



Revealing the Influencing Mechanisms of Harsh Parenting on Loneliness: Evidence from school-aged Chinese Adolescents

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Abstract

Introduction Although a wealth of research demonstrated the link between parenting behaviors and adolescent emotional problems, previous literature has rarely investigated the mediation effects of parent–child attachment and social relationships, including peers and student–teacher relationships. This study aims at exploring the potential roles of attachment and social relationships on the association between harsh parenting and loneliness among adolescents.

Methodology This study selects 937 middle and high school students in mainland China using multistage cluster random sampling. Structural equation modelling was used for data analysis.

Results Results showed that harsh parenting not only directly related to adolescent loneliness, but also indirectly through attachment and the relationship with peers and teachers.

Conclusion The findings of this study indicate that adolescents with experience of harsh parenting are more likely encounter low levels of parent–child attachment, which predicts poor relationships with peers and teachers, thereby increasing their risk of loneliness. These findings reflect the importance of improving peer and student–teacher relationships from the detrimental influence of harsh parenting on loneliness.

Keywords Harsh parenting · Attachment · Peer relationship · Student–teacher relationship · Loneliness

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Introduction

Loneliness is defined as the negative emotion caused by the lack of intimate and meaningful relationships with others (Weiss, 1973). This distressing feeling tends to be prevalent in adolescents, who are gradually moving away from their parents but have not fully integrated into the social network of peers (Goossens, 2018). Approximately 11–20% of youth are estimated to experience occasional loneliness, which can persist during adolescence and onwards (Qualter et al., 2015; Mund et al., 2020). A growing body of studies validate the adverse impacts of loneliness on adolescent emotional and behavioral problems, such as social anxiety, depression, and substance use (Cavanaugh & Buehler, 2016; Kim et al., 2018). Given the deleterious consequence of loneliness in adolescents, to explore and determine its risk factors is particularly imperative to facilitate the formulation of related social work programs.

Several factors from different ecosystem levels have been demonstrated to induce loneliness in adolescents, such as school belonging, family relationship, and sense of community (Heshmati et al., 2021; Arslan, 2021; Cicognani et al., 2014). Of all predisposing factors, harsh parenting plays one of the most prominent roles (Luo et al., 2021). It refers to coercive activities and unpleasant emotional expressions directed at children by their parents, including verbal aggression such as screaming or name-calling, and physical aggression such as slapping or striking (Chang et al., 2003). Such behaviors can be conceptualized as a range of child abuse, from causing at least psychological distress to serious injury or even death to the child (Gershoff, 2002). Considerable evidence suggests that adolescents who experience harsh parenting behaviors are more prone to perceived loneliness (Pinquart, 2021; Tang et al., 2018). However, an apparent limitation in previous studies is a lack of attention to exploring the potential mediating effects of attachment and social relationships (with teachers and peers) on the link between harsh parenting and loneliness. Accordingly, based on attachment theory, this study fills in this research gap by using a sample of Chinese adolescents to examine whether parent–child attachment and teacher and peer relationships sequentially mediate the link between harsh parenting and loneliness.

Literature Review

Harsh Parenting and Loneliness

Adolescents experience changes in both psychological and behavioral, including increased autonomy and social relationship demands outside family, especially for peers (Shifflet-Chila et al., 2016). Nevertheless, given the asymmetry between the desire for autonomy and the sense of incompetence, teenagers still need guidance and support from their parents. In this case, lack of a good relationship and harmony interaction with parents may increase the risk of loneliness (Laursen & Hartl, 2013). Harsh parenting is considered as one of rejecting behavior through hostility and aggression (Rohner, 1990). According to parental acceptance-rejection theory, parental rejection behavior toward children reflected by dislike, disapproval, and resentment can result in adverse psychosocial effects on children's development. In

