2 and Fig. 3). For individual with low levels of peer attachment, higher parental marital conflict was associated with higher depression/anxiety ($B_{\text{simple}}=0.35$, $t=17.01$, $P<0.001$ for depression; $B_{\text{simple}}=0.32$, $t=15.67$, $P<0.001$ for anxiety). However, for high levels of peer attachment individuals, the effect of parental marital conflict and depression/anxiety was still significant but considerably weaker ($B_{\text{simple}}=0.15$, $t=6.17$, $P<0.001$ for depression; $B_{\text{simple}}=0.16$, $t=6.90$, $P<0.001$ for anxiety).

We adopted the PROCESS macro method (Model 7) further to test moderation mediation

(Preacher et al., 2007), which indicated that the indirect effect of parental marital conflict on Internet addiction through depression/anxiety was moderated by peer attachment. The index of moderated mediation was -0.023, SE=0.005, 95%CI= [-0.033, -0.014] for depression and -0.018, SE=0.005, 95%CI= [-0.028, -0.008] for anxiety. For low peer attachment students, parental marital conflict had a negative influence on Internet addiction through depression/anxiety (effect=0.055, SE=0.006, 95%CI= [0.045, 0.067] for depression; effect=0.051, SE=0.006, 95%CI= [0.041, 0.063] for anxiety). In contrast, the indirect effect became weaker as the level of peer attachment increased (effect=0.023, SE=0.005, 95%CI= [0.014, 0.033] for depression; effect=0.026, SE=0.005, 95%CI= [0.016, 0.037] for anxiety).

4. Discussion

During adolescence, high school students are at a critical life transition period, where individuals might experience many physical and psychological changes (Wang et al., 2011). These adolescents are under great academic pressure, especially in China. The adverse effect on high school students resulting from Internet addiction might be more serious than in other groups. This study selected high school students as the participants and formulated a moderated mediation model to investigate the influence of family factor, individual factor and peer factor on Internet addiction. We specifically examined the mediating effect of depression/anxiety on the association between parental marital conflict and Internet addiction and the moderating effect of peer attachment on the indirect path. The results of our study contributed to a better understanding of the potential mechanisms in the development of Internet addiction, which may be helpful for the improvement of high school students' mental health and the prevention of Internet addiction development.

As expected, the effect of parental marital conflict on Internet addiction was mediated by depression and anxiety, which confirmed Hypothesis 1. Simple mediation analyses suggested significant indirect effect for depression and anxiety, revealing that those who were frequently exposed to parental conflict were at an increased risk for depression and anxiety which, in turn, can lead to Internet addiction. In line with the findings of previous studies (Li et al., 2014, Zhang et al., 2017), our findings showed that parental marital conflict was positively associated with Internet addiction. Depression and anxiety were important mechanisms of developing Internet addiction in high school students, which verified the cognitive-behavioral model (Davis, 2001). Internet addiction, which may be an adaptation of negative emotion and stressful life events (Zhao et al., 2017), was a maladaptive coping strategy for parental conflict, depression and anxiety. High school students who are exposed to chronic parental conflict are more likely to suffer from psychological problems due to mental immaturity and lack of family social support. Faced with an insecure family environment, high school students with high levels of depression and anxiety are more inclined to extricate themselves from negative experiences and unpleasant situations through Internet usage (Lu et al., 2017).

Our study indicated that peer attachment played a moderating role in the indirect effect between parental marital conflict and Internet addiction. Specifically, peer attachment moderated the first stage of the indirect path, which means that the association between parental conflict and depression/anxiety relies on the level of peer attachment. The results supported Hypothesis 2. Peer relationships, as an important source of emotional support, influence adolescents' psychosocial functioning (La Greca and Harrison, 2005). Peer attachment could be a protective factor against adverse psychological outcomes (Oldfield et al., 2018). A low level of peer attachment amplified the negative influence of parental conflict on depression and anxiety, while a high level of peer attachment mitigated the negative influence. Peer attachment has been demonstrated to be correlated with a degree of resilience, which can buffer the influence of a stressor (Turner and Barrett, 1998). High school students can share experiences and affection with peers, who may help them treat parental conflict in a healthy way and handle negative emotions.

