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Highlights in educational psychology: Parental influence on child education

Edited by
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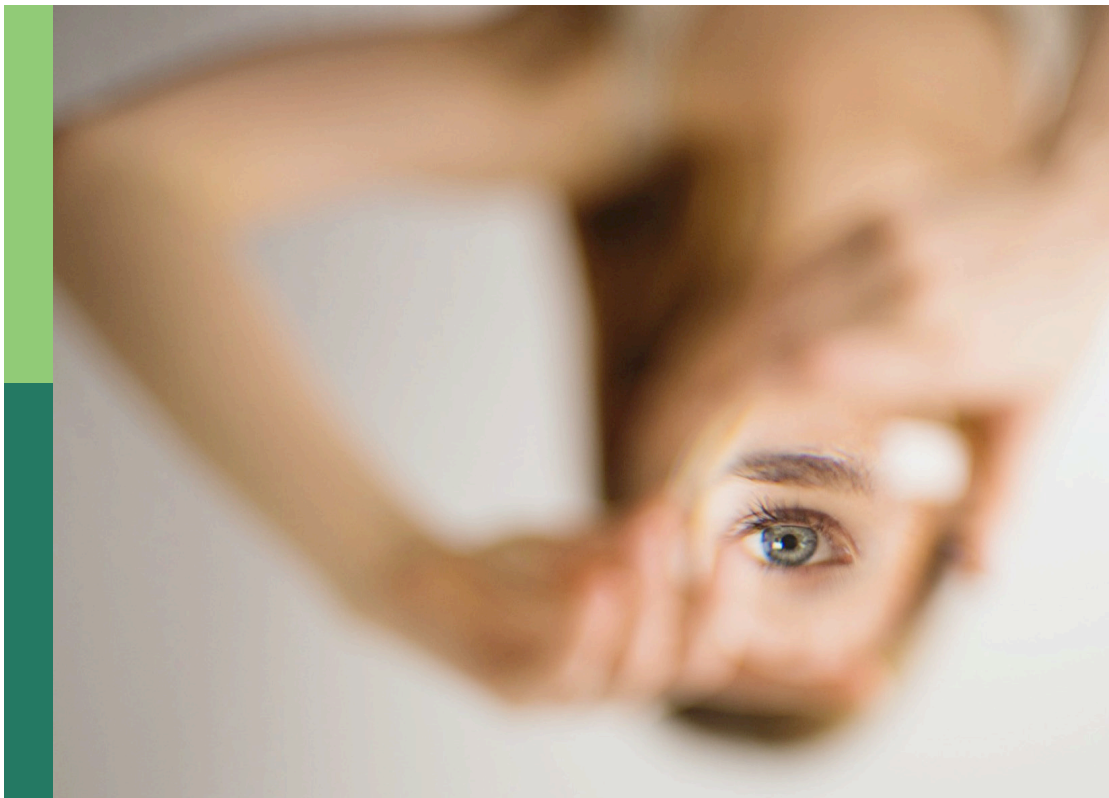

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Highlights in educational psychology: Parental influence on child education

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Parents' Education Anxiety and Children's Academic Burnout: The Role of Parental Burnout and Family Function

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This study aimed to explore the effect of parents' education anxiety on children's academic burnout, and the mediation effect of parental burnout and the moderating effect of family function. A total of 259 paired parents and children from two middle schools in central China participated in the survey. The questionnaire was conducted using the Educational Anxiety Scale, Parental Burnout Scale, Adolescent Student Burnout Inventory, and Family APGAR Index. Our results indicated that parental education anxiety had a positive predictive effect on children's academic burnout. Moreover, parental burnout played a complete mediating role between parents' education anxiety and children's academic burnout. Finally, the relationship between education anxiety and parental burnout was moderated by family function, and higher family function buffered the effect of education anxiety on parental burnout. The results suggest the mechanism of parental education anxiety on children's academic burnout, and the role of family function in alleviating parental burnout.