addition, several empirical studies also demonstrate that parental inappropriate parenting style predicts children high levels of internalizing symptoms. For example, from a sample of 1,169 Chinese students, Luo et al. (2021) found that adolescent's retrospective experience of parental physical punishment has a positive association with their perceived loneliness. Results indicated that harsh parenting has a direct effect on adolescent depression (Tang et al., 2018). A meta-analysis also validated that the children suffering from harsh parenting are highly vulnerable to emotional problems (Pinquart, 2021). However, given the profound influence of concepts such as filial piety in Confucian culture, harsh parenting is more frequent and easier to accept in Chinese society (Luo et al., 2013); such behaviors are usually regarded as a means of punishing children for deviating from social norms or disobeying parents. Moreover, both parents and children tend to see this behavior as a sign of parental involvement that shows care and love for the young (Wang & Liu, 2018). In this case, harsh parenting behavior is considered more normal and likely to contribute to less serious consequences for Chinese children (Tang et al., 2018).

Peer Relationships, student-teacher Relationship and Loneliness

Substantial studies have found the association of student–teacher relationship and peer relationships with loneliness among adolescents (Zhen et al., 2019). A high-quality teacher-student relationship characterized by high levels of warmth and low levels of conflict can help students feel accepted, encourage them to actively participate in group activities, and foster a sense of school belonging and general perception, thereby alleviating their loneliness (Galanaki & Vassilopoulou, 2007; Zhang et al., 2019). Both emotional and instrumental teacher supports are associated with their students' perceptions of loneliness. Likewise, adolescents with positive peer relationships are also less likely to perceive loneliness, whereas lack of peer acceptance, popularity, and low level of help from friends significantly predict self-reported loneliness; in particular, children without mutual friends are hypothesized to be the loneliest (Espinoza & Hernandez, 2022; Kingery & Erdley, 2007).

Sequential Mediation of Attachment and Social Relationships

Attachment theory argues that children's early disruptive experiences from their parents can influence the formation of secure attachment that serves as their foundation to express emotions and communication in developing later relationships (Bowlby, 1969). Accordingly, teenagers who have been subjected to harsh parenting are more likely to develop insecure attachment, which will prevent them from forming and maintaining good relationships with peers and teachers. The model of family-peer linkages also considers that parenting behaviors is closely associated with their children's social competence, which then affects their interaction with peers (Ladd & Parke, 2021). Harsh rejection and parental unavailability poses considerable threats to the interactions between caregivers and children, increasing the risk of anxious-avoidant attachment (Moretti & Peled, 2004). Children who experience intensive physical discipline such as being stricken and slapped, are highly likely to develop low-level of attachment with their parents (Christopher et al., 2017; Wang et al.,

2021). Subsequently, those attachment types can have an adverse impact on the establishment of interpersonal relationships outside the family, such as those with peers and teachers. Securely attached children are more confident in exploring new environments on their own, and can apply the relationship skills they learned from interactions with their parents to their other social relationships, which can make them more acceptable and attractive to their peers; by contrast, children with insecure attachment patterns may experience various peer difficulties (Seibert & Kerns, 2015; Schneider et al., 2001). Similarly, securely attached children have social skills, such as sensitivity, responsiveness, and effectiveness to communicative signals, which are conducive to establishing a close and harmonious teacher-student relationships (Casidy & Shaver, 2008). Conversely, children with low-quality parent-child attachment are more likely to encounter insecurity, negative self-expression, avoidance, fear, and social anxiety in intimate relationships, which are detrimental to the development of teacher-student relationship (Wang et al., 2022).

In addition, there are also some empirical studies that have suggested the potential serial mediating roles of parent-child attachment and the relationships with teachers and peers on the nexus between stress events and adolescent internalizing problems. For example, Benoit and DiTommaso (2020) found that insecure attachment has a positive indirect effect on loneliness through online and offline social support based on a sample of 385 Canadian students. Another study also shows that the link between parent-child attachment and three categories of loneliness including social, romantic and family is partially mediated by perceived social relationships (Bernardon et al., 2011). That is, the experience of harsh parenting first result in reduced children attachment with their parents (Wang et al., 2021). And then compared with securely attached children, insecurely attached ones are less likely to consider themselves capable of receiving their needed support from others (Bernardon et al., 2011), which finally increases their risk of perceived loneliness (Larose et al., 2002).

