

The Relationship Between Parental Monitoring and Adolescent Smartphone Addiction: The Longitudinal Mediating Role of Parent-Child Attachment

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Abstract

This study investigated the long-term effects of parental monitoring on mobile phone addiction among high school students and examined the longitudinal mediating role of parent-child attachment. A three-wave longitudinal study spanning 1.5 years was conducted using the Parental Monitoring Scale, Parent-Child Attachment Scale, and Mobile Phone Addiction Scale. Valid data were collected from 405 students (grades 10–11) at a Chongqing secondary school across three assessments. The results demonstrated that: 1) Parental monitoring significantly negatively predicted adolescents' mobile phone addiction over time; 2) The mediating effect of parent-child attachment remained consistent across different time points, indicating stability in its intermediary role throughout the study period. These findings suggest that parental monitoring not only directly reduces mobile phone addiction but also exerts an indirect influence by enhancing parent-child attachment. The study highlights the enduring protective role of parental involvement and relational bonds in mitigating technology-related behavioral issues during adolescence.

Keywords: parental monitoring, mobile phone addiction, parent-child attachment, high school students

1. Introduction

The widespread adoption of smartphones has exacerbated concerns about mobile phone addiction among adolescents. According to the China Internet Network Information Center(CNNIC, n.d.), China currently hosts 188 million underage internet users, with 99.7% relying primarily on mobile devices for online access. Compared to adults, adolescents exhibit weaker self-control, rendering them more susceptible to excessive smartphone use(Hefner et al., 2019). Research indicates that mobile phone addiction is associated with sleep disturbances(Tettamanti et al., 2020), diminished well-being (Horwood & Anglim, 2019), interpersonal conflicts(Elhai et al., 2019), and even severe psychological issues such as risk-taking behaviors(Vannucci et al., 2020). Consequently, identifying the causes of adolescent mobile phone addiction and developing intervention strategies hold significant practical implications.

The negative effects of excessive smartphone use on adolescents are well-documented. Existing studies have explored predictors of mobile phone addiction from various perspectives, including individual traits, physiological factors, psychological factors, and environmental factors. At the individual level, gender and age have been identified as significant predictors of mobile phone addiction. A meta-analysis on nomophobia (fear of being without a mobile phone) found that the prevalence of mobile phone addiction among adults is approximately 21%, with higher rates observed among females and younger individuals(Farchakh et al., 2021). Adolescents and students are particularly vulnerable, with around 20% showing tendencies toward mobile phone addiction(Lin et al., 2021). Personal traits such as low self-esteem, loneliness, and anxiety are also closely linked to mobile phone addiction, as these individuals are more likely to engage in prolonged smartphone use, further exacerbating their dependency(Kara et al., 2021).

At the physiological and psychological levels, smartphone addiction is closely associated with both physical and mental health. Excessive smartphone use can lead to attention deficits, reduced work performance, and increased levels of anxiety and depression(Kim et al., 2018). Prolonged use of smartphones can also result in physical discomfort, such as neck and wrist pain(Alabdulwahab et al., 2017). Furthermore, a meta-analysis on adolescent smartphone addiction and sleep found that addicted adolescents are at a higher risk of developing sleep disorders, which can lead to further complications such as anxiety, depression, memory decline, and obesity (Cappuccio et al., 2008).

Environmental factors, particularly those related to family and school, also play a crucial role in adolescent smartphone addiction. Family environment, especially parental media education, significantly influences adolescent behavior (Deng et al., 2020). A study of 471 middle school students found that parents who are themselves heavy smartphone users ("phubbers") contribute to their children's smartphone addiction (Zhang et al., 2021). While positive parental intervention can effectively reduce the risk of addiction, excessive monitoring and content restrictions may paradoxically accelerate it (Chen et al., 2019). Psychological control by parents has also been shown to increase the likelihood of smartphone addiction among adolescents (Jiang et al., 2022). Moreover, technological interference in parent-child interactions can negatively affect children's behavior (McDaniel & Radesky, 2018). Research indicates that the more parents interfere with technology during interactions, the more likely adolescents are to develop smartphone addiction (Liu et al., 2018).