There are several limitations to this study. First, our study was based on a cross-sectional design, which cannot provide strong evidence for causality. Internet addiction was an outcome variable in this study, though it may conversely affect family factors and mental health. Longitudinal designs need to be used for exploring the directionality of these associations. Second, all of the information in this study stemmed from self-reported questionnaires of participants, which bears the problems of subjectivity and reliability. Last, depression and anxiety had a partial mediating effect on the association of parental marital conflict and Internet addiction, which indicated that there were other mediating variables in this association. This study only determined the moderating effect of peer context. Other contextual factors can be considered in the future.

5. Conclusions

This study helps to elucidate the mechanism underlying association between parental marital conflict and Internet addiction. As high school students are exposed to parental marital conflict more frequently, their level of Internet addiction might be heightened. Parental marital conflict increases the likelihood of Internet addiction by mediating depression and anxiety with insecure peer attachment.

Conflicts of interest

We have no conflicts of interest to disclose.

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Author statement contributors

Tingting Gao, Xiangfei Meng and Songli Mei designed the study. Han Zhang, Yixi Kong, Jinglei Gao, Zeying Qin and Yueyang Hu performed the study. Tingting Gao analyzed the data and drafted the manuscript. Xiangfei Meng and Songli Mei participated in revising the manuscript. All co-authors have read, approve of, and concur with the submitted manuscript and they have made substantial contributions that meet the stated requirements for authorship.

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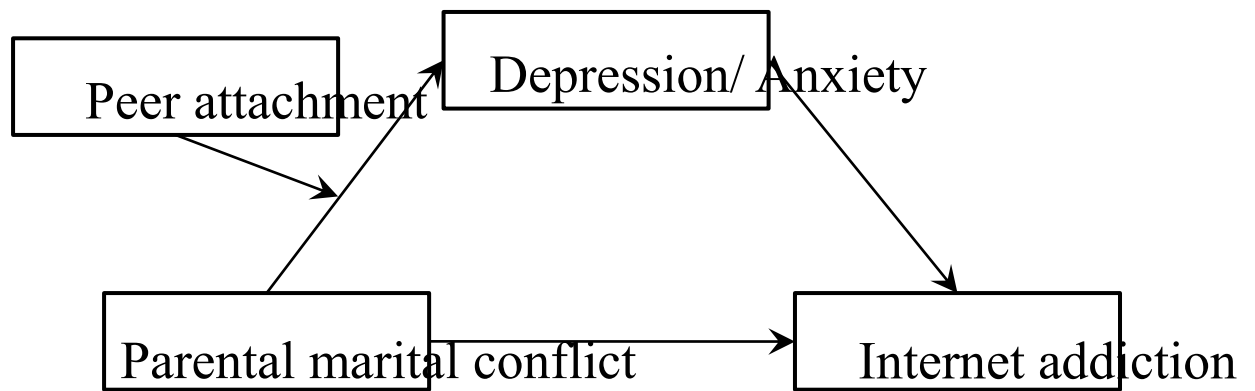


Fig. 1. The conceptual framework of the moderated mediation model.