Keywords: education anxiety, parental burnout, academic burnout, family function, moderated mediation model

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INTRODUCTION

The traditional Chinese idiom of "Meng Mu San Qian"—which describes how a wise mother endeavors to find the best environment for her children's education—shows that Chinese people have emphasized children's education since ancient times. The imperial examination system has been implemented since the Sui and Tang Dynasties. While it provided opportunities for people from common backgrounds to attain official positions, it also strengthened the results-orientation of children's educational evaluations. With dramatic shifts in parenting and environments, parents set progressively higher expectations for both their parenting behaviors and the development of their children, and are increasingly anxious about performing well as parents (Nelson and Nelson, 2010; Eibach and Mock, 2011; Lan, 2018). Thus, most parents typically expect their children to have a bright future.

The rapid development of the social economy has provided more parenting resources to raise children (Thomson et al., 1994; Hillman and Jenkner, 2004). However, high-speed development has also aggravated social competition and further raised parents' expectations (Roskam et al., 2017). Specifically, parents increasingly worry about their children's future and their failure in terms

of education (Cheng, 2019). High parenting expectations and uncertainty regarding parenting outcomes have become common problems for Chinese parents. Recently, the popular TV series, "A Love for Dilemma," incisively highlighted the phenomena of "educational involution," and "pushing children to be the best." The drama aroused extensive public discussion and illustrated the prevalence of education anxiety in contemporary China.

Education Anxiety

Accordingly, the term "education anxiety," which first emerged in news reports, has become familiar to the Chinese (Chen and Xiao, 2014), and has also been recognized by researchers (Cheng, 2019). For instance, Cheng (2019) indicated that education anxiety is a state of anxiety produced in the educational context. Regarding their children's education, parent's high expectations, uncertainty of education outcomes, and fear of failure may cause parents to experience tension, worry, panic, and other negative emotions. Furthermore, the content of parents' education anxiety may encompass all aspects of their children's development, such as whether their body height and shape meet certain standards, whether their learning motivation is strong, whether they have good learning habits, and whether they are skilled at interpersonal communication. That is, parents' education anxiety can emerge during various developmental stages of their children and depend on children attaining the level of parents' expectation of achievements.

Due to education being highly competitive in China, the quality of a child's junior school education affects their ability to enter a prestigious high school, which also determines whether they can enter a well-known university. Therefore, parents may develop education anxiety when their children enter junior high school (Chang et al., 2020). These students are in their adolescence, and typically experience rapid physical and mental development, an awakening of self-consciousness, advanced independence, and critical thinking. However, they may also experience emotional instability and increased difficulty in communicating with their parents (Bailen et al., 2019). In addition, some students live in school dormitories, which further reduces opportunities for students to communicate with their parents (Zhang and Cao, 2018). Ultimately, a lack of communication between parents and children may worsen parents' education anxiety.

Relations Between Education Anxiety and Academic Burnout

Parents with education anxiety may have difficulties managing their expectations regarding their children. They may worry about providing sufficient educational resources for their children's development, and the children achieving enough to meet their expectations. While students' core task is learning (Chang et al., 2014), parents' anxiety mainly revolves around their children's studies. For example, parents may worry about their children's learning motivation, habits, and performance. Furthermore, parents' negative emotions were related to a decrease in positive parenting behavior and an increase in negative parenting behavior (Dallaire et al., 2006). Accordingly, these anxieties are unproductive in children's education and may further increase pressure on children regarding their learning, resulting in academic burnout (Cheng, 2019).

Academic burnout can be regarded as an extension of career burnout as students' routines may include structured activities, such as attending class and submitting assignments, which can be considered "work" (Lin and Huang, 2014). Researchers have indicated that emotional exhaustion, depersonalization, and feelings of low personal accomplishment can be experienced in students' learning process, course stress, course load, and so forth (Balogun et al., 1996; Lingard et al., 2007). Walburg (2014) reviewed the academic burnout in high school students and confirmed the three-dimensional construct of academic burnout. Furthermore, academic burnout was positively related to depression and school dropout. School pressure, peer groups, and school engagement were risk factors for academic burnout.

According to social learning theory (Bandura, 1989), children learn their parents' reaction patterns. Anxious parents may show tension, or disgust when encountering pressure and frustrating situations. When children experience stressful situations, they may also exhibit a series of negative symptoms that imitate their parents' reaction patterns that produce tension, anxiety and disgust. Specifically, students may lose their enthusiasm for studying and school activities, may have difficulty communicating with their classmates or friends, and may fail in obtaining a sense of achievement from their studies (Wu et al., 2007). Previous studies have also indicated the positive relationship between parents' education anxiety and their children's academic burnout (Cheng, 2019). Therefore, in line with prior studies, Hypothesis 1 was proposed: parental anxiety is positively related to academic burnout.