Present Study

Despite substantial evidence documenting the adverse influence of negative parenting style on adolescent internalizing behaviors, few have examined the mechanisms through which harsh parenting affects adolescent perceived loneliness. Therefore, based on attachment theory, family-peer linkages model, and previous empirical studies, the present study expands current literature by simultaneously examining the direct effects of harsh parenting on loneliness, and the indirect effects through parent-child attachment and the relationships with teachers and peers. The specific research hypotheses are developed from the following theoretical model (Fig. 1).

Hypothesis 1 Harsh parenting is positively associated with adolescent perceived loneliness.

Hypothesis 2 Harsh parenting is negatively associated with parent-child attachment, which predicts a greater likelihood of loneliness.

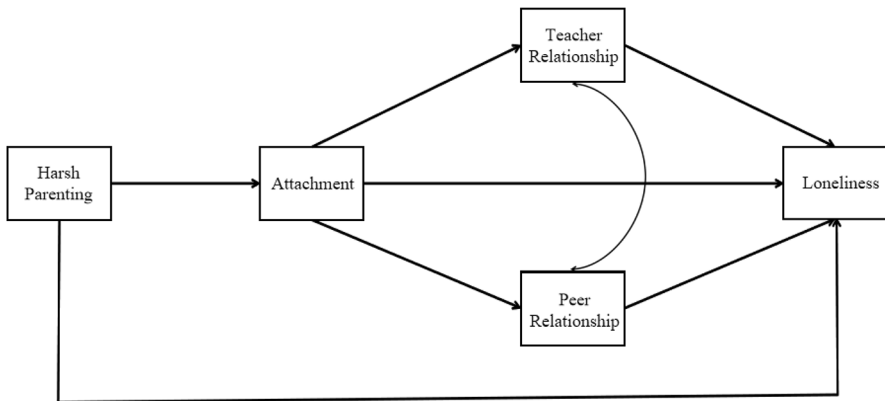


Fig. 1 Theoretical model

Hypothesis 3 Harsh parenting is negatively associated with parent-child attachment, which predicts poor peer relationship, thereby increasing the likelihood of loneliness.

Hypothesis 4 Harsh parenting is negatively associated with parent-child attachment, which predicts poor student-teacher relationship, thereby increasing the likelihood of loneliness.

Method

Participants and Procedures

Participants were recruited from two junior high schools (grades 7–9) and two high schools (grades 10–12) in Shaanxi Province, mainland China by multi-stage cluster random sampling from September to November 2020. First, two middle and senior high schools were randomly chosen, and then 1–2 classes were selected randomly in every grade. Finally, all the students in each chosen class were invited to participate in this investigation. Signed consent forms were obtained from the students and their parents, and 971 adolescents (469 males and 468 females) participated in the present study. Questionnaires were finished in class under the supervision of well-trained research assistants. The mean age of the participants was 15.106 years (Standard deviation=2.814). The total sample contains 550 left-behind children and 396 non-left-behind children, of which 5.8% were from single-parent families. In addition, this research was approved by the Survey and Behavioral Research Ethics Committee of the university the first author affiliated.

Measures

Harsh Parenting

A subscale of the Parenting Behavior Scale was applied to assess children's perception of harsh parenting (Li et al., 2005). The subscale included four items, specifically, "If I make a mistake, my parents will yell at me"; "If I make a mistake, my parents will beat me"; "If I make a mistake, my parents will beat me with a belt or something like that"; and "If I make a mistake, my parents will kick me out or lock me out." Each item was measured on a 5-point Likert scale from 1 (never) to 5 (always). All the four items were averaged, with higher score indicating higher level of harsh parenting. The scale showed satisfactory reliability and validity in previous studies in the Chinese cultural context (Ye, 2012). In present study, Cronbach's α for the scale was 0.705.

