



Parental Psychological Aggression and Phubbing in Adolescents: A Moderated Mediation Model

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Objective The present study aimed to examine the mediated moderation effect underlying the association between parental psychological aggression and phubbing, as well as the mediating role of anxiety and moderating role of sex and grade.

Methods Based on a cross-sectional study, a total of 758 Chinese junior high school students had completed measures on socio-demographic characteristics, parental psychological aggression, anxiety and phubbing. Structural equation modeling was adopted to examine the mediating effect of anxiety on the association between parental psychological aggression and phubbing. Multigroup analyses were conducted to explore whether the path coefficients differed by sex and grade.

Results Mediation analysis indicated that anxiety could mediate the association between parental psychological aggression and phubbing. The indirect effect of parental psychological aggression on phubbing via anxiety was 0.12. Multigroup analyses revealed that the higher mediation effect of anxiety was more likely to be reported by boys and students from grade eight.

Conclusion Findings of the present study may inform prevention and intervention programs for phubbing in adolescents exposed to parental psychological aggression, by decreasing the anxiety and adopting selective strategies for different sex and grade groups.

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Keywords Parental psychological aggression; Anxiety; Phubbing; Sex; Grade.

INTRODUCTION

Smartphones are the preferred tool of social media use and modern communication for most people. People use smartphone regularly during the moment of staying with friends and family.¹ Phubbing is a new phenomenon emerging several years ago. This behavior is relatively common in various life situations.²⁻⁴ The term “phubbing” is a portmanteau of words “phone” and “snubbing.” Phubbing is characterized by act of snubbing someone in a social setting by focusing on his or

her smartphone instead.⁵ One person can be a phubber (the one exhibits phubbing) or a phubbee (the one is phubbed). Limited epidemiological studies have identified high prevalence of phubbing, which is about 50%.^{6,7} Phubbing can result in a variety of detrimental consequences, including poor interpersonal relationship, psychological distress and academic burnout.^{6,8} In order to reduce the negative impact of phubbing for both phubber and phubbee, it is important to investigate the potential correlates of phubbing.

Despite diverse cultural context, psychological aggression is the highly prevalent form of harsh discipline parenting method in Chinese and Western societies.⁹⁻¹¹ Parental psychological aggression is defined as verbal and symbolic acts exhibited by parents towards their children with the intention of causing psychological pain or fear for the purpose of correcting or controlling children’s misbehavior.^{12,13} The high frequency and severity of psychological aggression by parents can be considered as a specific form of child abuse instead of normal interaction in typical families.¹¹ Students from grade

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7 to 9 (age 13–15 years) in Southern China reported the prevalence of parental psychological aggression in the past 6 months with 78.3%.¹⁴ The prevalence of severe psychological aggression by parents for American teenagers was about 50%.¹¹ Even the high cultural acceptance, children exposed to parental psychological aggression are at risk of a series of negative outcomes, such as externalizing and internalizing problem behaviors.¹⁵ Prior studies have emphasized the important influence of abusive parenting on adolescents' problematic smartphone use,^{16–18} while little is known about the relationship between parental psychological aggression and phubbing. Adolescence is a special period with a significant change in emotional and social development,¹⁹ prevention and intervention efforts aimed at decreasing the negative effect of parental psychological aggression on phubbing are of great significance. The present study will examine the association between parental psychological aggression and phubbing and the potential mechanism underlying this relation.

Parental psychological aggression and phubbing

Children can perceive psychological aggression as a rejection.²⁰ The parental acceptance-rejection theory argues that children who feel rejected by their parents or other caregivers are increased risk of internalizing and externalizing behavior problems.^{21,22} Individuals perceived rejection tend to feel unloved, flawed and worthless, which increase the probability of behavior problems,²³ such as phubbing. Experiencing parental psychological aggression could reduce children's trust and attachment to parents in the real world, which make them turn to concentrating on smartphone and escaping from interpersonal communication with the other person present as a maladaptive coping strategy.^{24,25} Empirical research has demonstrated parental neglect and childhood psychological maltreatment could leave children vulnerable to smartphone addiction.^{16,17} Phubbing as a compensatory behavior for unmet need might be triggered by parental psychological aggression. Based on the previous work, we proposed the following hypothesis: Hypothesis 1. Parental psychological aggression would be positively correlated with phubbing among adolescents.

The potential mediating role of anxiety

Negative emotions play important role in contributing to excessive use of smartphone and anxiety is one of affective variables. According to the parental acceptance-rejection theory,^{21,22} children who frequently experience parental psychological aggression exhibit higher levels of anxiety. If parental psychological aggression is interpreted a psychological and emotional rejection by children, severe anxiety symptoms will be reported in adolescents due to lack of parental warmth, care and support.²⁶ After a research on demographic variables and

various forms of parental aggression, parental psychological aggression was found to be the most predictive of anxiety.²⁷ Thus, individual's anxiety might decrease after he or she being psychological aggression by parents.