Parental monitoring has emerged as a critical variable in the family context. Grounded in Clark's (2011) theoretical framework, parental monitoring encompasses positive intervention (e.g., communicative guidance) and restrictive monitoring (e.g., enforcing usage rules). While positive intervention reduces addiction risks through effective parent-child communication (van den Eijnden et al., 2010), the role of restrictive monitoring remains contentious. On one hand, it may prevent addiction by limiting screen time (Ding et al., 2019); on the other hand, it could trigger psychological reactance by suppressing autonomy needs (Hefner et al., 2019). These contradictory findings highlight the necessity to clarify the pathways and boundary conditions of parental monitoring.

Parent-child attachment may serve as a pivotal mechanism underlying these discrepancies. Attachment theory posits that secure parent-child attachments buffer negative emotions and reduce addictive behaviors (Seo et al., 2016), whereas insecure attachment predisposes individuals to compensatory phone dependency for emotional fulfillment (Dwyer, 2005). As a key dimension of parenting, parental monitoring may indirectly influence mobile phone addiction by shaping attachment quality. Empirical evidence suggests that authoritative parenting enhances parent-child attachment, whereas excessive monitoring weakens relational bonds. Thus, parental monitoring may mitigate mobile phone addiction by fostering secure attachment.

In summary, this study investigates parental monitoring as a predictor of adolescent mobile phone addiction, with parent-child attachment as a mediator, while examining the longitudinal stability of this mediating effect. The findings will contribute to a deeper understanding of the complex interplay between parental monitoring, parent-child attachment, and adolescent smartphone addiction, offering valuable insights for developing effective intervention strategies.

2. Method

2.1 Participants

This study employed a cluster convenience sampling method to recruit students from grades 7 to 11 (excluding grade 9) at a secondary school in Chongqing Municipality, China. After obtaining informed consent from school administrators, homeroom teachers, students, and their parents, questionnaires were distributed offline to participants.

Data were collected across three waves: April 2023 (T1), October 2023 (T2), and May 2024 (T3). At T1, participants were in the second semester of grade 10. Initial recruitment included 566 students, but attrition occurred at T2 and T3 due to missing student IDs/names, absences, or transfers. After matching data across all three waves, 405 participants (attrition rate: 28.4%) were retained for analysis.

The final sample comprised 176 males (43.50%) and 229 females (56.50%). Regarding family structure, 90.9% ($n = 368$) reported living in dual-parent households, while 14.60% ($n = 59$) came from single-parent households. Notably, 151 participants (37.30%) were identified as left-behind children (raised by relatives due to parental migration), and 254 (62.70%) were non-left-behind children.

2.2 Measures

(1) Parental Monitoring Questionnaire

Parental monitoring was assessed using an 8-item scale developed by Shek (2005), which measures parents' awareness and concern about their children's activities. Responses were recorded on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree), with higher scores indicating greater parental monitoring. The scale demonstrated good structural validity, and its Cronbach's α coefficients across the three waves were 0.874, 0.905, and 0.888, respectively.

(2) Parent-Child Attachment Scale (Short Version of IPPA)

Parent-child attachment was evaluated using a 13-item short version of the Inventory of Parent and Peer

Attachment (IPPA), adapted by Li et al.(2021). The scale employs a 5-point Likert response format (1 =never true to 5 =always true) and includes three dimensions:trust(e.g., “My parents respect my feelings”),communication(e.g., “I share my thoughts with my parents”),andalienation(reverse-coded). The scale showed strong reliability and validity, with Cronbach’s α coefficients of 0.921, 0.905, and 0.900 across waves.

(3) Smartphone Addiction Scale (SAS-SV)

Smartphone addiction was measured using the 10-item short version of the Smartphone Addiction Scale(Kwon et al., 2013). Participants rated items (e.g., “I feel impatient without my smartphone”) on a 6-point Likert scale (1 =strongly disagree to 6 =strongly agree), with higher total scores indicating more severe addiction. The scale exhibited excellent reliability, with Cronbach’s α values of 0.929, 0.961, and 0.829 at T1, T2, and T3, respectively.