Attachment

The parent-child attachment scale was taken from the Inventory of Parent and Peer Attachment created by Armsden and Greenberg (1987). This scale comprised 21 items assessing communication, trust, and alienation. All the questions were rated on a 5-point Likert scale, ranging from 1 (almost never to never) to 5 (almost always or always). Communication included eight questions, such as: "My parents can help me understand myself better"; "If my parents knew something was bothering me, they would ask me"; and "When I am sad, my parents can feel it." Trust contains five questions, some sample items are: "Parents care what I think when discussing things" and "I trust my parents." Alienation comprised eight questions. For instance, "I wish I had different parents"; "My frustration is more than my parents know"; and "I don't know who I can rely on." The average value of these 21 item was calculated, and the higher score indicated the stronger attachment between parents and children. The Chinese version of this scale has been used in many empirical studies and showed satisfactory validity and reliability (Zhang et al., 2011). The Cronbach's α for the subscale in this study was 0.912.

Teacher and peer Relationships

Adolescents' relationship with teachers and peers were assessed by using the Interpersonal relationship scale (Lin, 2002). Teacher relationship covered three questions such as "I often talk to the teacher when class is over" and were also added together. The peer relationship subscale comprised eight questions, including "When encountering difficulties, friends will help me" and a summary value is calculated to represent adolescents' peer relationship. Each item was rated on a 4-point Likert scale ranging from 1 (never true) to 4 (very true). The higher mean value indicated the better relationship with teachers and peers, respectively. The scale has been applied in previous studies on Chinese population and has shown satisfactory validity and reliability (Guo, 2005). The Cronbach's α values for the four subscales are 0.792 and 0.901, respectively.

Loneliness

The University of California Los Angeles Loneliness Scale was used to assess adolescent perceptions of loneliness (Russell, 1996). This 20-item scale was scored on a 4-point Likert scale ranging from 1 (never) to 4 (always). Several examples in this scale are “I feel so alone”; “I feel there are few friends around who can share interests and ideas with me”; and “I feel alienated from others.” The mean score of the 20 items was computed to measure the level of loneliness, with a high score indicating a high level of loneliness. The Chinese version of this scale has been previously applied (Wang & Dong, 2018). In current study, the Cronbach’s alpha of this scale is 0.902.

Data Analyses

First, missing values was handled using the expectation-maximization (EM) estimation method. In the preliminary analyses, assumption of normality of variable in the present study was tested based on skewness and kurtosis. The absolute values are less than 2 for skewness and less than 7 for kurtosis, indicating that the data are normally distributed (West et al., 1995). Variance inflation factor (VIF) and tolerance were computed to detect multicollinearity problems. Next, descriptive statistics for the core variables were computed, including the means and standard deviations in SPSS 23.0. Pearson correlation analyses were also carried out to investigate the associations between harsh parenting, attachment, teacher relationship, peer relationship, and loneliness. A path analysis was performed using the maximum likelihood method in Mplus 7.4 to examine the proposed theoretical model. The model fit was evaluated depending on the following indices: comparative fit index (CFI) >0.90 , root mean square error of approximation (RMSEA) <0.08 and, root mean square residual (RMSR) <0.08 (Bae, 2017; Hair et al., 206). Bias-corrected bootstrapping procedures with 2000 samples were conducted to further verify the significance of the direct and indirect effects of harsh parenting on loneliness. In addition, gender (0= male, 1=female), age (12–19), and SES (including parental income, education level and position) were controlled in this study.

Results

Preliminary Analysis and Descriptive Statistics

Table 1 shows that skewness values ranged from -0.304 to 1.866 and kurtosis values range from -0.458 to 4.716 , which indicates that all core variables have quite normal distributions. VIFs were between 1.103 and 1.542, which did not exceed the threshold of 10 and tolerance are between 0.649 and 0.907, which is greater than 0.10, suggesting no significant multicollinearity between predictors in the current study. In addition, the average score for peer relationship was larger than that for teacher relationship, highlighting the importance of peer relationships in adolescence. Harsh parenting was negatively related to parent–child attachment ($r=-0.496$, $p<0.01$) and