According to compensatory internet use theory,²⁸ parental psychological aggression as a stressful life event drive individual to engage in phubbing in order to alleviate anxiety. People may try to distract themselves from anxiety with more attention to their smartphone rather than face-to-face communication. Phubbing as a "self-medication" means of regulating anxiety symptoms is adopted by many adolescents.²⁹ In addition, empirical research indicated that trait anxiety was significantly associated with phubbing.³⁰ Adolescents with high levels of social anxiety were more likely to exhibit friend phubbing.³¹

After the above discussion, it is possible that parental psychological aggression may exacerbate anxiety, which in turn would be related to increases in adolescent phubbing. Therefore, we hypothesized that anxiety would play a mediator role in the relationship between parental psychological aggression and phubbing (Hypothesis 2).

Sex and grade differences

Sex is an important socio-demographic variable influencing parental psychological aggression, anxiety and phubbing. Boys reported higher prevalence of maternal psychological aggression than girls, while no gender difference in paternal psychological aggression was found.³² Girls are more sensitivity to anxiety than boys.³³ Previous research indicated that the frequency and duration of phubbing were significantly higher in girls than boys.³⁴ Moreover, there is also gender difference in the predictors of phubbing. For example, variables of e-emotional expression, facilitation of e-emotions, and netiquette explained more variability in phubbing for girls than boys.³⁵ According to gendered family process model,³⁶ gender-differentiated parenting plays an important role in child behavior. Parents adopt different strategies to treat boys and girls, which result in differential development of girls and boys.³⁶ Child gender acted as a moderator in the relationships between parental discipline and both child moral regulation and externalizing problems.³⁷ Parents may use different levels of punishment for son and daughter.^{32,38} Although the similar discipline methods adopted by parents for girls and boys, they may differ on the reaction to punishment.³⁷ However, there was no consistent conclusion with regard to the role of gender in the association between harsh discipline and anxiety.^{38,39} Prior research revealed that internalizing behavior mediated the association between child maltreatment and externalizing behavior, while gender difference was found in this mediation model.⁴⁰ To best of our knowledge, no research has

conducted to examine the sex difference in the mediation model regarding the impact of parental psychological aggression on phubbing via anxiety. Therefore, we hypothesized that sex played a moderator role in our proposed mediation model (Hypothesis 3).

Except for sex, grade differences on home adjustment and health adjustment were obtained in adolescent students.⁴¹ Prior research found effective parenting buffered the effect of higher levels of peer deviance on conduct problems for students during the transition from seventh to eighth grade.⁴² Grade plays important role in the influence of parenting on adolescents' development. Consequently, we would like to explore the moderating effect of grade in our proposed mediation model and hypothesized that there was grade difference in the proposed mediation model (Hypothesis 4).

The present study

Based on the literature review, the present study will explore the influence of parental psychological aggression on phubbing in adolescents, as well as the mediating role of anxiety in this association. Sex and grade differences in our proposed mediation model will be also examined. We will identify the moderating role of sex and grade in which specific path. Findings will provide theoretical and empirical support for helping student properly handle parental psychological aggression and reduce phubbing.

METHODS

Study design and participants

Data used in our research was from a cross-sectional study of Chinese junior high school students conducted in November 2021. We adopted a cluster sample design to recruit the studied samples of 7th through 9th grade students in a public junior high school. According to the total number of this school, the selected number of each grade are calculated. Classes are randomly selected and all the students in the classes were invited to participant in the survey. A total of 789 students were approached, while 758 of these sample were included in the data analysis due to the rejection of invalid questionnaire. The city where the studied school is located was classified as the area at low risk of COVID-19 in 2021. Thus, the city had no lockdown measures and the school was not closed in 2021. The study took place at the end of 2021, so the impact of COVID-19 on our research results could be neglected.

A detailed description of the purpose, procedure, and confidentiality of the study were informed to all participants before the data collection. Written consent from all participants and parents of minors were received. All the participants were required to completed the structured questionnaire with the

help of trained researchers. This study was approved by the Research Ethics Committee of Shandong University (LL20210102) and it has been performed in accordance with the ethical standards of 1964 Declaration of Helsinki.

Measures

Socio-demographic characteristics

Socio-demographic variables included sex (male, female), grade (seventh grade, eighth grade, ninth grade), having any siblings (yes, no), family residence (urban areas, rural areas).

Parental psychological aggression

The parental psychological aggression subscale (e.g., shouted, yelled, or screamed) of the Parent-Child Conflict Tactics Scales was used for the present study, which has been validated in the Chinese population.^{12,14,43} Participants were asked to answer how often their parents engaged in the specific acts of psychological aggression in the past year. The psychological aggression subscale consists of five items scored on a 7-point Likert scale with the following response options: 0 (never), 1 (once), 2 (twice), 3 (3 to 5 times), 4 (6 to 10 times), 5 (11 to 20 times), and 6 (more than 20 times). Item are summed for a total score where in higher scores indicate more frequency of experiencing parental psychological aggression. In the present study, the Cronbach's α of psychological aggression subscale was 0.81.