Relationship Between Education Anxiety and Parental Burnout

Parental burnout refers to a group of negative symptoms caused by long-term parenting stress, such as emotional exhaustion related to the parental role, self-comparison with previous self, being fed up of their parental role, and emotional distance from children (Roskam et al., 2018). According to the balance between risks and resources (BR^2) theory (Mikolajczak and Roskam, 2018), parental burnout stems from high parenting requirements (perfectionism in parenting, low emotional intelligence, poor parenting habits, and lack of support from family and partners, etc.) and limited parenting resources (parents' self-empathy and lack of emotional support, etc.). Therefore, the emergence of parental burnout results from inadequate parenting resources, which cannot meet demand requirements. Moreover, high expectations regarding education (high parenting requirements) and anxieties that there are insufficient educational resources to meet children's needs (limited parenting resources) are predominant sources of education anxiety (Cheng, 2019). Thus, if parental burnout results from the long-term imbalance between resources and demands, then parenting anxiety may be an antecedent of their burnout. Therefore, Hypothesis 2 was proposed: parental anxiety is positively related to parental burnout.

The Relationship Between Education Anxiety and Academic Burnout

Furthermore, both the concepts of parental burnout and academic burnout are derived from job burnout (Pines et al., 1981; Roskam et al., 2017). Although parental burnout focuses on parents' inner experiences in the parenting process (Roskam et al., 2018), and academic burnout focuses on children's subjective feelings in the learning process (Farina et al., 2020), both concepts overlap considerably. Based on the social learning theory (Bandura, 1989), parents are usually their children's first teachers, role models, and main learning objects. Children acquire knowledge from their parents and learn their behaviors and emotional expressions (Bian et al., 2016). When children notice their parents' negative emotional experiences (parental burnout), they may learn from their parents' expressions and reproduce similar emotions (academic burnout) in the corresponding academic environment. Therefore, parental burnout may be an antecedent to children's academic burnout. Combined with a previous study (Cheng, 2019) and Hypothesis 2, Hypothesis 3 was proposed: the relationship between parents' education anxiety and children's academic burnout is mediated by parental burnout.

The Moderation Effect of Family Function

According to the BR^2 model (Mikolajczak and Roskam, 2018), excessive parental requirements are not necessarily related to parental burnout. Specifically, when parenting resources are insufficient to meet parenting requirements, anxious parents may not have extra resources to cope with their anxiety. In this situation, education anxiety may positively related with the occurrence of parental burnout; however, when parents have sufficient resources to cope with their requirements, they may avoid the occurrence of parental burnout. Therefore, the relationship between parenting requirements and parental burnout may be moderated by parenting resources. Family function reflects the intimacy, mutual support, and cooperation among family members, and could also be used to measure individual social support and emotional support (Zhang, 2013). In addition, family function was considered closely related to an individual's psychological status (Beavers and Voeller, 1983) and a well-functioning family can improve the care of family members and promote the self-esteem and self-acceptance ability of children (Bao, 2019). Therefore, high family function means that families can provide important emotional and social support (Danzeng et al., 2015), and it constitutes a typical parenting resource.

Although raising children is the responsibility and obligation of both spouses (Cheng et al., 2021), spouses may have different parental roles. Specifically, the role of primary caregivers may be more important than that of secondary caregivers. When the primary caregiver faces high parenting requirements and experiences education anxiety, high family function from the secondary caregiver or social support from other family members may reduce their parenting pressure and enrich parenting resources. Prior studies have already shown that social support can decrease the level of parental burnout (Ardic, 2020; Szczygiel et al., 2020). Moreover, partner support not only reduces parenting pressure, but also helps to maintain the balance between parenting demands and resources (Séjourné et al., 2012; Parfitt and Ayers, 2014). Therefore, Hypothesis 4 was proposed: the relationship between parenting anxiety and parental burnout is moderated by family function.