Table 1 Descriptive statistics and correlation results

	M	SD	1	2	3	4	5	Skew	Kurt	VIF	Tolerance
1. Harsh Parenting	1.518	0.536									
2. Attachment	3.461	0.823	-0.496**		0.289**	0.294**	-	-	-	1.542	0.649
3. Teacher Relationship	2.160	0.693				0.155**	-	0.299	0.028	1.104	0.906
4. Peer Relationship	3.383	0.470					-	-	1.05	1.103	0.907
5. Loneliness	2.117	0.572						0.344	-		
									0.412		

Note: ** $p < 0.01$; * $p < 0.05$

Table 2 Standardized and unstandardized coefficients for the mediation model

Predictor	Consequent							
	Attachment		Teacher relationship		Peer relationship		Loneliness	
	B(β)	SE	B(β)	SE	B(β)	SE	B(β)	SE
Harsh parenting	-0.762*** (-0.496)	0.042					0.072* (0.067)	0.034
Attachment			0.243*** (0.289)	0.026	0.168*** (0.294)	0.017	-0.289*** (-0.415)	0.024
Teacher relationship							-0.074** (-0.090)	0.024
Peer relationship							-0.235*** (-0.193)	0.035

Notes: B represents the unstandardized regression coefficients; β represent the standardized regression coefficients. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

positively related to loneliness among adolescents ($r = 0.302$, $p < 0.01$). Attachment was positively linked with teacher relationship ($r = 0.289$, $p < 0.01$) and peer relationship ($r = 0.294$, $p < 0.01$), but negatively linked with loneliness ($r = -0.532$, $p < 0.01$). A significant correlation was found between teacher and peer relationship ($r = 0.155$, $p < 0.01$), both of which negatively related to adolescent loneliness ($r = -0.245$, $p < 0.01$; $r = -0.337$, $p < 0.01$, respectively).

Mediation Model

The proposed multi-mediation model was applied to test the direct and indirect associations between variables. Results proved that this theoretical framework fit the data well (CFI=0.993, RMSEA=0.053, and RMSR=0.017). Table 2 presents standardized and unstandardized coefficients for the mediation model. Findings showed that harsh parenting had a significant direct effect on attachment ($\beta = -0.496$, $p < 0.001$) and explained 24.6% of the variance in parent-child attachment. Attachment had significant direct effects on teacher relationship ($\beta = 0.289$, $p < 0.001$) and peer relationship ($\beta = 0.294$, $p < 0.001$), accounting for 8.30% and 8.70% of their respective

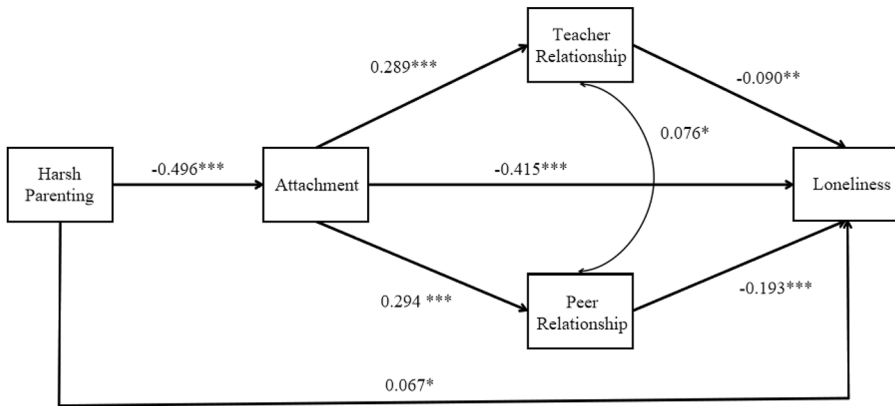


Fig. 2 Results of the path model testing. Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3 Direct, indirect and total effects with 95% confidence intervals (CI)