Anxiety

The Generalized Anxiety Disorder 7-Item Scale was used to assess the severity of anxiety symptoms over the past two weeks, which has been validated in the Chinese adolescents.^{44,45} This scale makes up seven items and is rated on a 7-point Likert scale from 0 (not at all) to 3 (nearly every day). Item are summed and total scores range from 0 to 21. Higher scores indicate greater levels of anxiety symptoms. In the present study, the Cronbach's α was 0.94.

Phubbing

The Chinese version of Generic Scale of Phubbing (GSP) was used to assess the phubbing,⁴⁶ which was originally developed by Chotpitayasunondh and Douglas.⁵ This scale consists of 15 items and 4 dimensions including nomophobia (4 items), interpersonal conflict (4 items), self-isolation (4 items), and problem acknowledgement (3 items). Participants responded on a 5-point Likert scale from 1 (not at all true for me) to 5 (extremely true of me). Item are summed and higher scores indicates the more severity of phubbing. In the present study, the Cronbach's α was 0.91.

Statistical analyses

There are less than 5% missing data in the present study. All the missing data were missing at random. Since all the studied continuous variables followed the normal distribution by determining their skewness and kurtosis, mean imputation was adopted to handle the missing data in continuous variables.⁴⁷ Statistical analyses were performed using SPSS 24.0 version program and Amos 23.0 software (IBM Corp, Armonk, NY, USA). Descriptive analysis and Pearson's correlation coefficient were conducted to determine the associations between the studied variables. Differences in the main study variables in terms of sex, and grade were determined by t test and two-way analysis of variance. Structural equation modeling (SEM) was adopted to examine the mediating effect of anxiety on the association between parental psychological aggression and phubbing. The mediation model was evaluated using the following indices: chi-square (CMIN), χ^2/df , comparative fit index (CFI), Tucker-Lewis index (TLI), and root-mean-squared error of approximation (RMSEA). Based on the recommended cutoff values, models with CMIN/df <5, CFI and TLI >0.9, and RMSEA <0.08 are deemed an acceptable fit; those with CMIN/df <3, CFI and TLI >0.95, and RMSEA <0.05 are deemed a good fit.^{48,49} The significance of mediation model was determined by bias-corrected bootstrapping procedure. The 95% confidence interval (CI) was calculated based on 5,000 bootstrap samples and the exclusion of zero indicated a significant mediation effect. The subgroup approach was used to examine the mediation in different levels of the moderator variable.⁵⁰ Specifically, we conducted multiple group path analysis to explore the roles of sex and grade in the proposed mediation model by determining the equivalence of path coefficients across different groups. The absolute value of critical ratios for differences between parameters with >1.96 indicated statistical significance of path coefficients across two groups. Two-tailed with $p < 0.05$ are considered statistically significant.

RESULTS

Sample characteristics

There are slightly more boys ($n=391$, 51.6%) than girls ($n=367$, 48.4%) in the sample, with the age ranged between 12 and 15 years (mean=13.45, standard deviation=0.96). Over one third students were in the seventh grade ($n=303$, 40.0%), followed by ninth grade ($n=232$, 30.6%) and eighth grade ($n=223$, 29.4%). The majority of respondents had at least one sibling ($n=608$, 80.2%). Participants were predominately from rural areas ($n=521$, 68.7%).

Preliminary analyses

Descriptive statistics and Pearson correlation among all the studied variables are displayed in the Table 1. Sex was significantly associated with parental psychological aggression ($p < 0.05$), anxiety ($p < 0.01$), and phubbing ($p < 0.01$). Grade was correlated with phubbing ($p < 0.01$). Parental psychological aggression, anxiety, and phubbing was positively correlated to each other ($p < 0.01$).

Differences in parental psychological aggression, anxiety and phubbing by sex and grade groups

Table 2 shows that girls had higher levels of parental psychological aggression ($t=2.31$, $p < 0.05$), anxiety ($t=3.36$, $p < 0.01$), and phubbing ($t=5.71$, $p < 0.001$) compared to boys. There were significant statistical differences in grade on parental psychological aggression ($F=5.42$, $p < 0.01$) and phubbing ($F=9.65$, $p < 0.001$). There were no grade differences in terms of anxiety.