Present Study

Thus, based on the BR^2 theory, the current study aimed to examine the effects and mechanisms of parents' education anxiety on children's academic burnout. Paired data from primary caregivers and children were utilized. Parental burnout was set as a mediating variable and family function as a moderating variable, and a moderated mediation model was built. The research framework is illustrated in **Figure 1**.

MATERIALS AND METHODS

Sample

Data were collected through convenience sampling. Participants were junior middle school students and their primary caregivers (father or mother) from two middle schools in Central China. Two versions of the questionnaire (students' and parents' versions) were distributed to students during class. Parents were asked to answer the education anxiety, parental burnout, and family function questionnaire. Children were asked to answer the academic burnout scale. After students completed their version in class, they delivered the parents' version (which was sealed in an envelope) to their primary caregivers at home. Upon completion, the primary caregivers sealed the questionnaire in the reply envelope and returned it to the students, who subsequently returned the questionnaires to school. Participants were required to provide signed informed consent which detailed that participation in the survey was voluntary, refusal to participate would not incur any repercussions, and that participants could withdraw at any time. All students provided informed consent to participate in the study, and their participation in the study was also approved by their parents. This survey was approved by the research ethics committee of the authors' academic institution.

Both the children's and parents' questionnaires contained a question, "Who is your primary caregiver?" and "Who is the primary caregiver of the child?" respectively. The students

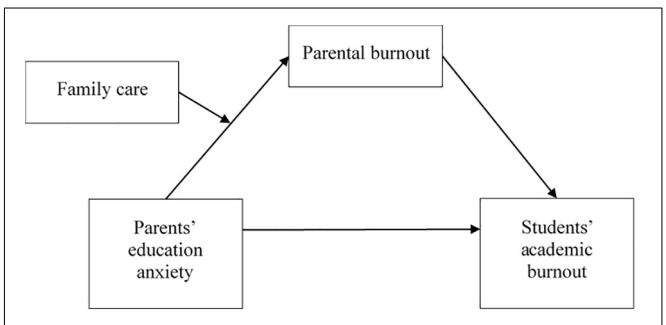

FIGURE 1 | The framework of the present study.

chose a response from father, mother, or others, while parents selected either themselves, their spouse, or others. After both questionnaires were returned, we checked whether the data matched. If the answers of parents and students about the primary caregiver were different, the paired questionnaires were excluded. If the answer of the primary caregiver was "others," these questionnaires were also excluded. In total, 259 pairs of data were retained for subsequent statistical analysis. Regarding primary caregivers, there were 206 mothers (79.54%) and 51 fathers (20.46%); the average age was 40.47 (SD = 3.76) years. For educational level, 123 had below high school education, 126 had higher than undergraduate education, and 10 did not answer. Regarding students, there were 118 boys (45.56%), 132 girls (50.97%), 9 missing (3.47%), 129 from grade 7 and 130 from grade 8; the average age was 12.89 (SD = 0.69) years.

Measures

Parents' Education Anxiety

Parents' education anxiety was measured using the Parental Anxiety about Children's Education Questionnaire (Cheng, 2019). It includes three dimensions: achievement anxiety, ability anxiety, and health anxiety; each dimension has four items, totaling 12 items. An example item is: "I am worried that my child will not have a stable job in the future." All items were assessed on a 5-point Likert scale ranging from 1 ("never") to 5 ("always"). Cronbach's α was 0.872 in the current study.

Parental Burnout

Parental burnout was measured using the Chinese version of the Parental Burnout Assessment (PBA; Cheng et al., 2020). This was translated from the English version of Roskam et al. (2018) and has satisfactory reliability and validity. It comprises 21 items; an example item is: "I feel as though I've lost my direction as a dad/mum." Each item was rated using a 7-point Likert scale, ranging from 1 ("completely inconsistent") to 7 ("completely consistent"), with a higher score representing higher burnout. Cronbach's α was 0.927 in the current study.

Family Function

Family function was measured using the Chinese version of the Family Adaption Partner Growth Affection Resolve Index (family APGAR index; Chen et al., 1980). It was translated from the English version of Smilkstein (1983) and has satisfactory reliability and validity. It includes five dimensions of adaption, partner, growth, affection and resolve, and each dimension has one item. An example item includes: "Family resources are available for coping." Each item was rated on a 3-point Likert scale, ranging from 0 ("rarely") to 2 ("always"). Cronbach's α was 0.862 in the current study.