2.3 Common Method Bias

Given the self-reported nature of the data, Harman’s single-factor test was conducted to assess common method bias across the three waves. Results showed that the first factor accounted for 29.48%, 38.10%, and 33.64% of the variance at T1, T2, and T3, respectively—all below the 40% threshold, indicating no severe common method bias.

2.4 Data Analysis

Data were analyzed using SPSS 27.0 for correlation analyses and the PROCESS macro(温忠麟 et al., 2005) to test cross-sectional mediation effects. Longitudinal mediation models were constructed with Mplus 8.3 to examine temporal pathways.

3. Results

3.1 Correlation Analysis

As shown in Table 1, parental monitoring (T1–T3) was significantly and positively correlated with parent-child attachment at all time points: T1 ($r = 0.442, p < 0.01$), T2 ($r = 0.357, p < 0.01$), and T3 ($r = 0.220, p < 0.01$). These stable correlations suggest that higher parental monitoring corresponds to stronger parent-child attachment.

Parental monitoring was negatively associated with smartphone addiction across waves: T1 ($r = -0.155, p < 0.01$), T2 ($r = -0.159, p < 0.01$), and T3 ($r = -0.052, p < 0.05$). While the T3 correlation was weaker, the overall trend supports the protective role of parental monitoring against addiction.

Parent-child attachment also exhibited consistent negative correlations with smartphone addiction: T1 ($r = -0.241, p < 0.01$), T2 ($r = -0.240, p < 0.01$), and T3 ($r = -0.165, p < 0.01$). These results underscore the critical role of secure attachment in mitigating excessive smartphone use.

Table 1. Correlation Test

	1	2	3	4	5	6	7	8	9
1 T1 Parental Monitoring	--								
2 T2 Parental Monitoring	0.531**	--							
3 T3 Parental Monitoring	0.407**	0.548**	--						
4 T1 Parent-Child Attachment	0.442**	0.385**	0.287**	--					
5 t2 Parent-Child Attachment	0.357**	0.472**	0.382**	0.635**	--				
6 T3 Parent-Child Attachment	0.220**	0.341**	0.459**	0.456**	0.569**	--			
7 T1 Smartphone Addiction	-0.155**	-0.223**	-0.164**	-0.241**	-0.228**	-0.158**	--		
8 T2 Smartphone Addiction	-0.159**	-0.209**	-0.208**	-0.240**	-0.292**	-0.264**	0.562**	--	
9 T3 Smartphone Addiction	-0.052	-0.203**	-0.124*	-0.165**	-0.270**	-0.220**	0.424**	0.523**	--

Note. * $p < 0.05$, ** $p < 0.01$

3.2 Longitudinal Mediation Model of Parent-Child Attachment Between Parental Monitoring and Mobile Phone Addiction

To further examine the longitudinal mediating role of parent-child attachment in the relationship between parental monitoring and mobile phone addiction across three time points, a mediation model was constructed (see Figure 1; only significant paths displayed). The model demonstrated acceptable fit indices: CFI = 0.936, TLI = 0.876, SRMR = 0.067, and $\chi^2/df = 5.14$, meeting standard criteria for model adequacy. Autoregressive effects for all three

variables were statistically significant with high coefficients, indicating strong temporal stability across measurements.

After controlling for autoregressive effects and concurrent correlations, parental monitoring at Time 1 (T1) significantly and positively predicted parent-child attachment at Time 2 (T2), $\beta = 0.056$, $p = 0.013$. In turn, parent-child attachment at T2 significantly and negatively predicted mobile phone addiction at Time 3 (T3), $\beta = -0.18$, $p = 0.020$. Bootstrap analysis with 5,000 resamples was conducted to test the longitudinal mediating effect of parent-child attachment. The results revealed a significant indirect effect ($ab = -0.018$), with a 95% bias-corrected bootstrap confidence interval of $[-0.037, -0.004]$ ($p = 0.037$), confirming the significant mediating role of parent-child attachment in the longitudinal relationship between parental monitoring and subsequent mobile phone addiction.