Testing for the mediation effect of anxiety

We built a SEM to verify the mediation effect of anxiety in the association between parental psychological aggression and phubbing. An acceptable model fit was obtained ($\chi^2/df=4.318$; $p < 0.001$, NFI=0.977, TLI=0.966, CFI=0.982, RMSEA=0.066). As can be seen in Figure 1, parental psychological aggression was positively correlated to anxiety ($\beta=0.30$, $p < 0.001$), which in turn was associated with phubbing ($\beta=0.41$, $p < 0.001$). The indirect effect of parental psychological aggression on phubbing via anxiety was 0.12. The 95% CI (0.09, 0.17) does not contain zero, indicating that anxiety partially mediated the association between parental psychological aggression and phubbing. The direct effect of parental psychological aggression on phubbing was 0.18 (95% CI: 0.10, 0.26). The mediation effect accounted for 40.0% of the total effect of the association between parental psychological aggression and

Table 1. Descriptive statistics and bivariate correlation among all the studied variables (N=758)

Variables	1	2	3	4	5
1. Sex	1				
2. Grade	-0.02	1			
3. Parental psychological aggression	-0.09*	0.05	1		
4. Anxiety	-0.13**	-0.01	0.33**	1	
5. Phubbing	-0.21**	0.11**	0.29**	0.46**	1
M	-	-	2.20	0.52	1.92
SD	-	-	1.50	0.70	0.80
Skewness	-	-	1.06	1.61	1.03
Kurtosis	-	-	0.63	2.05	0.86

Sex was dummy coded as 0=girl and 1=boy. * $p < 0.05$; ** $p < 0.01$; M, mean; SD, standard deviation

Table 2. Comparisons among parental psychological aggression, anxiety, and phubbing in studied socio-demographic characteristics (M±SD)[†]

Variables	PPA	Mean difference	Anxiety	Mean difference	Phubbing	Mean difference
Sex						
Girls	11.63±7.87	1.24*	4.20±4.95	1.14**	31.28±12.74	4.96***
Boys	10.39±6.89		3.06±4.40		26.31±10.73	
Grade						
Seventh (1)	11.08±7.64	(1)-(2)=1.31* (1)-(3)=-0.95	3.47±4.82	(1)-(2)=-0.55 (1)-(3)=0.08	26.41±10.07	(1)-(2)=-3.82*** (1)-(3)=-3.99***
Eighth (2)	9.76±6.65	(2)-(1)=-1.31* (2)-(3)=-2.26**	4.02±5.21	(2)-(1)=0.55 (2)-(3)=0.63	30.24±12.22	(2)-(1)=3.82*** (2)-(3)=-0.17
Ninth (3)	12.02±7.63	(3)-(1)=0.95 (3)-(2)=2.26**	3.39±3.95	(3)-(1)=-0.08 (3)-(2)=-0.63	30.41±13.54	(3)-(1)=3.99*** (3)-(2)=0.17

*p<0.05; **p<0.01; ***p<0.001; †sample size might be different in each comparison group due to the missing values in categorical variables. M, mean; SD, standard deviation; PPA, parental psychological aggression

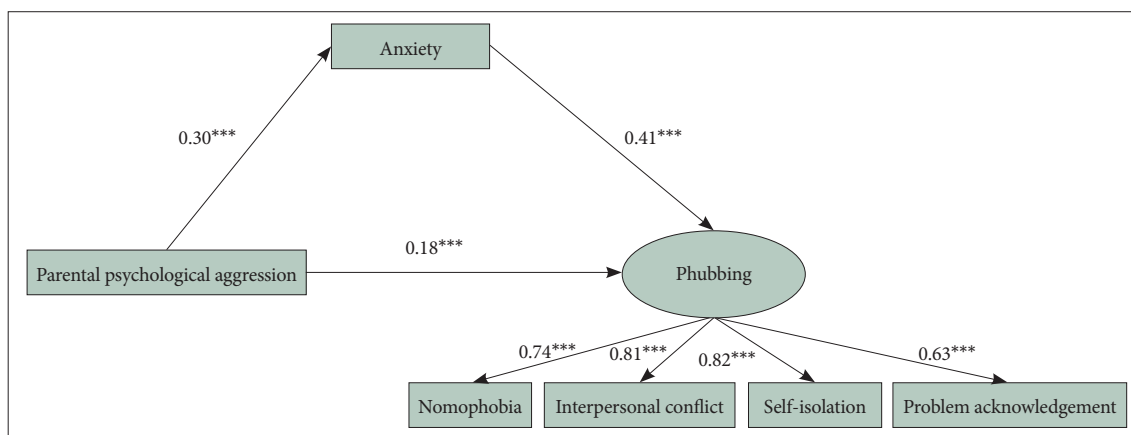


Figure 1. The mediation model of anxiety in the association between parental psychological aggression and phubbing. ***p<0.001.

phubbing.

The moderating role of sex and grade

In order to examine the stability of the above-mentioned mediation model across different groups, we make comparisons of the proposed mediation model by different socio-demographic groups through multiple group analysis. Specifically, a series of multiple group analysis was performed to verify the moderation effects of sex and grade on the association between parental psychological aggression and phubbing mediating by anxiety. A statistically significant difference indicates sex and grade could play moderating effect on the mediation model.

The sex and grade differences in the mediation model were identified. The path coefficients in the mediation model across different sex and grade groups are displayed in the Table 3 and were statistical significance (p<0.001). Specifically, results only indicated the path coefficient from anxiety to phubbing was significantly smaller in girls (β=0.30) than boys (β=0.53).