Academic Burnout

Academic burnout was measured using the Adolescent Academic Burnout Scale (Wu et al., 2010). The scale includes three dimensions: low sense of achievement, academic alienation, and physical and mental exhaustion. It consists of 16 items, for example: "I cannot feel any sense of achievement from learning" for low sense of achievement; "I am so bad at my study that I really want to give up" for academic alienation; and "I feel extremely tired at the end of a day studying" for physical and mental exhaustion. Each item was rated on a 5-point Likert scale, ranging from 1 (strongly inconsistent) to 5 (strongly consistent). Some items were reverse scored. A higher score on the scale indicates a higher level of academic burnout. The Cronbach's α was 0.877 in the current study.

Demographic Variables

Demographic items, including parents' age, gender, education level, and their child's gender and age were recorded.

Data Analysis

All data analyses were conducted using IBM SPSS 23.0, with a process macro. First, common method variance was examined using confirmatory factor analysis. Correlation analyses were then conducted to preliminarily examine the hypotheses. Finally, the mediation effects of parents' education anxiety and the moderating effects of family function were examined via regression and bootstrap analyses.

RESULTS

Common Method Bias

Although the present study adapted paired data, the answers were derived from different resources. All questionnaires were self-assessment scales that may produce common method bias. Therefore, common method bias was examined using the Harman single factor test (Zhou and Long, 2004). The results of the exploratory factor analysis showed that the number of factors without rotation was greater than 1, and the variance interpretation percentage of the first principal component was 23.62%, less than 40%. This indicated that common method bias had little effect on the overall results of the present study (Ashford and Tsui, 1991). Furthermore, common method variance was examined by controlling for the effects of the unmeasured latent method factor (Podsakoff et al., 2003). In the confirmatory factor analysis model, each item was allowed to load on its respective construct (i.e., education anxiety, parental burnout, family function, and academic burnout). In addition, the common method variance factor was created, with all items allowed to load. The latent factor did not correlate with other factors. The variance explained by the latent method factor was 2.4%, which is lower than the median of 25% reported in a previous study (Williams et al., 1989). These results provide further evidence that common method variance had little effect on the overall results of the present study.

Descriptive Statistics and Correlation Analysis

Firstly, a series of the independent-samples t test were conducted to examine whether the demographic characters could affect the variables. The results showed that education anxiety, parental burnout ($t = -0.96$, $df = 251$, $n.s.$), and family function ($t = 1.46$, $df = 251$, $n.s.$) did not show significant differences on parents' gender (for education anxiety: $t = -0.08$, $df = 251$, $n.s.$; for

parental burnout: $t = -0.96$, $df = 251$, *n.s.*; for family function: $t = 1.46$, $df = 251$, *n.s.*) or education level (for education anxiety: $t = -0.08$, $df = 251$, *n.s.*; for parental burnout: $t = -0.96$, $df = 251$, *n.s.*; for family function: $t = 1.46$, $df = 251$, *n.s.*). In addition, academic burnout did not show significant differences on students' academic burnout ($t = -0.72$, $df = 248$, *n.s.*) (**Table 1**).

Moderated Mediation Models

Aligned with Wen and Ye's (2014) suggestion, a multiple regression analysis was conducted to examine the direct effect of parents' education anxiety on children's academic burnout, the mediation effect of parental burnout, and the moderation effect of family function. In the first model, academic burnout was set as the dependent variable and education anxiety as the independent variable. In the second model, parental burnout was added as an independent variable. In the third model, parental burnout was set as the dependent variable, and education anxiety, family function, and interaction of family function and education anxiety were set as independent variables. The results were shown in **Table 2**.