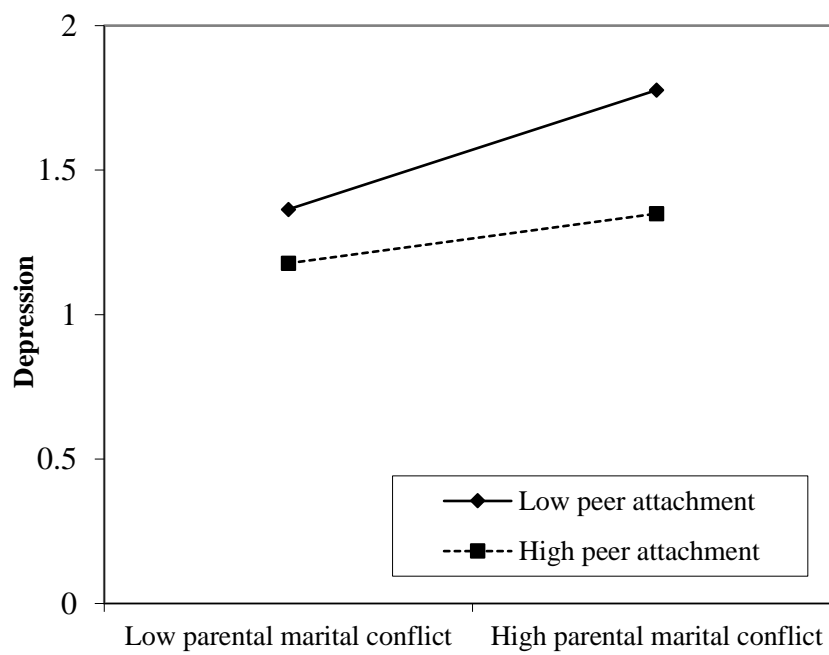


Fig. 2. Peer attachment moderates the effect of parental marital conflict on depression.

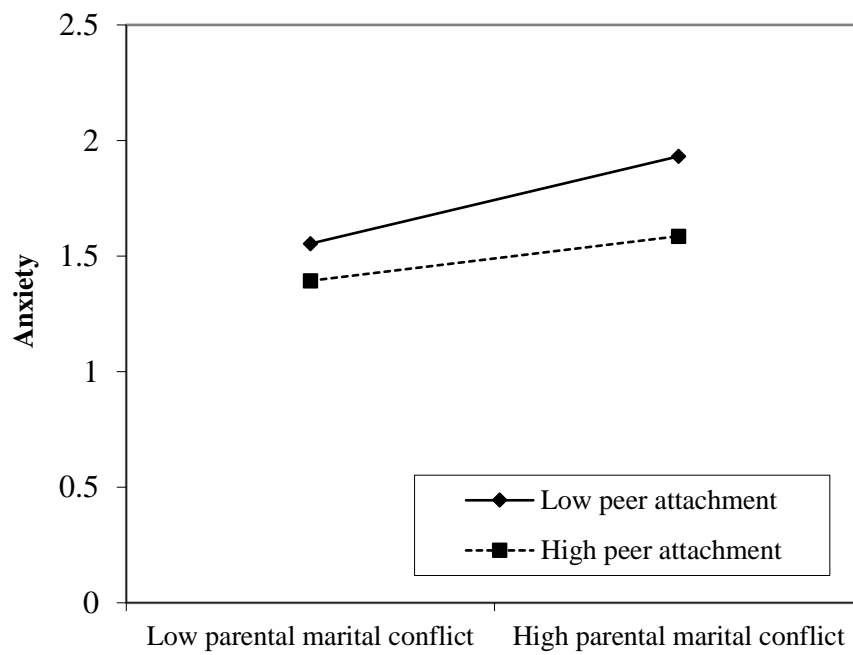


Fig. 3. Peer attachment moderates the effect of parental marital conflict on anxiety.

Table 1

Descriptive statistics and correlations among variables.

Variables	1	2	3	4	5
1. Parent marital conflict	1				
2. Depression	0.34**	1			
3. Anxiety	0.32**	0.67**	1		
4. Peer attachment	-0.28**	-0.35**	-0.29**	1	
5. Internet addiction	0.29**	0.40**	0.41**	-0.28**	1
<i>M</i>	1.86	1.43	1.63	3.88	0.34
<i>SD</i>	0.61	0.59	0.60	0.70	0.27

Note. ** $P < 0.01$.

Table 2

Testing the moderated mediation effect of parent marital conflict on Internet addiction.

Independent Variables	Model 1 (Internet addiction)		Model 2 (Depression/Anxiety)		Model 3 (Internet addiction)	
	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>
Parental marital conflict	0.11	11.29***	0.25/0.24	12.86***/12.01***	0.068/0.068	7.39***/7.53***
Peer attachment	-0.08	-10.40***	-0.22/-0.18	-13.17***/-10.38***	-0.053/-0.057	-6.56***/-7.22***
Parental marital conflict × Peer attachment	0.01	0.36	-0.15/-0.11	-6.31***/-4.65***		
Depression/Anxiety					0.147/0.147	14.44***/15.55***
Depression/Anxiety × Peer attachment					0.018/0.008	1.79/0.81
<i>R</i> ²	0.13		0.20/0.15		0.21/0.22	
<i>F</i>	109.99***		188.03***/135.16***		145.35***/154.31***	

Note. ****P*<0.001.