Table 3. Path coefficients (β) in different socio-demographic groups (N=758)

Variables	PPA to anxiety	Anxiety to phubbing	PPA to phubbing
Sex			
Girls	0.31	0.30*	0.20
Boys	0.29	0.53*	0.15
Grade			
Seventh	0.32	0.43	0.19
Eighth	0.40*	0.48	0.22
Ninth	0.22*	0.36	0.15

*path coefficients in the mediation model were statistically significant between two groups. PPA, parental psychological aggression

The value of critical ratios for differences between parameters was 3.101, which was greater than 1.96. Thus, sex moderated the relationship between anxiety and phubbing. Compared with girls, anxiety had more influence on boys’ phubbing. The indirect effect of the mediation model was 0.09 and 0.15

for girls and boys, which accounted for 32.06% and 51.18% of the total effect among girls and boys, respectively. The mediating effect of anxiety was stronger in boys than in girls. Path coefficient from parental psychological aggression to anxiety was very close in girls ($\beta=0.31$) and boys ($\beta=0.29$). There was no significant difference of path coefficient from parental psychological aggression to phubbing in girls ($\beta=0.20$) and boys ($\beta=0.15$).

With regards to the effect of grade on the mediation model, results only revealed the path coefficient from parental psychological aggression to anxiety was significantly larger in grade eight group ($\beta=0.40$) than those in grade nine ($\beta=0.22$). The value of critical ratios for differences between parameters was -3.408 and its absolute value was also greater than 1.96 indicating statistical significance. Differences in the path coefficient from parental psychological aggression to anxiety between seventh ($\beta=0.32$) and eighth grade, between eighth and ninth grade were not found. Thus, grade moderated the association between parental psychological aggression and anxiety. Students in eighth grade exposed to frequent parental psychological aggression were more likely to exhibit anxiety than those in ninth grade. The indirect effect of the mediation model was 0.14, 0.19, and 0.08, while the total effect of the mediation model was 0.33, 0.41, and 0.23 in seventh, eighth and ninth grade group, respectively. There was no significant difference of path coefficient with regard to the mediation model in varied grade except for the path from parental psychological aggression to anxiety.

DISCUSSION

The purpose of this study was to identify the association between parental psychological aggression and phubbing and the mediating effect of anxiety in this relationship, and to determine sex and grade differences in the proposed mediation model. Results indicated that frequently experiencing parental psychological aggression was directly associated with more adolescent phubbing. In addition, anxiety was a significant mediator in the association between parental psychological aggression and phubbing. Sex and grade moderated the mediation model from parental psychological aggression to phubbing via anxiety. Findings can help improve understanding of the mechanisms by more phubbing manifests in adolescents exposed to frequent parental psychological aggression.

The present study illustrated frequent parental psychological aggression was associated with greater phubbing among adolescents, which supported our first hypothesis. This finding is similar to previous research on the relationship of parental neglect and psychological maltreatment with excessive smartphone use.^{16,17} According to risk families model, children

from risky families may exhibit behavioral addiction as a compensation for deficiencies in the biological, social and emotional functioning.⁵¹ Parental psychological aggression is the threatening acts and negative emotional expressions of parents towards to their children.⁵² It is hard for adolescents with continuous exposure to parental psychological aggression to achieve basic psychological need fulfillment in real life.²⁰ More importantly, Internet use could fulfill various types of needs.⁵³ Adolescents living in a family with high levels of parental psychological aggression are more likely to involve in online activities by smartphone in order to seek support and satisfy the unmet need. The need for social communication fulfilled online might lead adolescents to focus on their smartphone when in face-to-face communication with the other person.

In line with our Hypothesis 2, results revealed that anxiety mediated the association between parental psychological aggression and phubbing. In other word, anxiety acts as a “bridge” linking parental psychological aggression to phubbing. In consistent with prior research, parental psychological aggression was significantly associated with anxiety,^{9,27} and anxiety was positively correlated to phubbing.³⁰ The indirect effect of anxiety implied that anxiety manifested in adolescents with the experience of parental psychological aggression, which in turn make adolescents susceptibility to phubbing. Compensatory internet use theory could offer an appropriate explanation to understand how parental psychological aggression leads to phubbing via anxiety.²⁸ Based on this theory,²⁸ adolescents are inclined to be addicted to smartphone and ignore face-to-face communication to reduce the anxiety generated from the parental psychological aggression. According to the self-medication model,⁵⁴ lack of adequate nurturance from parents in childhood increased difficulties in coping with affect, which placed individuals at increased risks of inappropriate use or overuse the specific substance to regulate themselves and get external relief, such as Internet and smartphone.