Parents' education anxiety had a positive effect on children's academic burnout ($\beta = 0.21$, $t = 3.45$, $p < 0.01$), which further supported Hypothesis 1. When parental burnout was added to the model, parental burnout had a significant effect on academic burnout ($\beta = 0.17$, $t = 5.57$, $p < 0.05$). Education anxiety was less significant than Model 1 ($\beta = 0.13$, $t = 1.96$, $p < 0.10$), which preliminarily supported Hypothesis 2. In addition, parents' education anxiety ($\beta = 0.46$, $t = 8.18$, $p < 0.001$), family function ($\beta = -0.14$, $t = -2.56$, $p < 0.05$), and the interaction between education anxiety and family function ($\beta = -0.20$, $t = -3.68$, $p < 0.001$) were significantly related to parental burnout, which preliminarily supported Hypothesis 3.

To further examine the hypothesized moderated mediation model, Model 14 of the process macro (Hayes, 2013) was used. Parents' education anxiety was set as the independent variable, parental burnout as a mediating variable, family function as a moderating variable, and students' academic burnout as the dependent variable. Following the suggestions of Fang et al. (2014), a non-parametric bootstrapping method (n = 5,000) was used, with a 95% confidence interval calculated using the bias-corrected bootstrapping method. The results showed that the moderated mediation model was significant (the indexes of moderated mediation were -0.015, *SE* = 0.010, 95% CI [−0.042, −0.002]. **Table 3** shows the mediating effects of parental burnout under different levels of family function.

TABLE 1 | Descriptive statistics and correlations.

		M	*SD*	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
①	Education anxiety	3.05	0.78	(0.872)									
②	Achievement anxiety	3.10	1.01	0.88**	(0.887)								
③	Ability anxiety	2.74	0.91	0.81**	0.52**	(0.676)							
④	Health anxiety	3.37	0.90	0.75**	0.50**	0.51**	(0.698)						
⑤	Parental burnout	1.67	0.75	0.45**	0.42**	0.32**	0.36**	(0.927)					
⑥	Academic burnout	2.32	0.61	0.21**	0.19**	0.24**	0.06	0.23**	(0.877)				
⑦	Physical and mental exhaustion	2.66	0.89	0.100	0.06	0.17**	-0.01	0.18**	0.76**	(0.752)			
⑧	Academic alienation	1.66	0.72	0.21**	0.19**	0.24**	0.06	0.28**	0.83**	0.57**	(0.826)		
⑨	Low sense of achievement	2.60	0.71	0.20**	0.19**	0.19**	0.09	0.13*	0.83**	0.37**	0.51**	(0.829)	
⑩	Family function	2.45	0.51	−0.20**	−0.20**	−0.17	−0.09	−0.27**	−0.25**	−0.16**	−0.22**	−0.23**	(0.862)

*$p < 0.05$ and **$p < 0.01$.

TABLE 2 | Results of multiple regression analyses.

	Model 1		Model 2		Model 3	
	Academic burnout		Academic burnout		Parental burnout	
	β	*t*	β	*t*	β	*t*
Education anxiety	0.21	3.45**	0.13	1.96+	0.46	8.18***
Family function					−0.14	−2.56*
Education anxiety × Family function					−0.20	−3.68***
Parental burnout			0.17	2.57*		
R^2	0.04		0.07		0.27	
$\triangle R^2$	0.04		0.03		0.27	
F	11.91**		9.39***		31.958***	

The dependent variables were academic burnout.
+$p < 0.10$.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

TABLE 3 | The mediation effects of parental burnout under different levels of family function.

	Family function	*EFFECT*	*SE*	*95%CI*
Parental burnout	*M-SD*	0.122	0.062	[0.016, 0.264]
	M	0.083	0.039	[0.012, 0.168]
	M + SD	0.044	0.021	[0.009, 0.094]

A simple slope test was conducted to further explore the moderating effects of family function (**Figure 2**). Education anxiety showed significant positive effects on parental burnout, regardless of whether family function was high or low. However, with low family function, the predictive effect of education anxiety on parental burnout (simple slope = 0.15, $t = 7.57$, $p < 0.001$) was higher than that in high family function (simple slope = 0.12, $t = 3.36$, $p < 0.001$). These results suggest that family support could help primary caregivers cope with the negative effect of education anxiety, and provided further support for Hypothesis 3.