	β	SE	95% CI	
			Lower	Upper
Total effect	0.314**	0.033	0.265	0.401
Direct effect				
Harsh parenting \rightarrow Loneliness	0.067*	0.032	0.002	0.136
Total indirect effect	0.247**	0.020	0.221	0.307
Specific indirect effect				
Harsh parenting \rightarrow Attachment \rightarrow Loneliness	0.206**	0.020	0.177	0.264
Harsh parenting \rightarrow Attachment \rightarrow Teacher relationship \rightarrow Loneliness	0.013**	0.004	0.006	0.024
Harsh parenting \rightarrow Attachment \rightarrow Peer relationship \rightarrow Loneliness	0.028**	0.005	0.020	0.043

Note: ** $p < 0.01$; * $p < 0.05$

variances in this study. Moreover, harsh parenting ($\beta = 0.067, p < 0.05$), attachment ($\beta = -0.415, p < 0.001$), teacher relationship ($\beta = -0.090, p < 0.01$), and peer relationship ($\beta = -0.193, p < 0.001$) had significant direct effects on loneliness. Collectively, all the current predictors explained 33.0% of the variance in adolescent loneliness. Figure 2 shows the path analyses results. This study further examined the indirect effect of harsh parenting on loneliness by carrying out bootstrapping with 2000 samples. Table 3 presents the standardized direct, indirect, and total effects with 95% bias-corrected confidence intervals. The indirect effect of harsh parenting on loneliness through attachment was significant ($\beta = 0.206, 95\% \text{ CI} = [0.177, 0.264]$). In addition, the above association was sequentially mediated by attachment and teacher relationship ($\beta = 0.013, 95\% \text{ CI} = [0.006, 0.024]$) and by attachment and peer relationship ($\beta = 0.028, 95\% \text{ CI} = [0.020, 0.043]$) respectively.

Discussion

By using a sample of Chinese students in middle and high schools, this study constructed a serial mediation model to explore the link between harsh parenting and adolescent loneliness. The results showed that harsh parenting is associated with adolescent report of loneliness not only directly, but also indirectly via parent–child attachment and relationships with teachers and peers. These findings facilitated a better understanding of the potential psychosocial mechanism on the nexus between harsh parenting and loneliness among adolescents.

Consistent with previous studies revealing the direct effect of parental behaviors on adolescent internalizing behavior problems (Pinquart, 2021; Tang et al., 2018), the present study also found that children who experience of harsh parenting are highly likely to suffer from loneliness. Specifically, if parents commonly yell at and punish children who make mistakes with physical discipline, then the children may have no way to obtain emotional needs from the family, thereby increasing their loneliness (Luo et al., 2021). Therefore, Hypothesis 1 is supported. However, the above finding contradicts the cultural normativeness hypothesis suggesting that the impact of harsh parenting on children development depends on whether the behavior is culturally acceptable (Lansford et al., 2005). Accordingly, given the profound influence of Confucianism, Chinese parents pay more attention to conforming to social norms and obeying their requirements of children behavior, and thus physical punishment may be more common in Chinese families, which may weaken the influence of harsh parenting on children development (Luo et al., 2013). This inconsistent result may be explained by the influence of Western culture, especially permissive and warmth parenting behaviors, and thus physical discipline in China decreases to low incidence and cultural normativeness (Janson et al., 2010). All of these changes may contribute to the decrease of children's recognition and acceptance on harsh parenting, thereby increasing the negative effects of such behavior (Pinquart, 2021).

The results not only found the mediating role of parent–child attachment on the link between harsh parenting and loneliness, but also the serial mediators of attachment and relationship with peers and teachers on this relationship. Thus, Hypotheses 2, 3, and 4 are all supported. This observation was in line with attachment theory that argues the experience of physical discipline can influence the development of children's secure attachment, which in turn hinders them from developing other social relationships outside the family (Bosmans et al., 2011; Bowlby, 1969). Loneliness is a distressing experience caused by a lack of intimacy or the feeling of not belonging to a certain group, which appears to peak during adolescence; thus gaining peer approval and maintaining friendships are important for adolescents to reduce feelings of loneliness (Espinoza & Hernandez, 2022). Furthermore, teacher–student relationship, as another significant interpersonal relationships for children, has a protective effect on adolescents' loneliness. Because a high-quality teacher–student relationship can provide student with increased social support and warmth (Davis, 2003). Adolescents who experience excessive parental corporal punishment tend to report lower levels of attachment security (Tussey et al., 2018). Insecurely attached children are more likely to perceive themselves as unlikable (Manning et al., 2017) and regard their parents as unreliable and untrustworthy (Manassis & Bradley, 1994).