Results indicated a significant sex differences in our proposed mediation model, which was in support of our Hypothesis 3. Specifically, sex moderated the path from anxiety to phubbing. Experiencing parental psychological aggression increased the possibility of anxiety, while more phubbing was exhibited in boys with anxiety. The influence of anxiety on phubbing was stronger in boys than girl, which was similar to the previous finding that student with anxiety symptom were inclined to be pathological internet users in males in comparison with females.⁵⁵ Possible explanations may be that girls are more physically and psychologically mature than boys in the period of junior middle school students. Moreover, girls often have high levels of self-control than boys, which makes girls are less susceptible to problematic mobile phone use.⁵⁶ However, results did not find the moderating effect of sex in

the direct path (parental psychological aggression to phubbing) and second path (anxiety to phubbing) of the mediation model. Parental psychological aggression as a high prevalent and less serious parental discipline has negative influence on individuals regardless of sex and there are no sex differences in this effect.

Results also identified a significant grade differences in our proposed mediation model, which was in support of our Hypothesis 4. Specifically, grade moderated the path from parental psychological aggression to anxiety. Univariate analysis of variance in the present study found that parental psychological aggression in grade eight students was significantly lower than that in grade seven and nine students. Though the prevalence of parental psychological aggression decreased significantly with children's age as a whole, prior research indicated that the paternal psychological aggression prevalence was high in children aged 12, 13, and 15 than children aged 14.³² In the study sample, 7th grade represents the beginning of junior high school, while 9th grade represents the end of compulsory school. Both of time point seem to be of great significance for students during this period. Due to competitive entrance of senior high school exam in China, parents often exercise too much verbal act or even psychological aggression to push their children to work hard and achieve high academic goals.⁵⁷ While parental psychological aggression was positively associated with anxiety, our results showed that the negative effect of parental psychological aggression on anxiety was stronger in grade eight students than that in grade nine. Eighth graders could report less frequency of parental psychological aggression but more sensitive to it. Students in grade eight might be more influenced by parental psychological aggression, which elevates the risk of anxiety. Future research is needed to verify this relationship and understand its underlying causes. There were no significant differences in the influence of parental psychological aggression on anxiety between seventh and eighth grade, between eighth and ninth grade. Other path coefficients in the mediation model were not significantly different in varied grade. This is might be on account of small age gap in between two grades and junior high school students are almost during the period of preadolescence.

Practical implications and limitations

Findings in the present study have some practical implications for prevention and intervention of adolescent phubbing. First, the effective intervention programs should be adopted and pay more attention to those families with frequent parental psychological aggression. Not only cultivate appropriate methods of parental discipline for parents, but improve coping resources and strategies of children for better response to parental psychological aggression. Second, reducing anxiety

will also contribute to the decrease in phubbing, especially for those who experience frequent parental psychological aggression. Third, the intervention of phubbing should also take socio-demographic factors into account, as they were closely correlated to the relationship between parental psychological aggression and phubbing.

Several limitations must be considered in interpreting the finding of the current study. First, this study was based on a cross-sectional design, which limits any causal conclusions. The direction of each path involved in the present study need further confirmation in future longitudinal studies. Second, the retrospective and self-report measures used in this study are more likely to introduce measurement bias, especially for the experience of parental psychological aggression. Children might be reluctant to recall or give an objective report of how often did she or he experience parental psychological aggression. Respondents might over-report or under-report such adverse experience. More validated and accurate measurements to evaluate these variables should be considered in future studies. Third, only the frequency of parental psychological aggression was examined in this current study. We encourage future research include the severity and duration of psychological aggression.

In summary, the findings presented in the current study provide an understanding of the underlying mechanism in the association between parental psychological aggression and phubbing, emphasizing the importance of anxiety, sex, and grade. In addition to the direct effect of parental psychological aggression on phubbing, parental psychological aggression was indirectly associated with adolescent phubbing via anxiety. The mediating effect of anxiety in the relationship between psychological aggression and phubbing varied by sex and grade groups. Our findings support a moderated mediation model which advances our understanding of how and when parental psychological aggression is related to adolescent phubbing.

Availability of Data and Material

The datasets generated or analyzed during the study are available from the corresponding author on reasonable request.

Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

Author Contributions

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REFERENCES

- Mantere E, Savela N, Oksanen A. Phubbing and social intelligence: role-playing experiment on bystander inaccessibility. *Int J Environ Res Public Health* 2021;18:10035.
- Wang X, Wang W, Qiao Y, Gao L, Yang J, Wang P. Parental phubbing and adolescents' cyberbullying perpetration: a moderated mediation model of moral disengagement and online disinhibition. *J Interpers Violence* 2022;37:NP5344-NP5366.
- Bröning S, Wartberg L. Attached to your smartphone? A dyadic perspective on perceived partner phubbing and attachment in long-term couple relationships. *Comput Hum Behav* 2022;126:106996.
- Roberts JA, David ME. Put down your phone and listen to me: how boss phubbing undermines the psychological conditions necessary for employee engagement. *Comput Hum Behav* 2017;75:206-217.
- Chotpitayasunondh V, Douglas KM. Measuring phone snubbing behavior: development and validation of the generic scale of phubbing (GSP) and the generic scale of being phubbed (GSBP). *Comput Hum Behav* 2018;88:5-17.
- Davey S, Davey A, Raghav SK, Singh JV, Singh N, Blachnio A, et al. Predictors and consequences of "phubbing" among adolescents and youth in India: an impact evaluation study. *J Family Community Med* 2018;25:35-42.
- Isrofin B, Munawaroh E. The effect of smartphone addiction and self-control on phubbing behavior. *Jurnal Kajian Bimbingan Dan Konseling* 2021;6:15-23.
- Zhang H, Gao T, Hu Q, Zhao L, Wang X, Sun X, et al. Parental marital conflict, negative emotions, phubbing, and academic burnout among college students in the postpandemic era: a multiple mediating models. *Psychol Sch* 2022 Apr 18. [Epub] <https://doi.org/10.1002/pits.22707>.
- Kwok SY, Gu M, Cheung AP. A longitudinal study of the role of children's altruism and forgiveness in the relation between parental aggressive discipline and anxiety of preschoolers in China. *Child Abuse Negl* 2017;65:236-247.
- Xing X, Zhang H, Shao S, Wang M. Child negative emotionality and parental harsh discipline in Chinese preschoolers: the different mediating roles of maternal and paternal anxiety. *Front Psychol* 2017;8:339.
- Straus MA, Field CJ. Psychological aggression by American parents: national data on prevalence, chronicity, and severity. *J Marriage Fam* 2003;65:795-808.
- Straus MA, Hamby SL, Finkelhor D, Moore DW, Runyan D. Identification of child maltreatment with the parent-child conflict tactics scales: development and psychometric data for a national sample of American parents. *Child Abuse Negl* 1998;22:249-270.
- Wang M, Wang X, Liu L. Paternal and maternal psychological and physical aggression and children's anxiety in China. *Child Abuse Negl* 2016;51:12-20.
- Leung PW, Wong WC, Chen WQ, Tang CS. Prevalence and determinants of child maltreatment among high school students in Southern China: a large scale school based survey. *Child Adolesc Psychiatry Ment Health* 2008;2:27.
- Liu L, Wang M. Parental harsh discipline and adolescent problem behavior in China: perceived normativeness as a moderator. *Child Abuse Negl* 2018;86:1-9.
- Liu F, Zhang Z, Chen L. Mediating effect of neuroticism and negative coping style in relation to childhood psychological maltreatment and smartphone addiction among college students in China. *Child Abuse Negl* 2020;106:104531.
- Wang Z, Jiang S. Influence of parental neglect on cyberbullying perpetration: moderated mediation model of smartphone addiction and self-regulation. *Health Soc Care Community* 2022 Mar 17. [Epub] <https://doi.org/10.1111/hsc.13787>.
- Jahng KE. Maternal abusive parenting and young South Korean adolescents' problematic smartphone use: the moderating effects of time spent hanging out with peers and trusting peer relationships. *Child Youth Serv Rev* 2019;98:96-104.
- World Health Organization. Adolescent mental health. Available at: <https://www.who.int/news-room/fact-sheets/detail/adolescent-mental-health>. Accessed December 2, 2021.
- Hart SN. Psychological maltreatment: emphasis on prevention. *Sch Psychol Int* 1988;9:243-255.
- Ali S, Khaleque A, Rohner RP. Pancultural gender differences in the relation between perceived parental acceptance and psychological adjustment of children and adult offspring: a meta-analytic review of worldwide research. *J Cross-Cult Psychol* 2015;46:1059-1080.
- Miranda MC, Affuso G, Esposito C, Bacchini D. Parental acceptance-rejection and adolescent maladjustment: mothers' and fathers' combined roles. *J Child Fam Stud* 2016;25:1352-1362.
- Rohner RP. The parental "acceptance-rejection syndrome": universal correlates of perceived rejection. *Am Psychol* 2004;59:830-840.
- Hsieh YP, Shen ACT, Wei HS, Feng JY, Huang SCY, Hwa HL. Associations between child maltreatment, PTSD, and internet addiction among Taiwanese students. *Comput Hum Behav* 2016;56:209-214.
- Liang HY, Zhang B, Jiang HB, Zhou HL. Adult attachment: its mediation role on childhood trauma and mobile phone addiction. *J Psychol Afr* 2021;31:369-374.
- Rohner RP. The warmth dimension: foundations of parental acceptance-rejection theory. Beverly Hills: Sage Publications, Inc; 1986.
- Miller-Perrin CL, Perrin RD, Kocur JL. Parental physical and psychological aggression: psychological symptoms in young adults. *Child Abuse Negl* 2009;33:1-11.
- Kardefelt-Winther D. A conceptual and methodological critique of internet addiction research: towards a model of compensatory internet use. *Comput Hum Behav* 2014;31:351-354.
- Elhai JD, Levine JC, Hall BJ. The relationship between anxiety symptom severity and problematic smartphone use: a review of the literature and conceptual frameworks. *J Anxiety Disord* 2019;62:45-52.
- Balta S, Emirtekin E, Kircaburun K, Griffiths MD. Neuroticism, trait fear of missing out, and phubbing: the mediating role of state fear of missing out and problematic Instagram use. *Int J Ment Health Addiction* 2020;18:628-639.
- Sun J, Samp JA. 'Phubbing is happening to you': examining predictors and effects of phubbing behaviour in friendships. *Behav Inf Technol* 2021 Jun 17. [Epub] <https://doi.org/10.1080/0144929X.2021.1943711>.
- Wang M, Liu L. Parental harsh discipline in mainland China: prevalence, frequency, and coexistence. *Child Abuse Negl* 2014;38:1128-1137.
- McLean CP, Anderson ER. Brave men and timid women? A review of the gender differences in fear and anxiety. *Clin Psychol Rev* 2009;29:496-505.