DISCUSSION

At present, parents focus on and invest more resources in children's education with high expectations. In addition, because of uncertainties regarding educational outcomes, parents' education anxiety is becoming more prevalent. Previous studies indicate that education anxiety not only negatively affects parents' sleep quality, but also exacerbates children's academic burnout (Cheng, 2019). However, few works have focused on this effect from the children's perspective and examined the mechanism. Therefore, by using paired data, the present study established a moderated mediation model, and examined the mediation effect of parental burnout and the moderation effect of family function. The result generally supported the hypotheses.

Although the term "education anxiety" often appears in various news reports, there are few empirical studies on this social phenomenon (Li, 2020). The present study examined the relationship between education anxiety and parental burnout based on the characteristics and current context of family education in China. The results support that parents' education anxiety could be positively related to their level of parental burnout. This result is consistent with the BR^2 theory of parental burnout (Mikolajczak and Roskam, 2018). Furthermore, parents' education anxiety may partly originate from perfectionism, and perfectionism could also be an antecedent of parental burnout (e.g., Meeussen and Van Laar, 2018; Furutani et al., 2020). Future studies should control the effects of perfectionism, and examine the relationship between education anxiety and parental burnout.

According to the BR^2 model, anxiety about high educational expectations, concerns about the uncertainty of educational achievements, and fear of educational failure, could be regard as parenting requirements. When these requirements exceed parenting resources, it may lead to resource depletion, resulting in parental burnout. The present study provides a new perspective for exploring the antecedents of parental burnout. Therefore, the prevention and intervention of parental burnout may be achieved by decreasing education anxiety. Parents should parents should assume a scientific approach toward parenting, adjust their parenting expectations, and set realistic parenting goals to reduce education anxiety and parental burnout.

An essential aspect of parents' education behavior is the interaction between parents and children (Guo, 2011). Parents with high levels of anxiety may find it difficult to adjust their behaviors. Combined with high expectations, these parents may emphasize the learning of knowledge and skills, and ignore their children's emotional demands. This results in improper rearing behavior, for instance, parents may permit their children to participate in many tutorial classes and reduce their rest and entertainment time. Children may not realize their parents' expectations; thus, negative parental behavior may harm the parent-child relationship and result in parent-child conflict (Han, 2018). In addition, children become vulnerable in parent-child relations, and may suffer serious psychological damage.

The present study examined whether the relationship between education anxiety and children's academic burnout could be mediated by parental burnout. The results provide new evidence to explain the mechanism of education anxiety on children's academic burnout. Furthermore, this aligns to prior studies

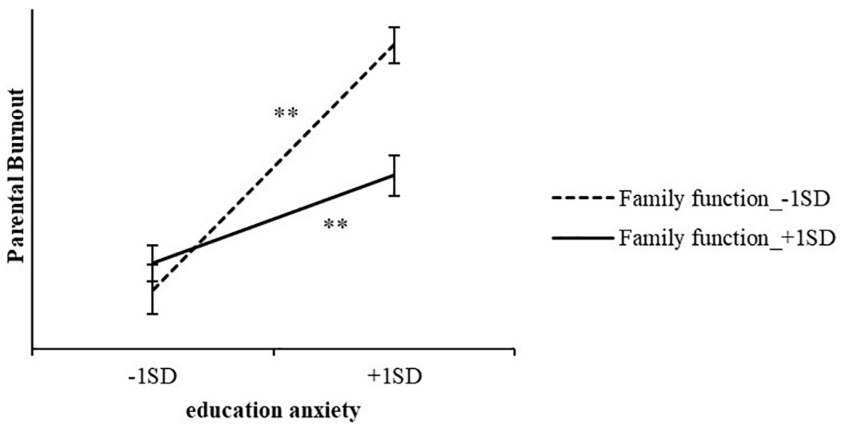

FIGURE 2 | The moderation effects of family care.

that suggest job burnout and marriage burnout are positively correlated (Pines et al., 2011; Dacey, 2019). The present study contributed new evidence that different kinds of burnout may be correlated with each other. Future studies should adopt a more comprehensive perspective, and examine the relationship between parental burnout and couple burnout from a family perspective, job burnout from a work perspective, and academic burnout from children's developmental perspective.