Such internal working model leads children to be hypersensitive to cues or signals of rejection, and have difficulties in emotions and reaction understanding that makes them more prone to misunderstand others' intentions in uncertain situation (Konok et al., 2016). All these maladaptive interpersonal characters cause difficulties to establish and maintain satisfying relationships with others, thereby greatly increasing their risk of experiencing loneliness (Liu et al., 2021).

Finally, this study theoretically contributes to attachment theory and the model of family-peer linkages, given that the findings provide empirical support in Chinese society. The proposed theoretical model is the first to uncover the intermediary roles of attachment and social relationships on the nexus between harsh parenting and adolescent loneliness, which thus clarifies its psychosocial mechanism. In addition, the present study also has vital practical implications. Specifically, the positive relationship between harsh parenting and loneliness is demonstrated, validating that intervention aiming at reducing negative parenting may be effective when attempting to prevent adolescent loneliness. Parents are encouraged to use positive behaviors such as encouraging, praising, consistency, and modelling instead of harsh parenting to meet children's emotional needs in the family, while paying more attention to the changes in the children's inner worlds (Luo et al., 2021; Seay et al., 2014). Meanwhile, school psychologists can organize advocacy campaigns regarding parenting styles to inform parents about the harmful effects of harsh parenting and the importance of maintaining a supportive family environment (Tang et al., 2018). Parents must be informed that their harsh behaviors toward children may reduce the latter's parent-child attachment, social skills, and competence, which can severely affect their development of relationships outside the home, further triggering feelings of loneliness. In addition, this study provides a new perspective on reducing the adverse effects of harsh parenting on loneliness among adolescents by improving their relationships with teachers and peers at school. High-quality teacher-student relationship can effectively prevent loneliness among adolescents by promoting their self-concept and self-esteem (Guerin & Tatlow-Golden, 2019). Meanwhile, school can enhance interaction and cooperation with parents to support the children's psychosocial development. High-quality friendships are also shown to act as a protective factor against peer exclusion and isolation in school settings and can also improve student school engagement. Therefore, individualized social skills training for disadvantaged groups must be strengthened, such as by encouraging children who are vulnerable to loneliness to participate in social and emotional learning activities in the classroom (Antonopoulou et al., 2019).

Limitations

Several limitations must be considered in present study. First, the data are collected from a cross-sectional survey and cannot determine causality. Thus, longitudinal research needs to be carried out to confirm the causal relationships among harsh parenting, attachment, social relationships, and loneliness. Second, the use of self-report measures may allow the validity of research findings to be influenced by social desirability. Future research can collect data from multiple informants such as parents, children, teachers, and peers. Third, given that this study only selects four schools

in Shaanxi Province, the current conclusions cannot be generalized to other groups and societies. Future research can replicate the proposed theoretical model to other groups and regions to obtain more generally applicable results. Fourth, this study only examines the serial mediating effects of attachment and social relationships on the relationship between harsh parenting and adolescent loneliness, other alternative models can be tested to achieve a more comprehensive understanding of such influencing mechanism.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s11482-023-10236-2>.

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Data Availability The data used during the current study are available from the corresponding author on reasonable request.

Declarations

Conflict of Interest None.

Ethical Approval All procedures in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This survey has been approved by the Survey and Behavioural Research Ethics Committee (SBREC) of The Chinese University of Hong Kong (Reference No. SBRE-20-078, Date: 13November 2020).

Informed Consent Informed consent was obtained from all individual participants included in the study.

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