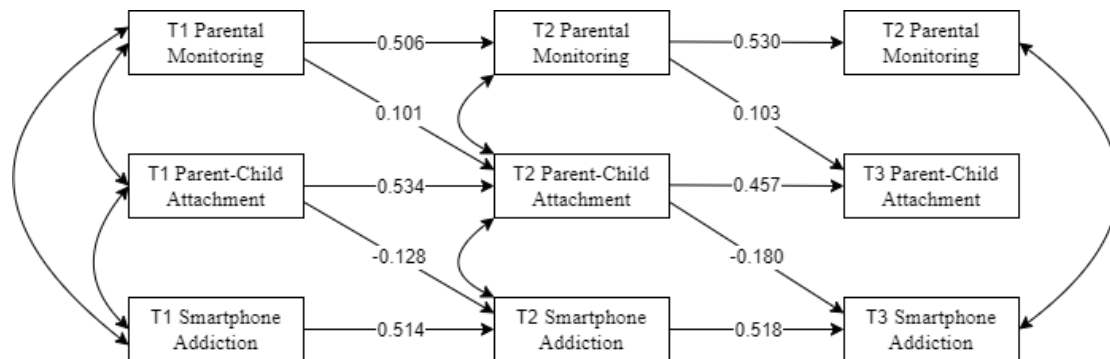


Figure 1. Longitudinal Mediation Test

Notes: Standardized path coefficients are reported. Fit indices align with conventional thresholds (CFI/TLI ≥ 0.90 , SRMR ≤ 0.08 ; Schreiber et al., 2006). Negative mediation effect suggests higher parental monitoring strengthens parent-child attachment, which in turn reduces later mobile phone addiction risk.

4. Discussion

The study revealed that parent-child attachment significantly mediated the relationship between parental monitoring and smartphone addiction during the first wave of measurement (T1). Over time, fluctuations in the strength of parent-child attachment—whether increasing or decreasing—were found to directly influence children's smartphone usage behaviors. This underscores that parent-child attachment is not merely a stable emotional bond but also serves as a longitudinal predictor of children's future psychological states and behavioral tendencies. Specifically, the stability and intensity of parent-child attachment exhibited a negative correlation with smartphone addiction risk, highlighting the critical need for parents to cultivate positive parent-child relationships as a preventive strategy.

Furthermore, the manifestations of smartphone addiction were observed to evolve over time, suggesting the necessity for dynamically adjusted intervention strategies. Although no significant association between parent-child attachment and smartphone addiction was detected at the third measurement wave (T3), the potential role of parental monitoring in mitigating addiction risk remained evident. Future research should prioritize investigating the temporal trajectories of smartphone addiction, particularly how developmental stages modulate the impact of attachment relationships. Adolescents in different age groups may interpret and respond to parental monitoring and support divergently, leading to age-specific variations in addiction susceptibility. Longitudinal monitoring and analysis of these dynamics will enhance our understanding of risk factors and inform tailored family- and school-based interventions.

The findings emphasize the importance of incorporating longitudinal perspectives into intervention design. Strategies targeting parental monitoring and parent-child attachment should be sustained and developmentally adaptive. For instance, as children mature, parents should gradually transition from direct supervision to fostering autonomy and decision-making skills. This shift from control to empowerment not only strengthens children's self-efficacy but also preserves relational harmony, thereby reducing reliance on smartphones. Additionally, interventions should integrate age-appropriate educational programs and family activities to strengthen parent-child bonds, complemented by efforts to enhance adolescents' emotional regulation and social skills. Equipping youth with these competencies may promote healthier choices in navigating digital environments.

In conclusion, this longitudinal study elucidates the dynamic interplay among parental monitoring, parent-child attachment, and smartphone addiction. Parental monitoring was shown to predict the quality of parent-child attachment over time, with attachment serving as a significant mediator in the pathway to addiction. These findings underscore the pivotal role of family dynamics in preventing maladaptive behaviors and provide actionable insights for evidence-based interventions. Future investigations should explore the applicability of these relationships across diverse cultural contexts and developmental stages to refine intervention frameworks and maximize their efficacy.

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