34. Chotpitayasunondh V, Douglas KM. How “phubbing” becomes the norm: the antecedents and consequences of snubbing via smartphone. *Comput Hum Behav* 2016;63:9-18.
35. Cebollero-Salinas A, Cano-Escoriaza J, Orejudo S. Impact of online emotions and netiquette on phubbing from a gender perspective: educational challenges. *J New Approaches Educ Res* 2022;11:64-78.
36. Endendijk JJ, Groeneveld MG, Mesman J. The gendered family process model: an integrative framework of gender in the family. *Arch Sex Behav* 2018;47:877-904.
37. Kerr DC, Lopez NL, Olson SL, Sameroff AJ. Parental discipline and externalizing behavior problems in early childhood: the roles of moral regulation and child gender. *J Abnorm Child Psychol* 2004;32:369-383.
38. McKee L, Roland E, Coffelt N, Olson AL, Forehand R, Massari C, et al. Harsh discipline and child problem behaviors: the roles of positive parenting and gender. *J Fam Violence* 2007;22:187-196.
39. Liu L, Zhai P, Wang M. Parental harsh discipline and migrant children’s anxiety in China: the moderating role of parental warmth and gender. *J Interpers Violence* 2022;37:NP18761-NP18783.
40. Maschi T, Morgen K, Bradley C, Hatcher SS. Exploring gender differences on internalizing and externalizing behavior among maltreated youth: implications for social work action. *Child Adolesc Social Work J* 2008;25:531-547.
41. Gopal DV, Ashok A, Madhu K. Role of grade and gender in adolescent adjustment. *J Psychosoc Res* 2013;8:53-60.
42. Trudeau L, Mason WA, Randall GK, Spoth R, Ralston E. Effects of parenting and deviant peers on early to mid-adolescent conduct problems. *J Abnorm Child Psychol* 2012;40:1249-1264.
43. Wang F, Wang M, Wang T, Wang Z. Harsh parental discipline, parent-child attachment, and peer attachment in late childhood and early adolescence. *J Child Fam Stud* 2021;30:196-205.
44. Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med* 2006;166:1092-1097.
45. Sun J, Liang K, Chi X, Chen S. Psychometric properties of the generalized anxiety disorder scale-7 item (GAD-7) in a large sample of Chinese adolescents. *Healthcare (Basel)* 2021;9:1709.
46. Zhang L, Zhang L. Revision of the Chinese version of generic scale of phubbing. *Chinese Journal of Clinical Psychology* 2020;28:29-32.
47. Kline RB. Principles and practice of structural equation modeling. New York: Guilford Press; 1998.
48. Browne MW, Cudeck R. Alternative ways of assessing model fit. *Sociol Methods Res* 1992;21:230-258.
49. Hu LT, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Struct Equ Model* 1999;6:1-55.
50. Edwards JR, Lambert LS. Methods for integrating moderation and mediation: a general analytical framework using moderated path analysis. *Psychol Methods* 2007;12:1-22.
51. Repetti RL, Taylor SE, Seeman TE. Risky families: family social environments and the mental and physical health of offspring. *Psychol Bull* 2002;128:330-366.
52. Erath SA, El-Sheikh M, Mark Cummings E. Harsh parenting and child externalizing behavior: skin conductance level reactivity as a moderator. *Child Dev* 2009;80:578-592.
53. Liu QX, Fang XY, Wan JJ, Zhou ZK. Need satisfaction and adolescent pathological internet use: comparison of satisfaction perceived online and offline. *Comput Hum Behav* 2016;55:695-700.
54. Shepherd RM, Edelman RJ. Reasons for internet use and social anxiety. *Pers Individ Differ* 2005;39:949-958.
55. Kaess M, Durkee T, Brunner R, Carli V, Parzer P, Wasserman C, et al. Pathological internet use among European adolescents: psychopathology and self-destructive behaviours. *Eur Child Adolesc Psychiatry* 2014;23:1093-1102.
56. Hu YT, Wang Q. Self-control, parental monitoring, and adolescent problematic mobile phone use: testing the interactive effect and its gender differences. *Front Psychol* 2022;13:846618.
57. Tang CS. The rate of physical child abuse in Chinese families: a community survey in Hong Kong. *Child Abuse Negl* 1998;22:381-391.