According to social learning theory (Bandura, 1989), parents serve as role models and are the main learning objects for their children. Children not only observe their parents' behaviors, but also capture their parents' emotional reactions. Children internalize the pattern of their parents' behavior and emotional reactions within their psyche and reproduce them in appropriate situations (Bandura, 1989; Bian et al., 2016). Parents suffering from burnout tend to exhibit a series of negative symptoms while interacting with their children, such as psychological alienation, emotional apathy, and escape from responsibility (Roskam et al., 2018). Children observe and learn these reactions which may manifest in significant daily activities. Specifically, in the education context, children may display corresponding symptoms of academic burnout. Therefore, burnout symptoms are transmitted from parents to children.

From a BR^2 model perspective, parental burnout is the result of a long-term imbalance between parenting requirements and resources. Therefore, parenting resources play a moderating role in the relationship between parenting requirements and parental burnout. Family is not only the initial and primary platform for parenting activities (Cheng et al., 2021), but also serves as the foundation of intimate relationships, partner communication, and parent-child interactions (Liu et al., 2018). Therefore, families may provide the main resources for parenting. Given that high family function represents ideal family functioning (Lv and Gu, 2005), it could be regarded as a typical parenting resource. The present study examined its moderating effect on the relationship between education and parental burnout. The results showed that, compared with low family function, individuals with high family function showed less parental burnout with increased education anxiety. These findings suggest that to avoid parental burnout, individuals should strive to enrich their own parenting resources, and should seek help from other family members when they experience anxiety.

In addition, the present study may also contribute in practical ways. From a parental perspective, parents should adhere to scientific parenting goals to avoid becoming anxious. Meanwhile, they should remain alert for signs of anxiety or burnout and avoid transmitting these emotions to their children. Family therapists should focus on establishing and improving the overall family function of anxious parents and ensure sufficient support from their family, partners, or other members.

Limitations and Future Directions

This study had several limitations. First, present study adopted paired data collection and confirmation of the primary caregivers. The cross-sectional nature of the study limited our results to proving the causal relations between variables. Future studies should adopt a longitudinal research design to collect data at multiple time points, which may enable a more in-depth examination of the relationship between variables. Second, junior high school is a critical period in children's education when their physical and psychological characteristics are undergoing rapid development. Adolescents and their parents are thus, ideal targets for studying education anxiety, parental burnout, and academic burnout. However, parenting activities constitute long-term interactions. Moreover, infants, children, and adolescents of different ages have varying physical and mental development tasks, and their parents also have distinct parenting pressures. Therefore, parents may have varying levels of education anxiety or parental burnout during children's various developmental stages. The present study only included junior middle school students and their parents, and whether these results can be extended to children at other stages of development and their parents must be further explored. Third, the present study mainly focused on the general effect of education anxiety on academic burnout, we failed to examine the relationship between each sub-dimension of academic anxiety and academic burnout. Future studies should focus on these issues, and conduct meticulous designs to explore the relationship between each sub-dimension.

CONCLUSION

In general, by establishing a moderated mediation model, the present study confirmed that parents' education anxiety could be associated with children's academic burnout. In addition, education anxiety may be an antecedent of parental burnout. The different forms of burnout could be associated with each other.

DATA AVAILABILITY STATEMENT

The datasets generated for this study are available on request to the corresponding author.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Research Ethics Committee of the Institute of Psychology and Behavior, Henan University. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

YL and KW generated the idea and designed the study. FW performed material preparation and data collection. FW and WW performed data analysis. WW wrote the first draft of the manuscript. All authors commented on previous versions of the manuscript, read, and approved the final manuscript.

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The Influence of Parental Educational Expectations on Children's Higher Education Attainment: Re-estimation Based on Instrumental Variables

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Studies show that parental educational expectations (PEEs) serve as an intermediary variable between family background and children's educational attainment. This paper re-examines the relationship between PEEs and children's higher educational attainment using data from the China Family Panel Studies (CFPS) 2010–2018. To address potential endogenous problems in the previous papers, we use the average College Enrolment Opportunity Index (CEOI) when the children were 10–12 years old as an instrumental variable for PEEs. The results revealed that: (1) In addition to the indirect intermediary effects, the PEEs also had a direct impact on children's higher educational attainment independent of family background; (2) the magnitude of the effect was much larger (almost three times) than previous estimates after solving endogenous problems; (3) there was no significant gender difference in the effect of PEEs. In addition, we also found that PEEs had a greater impact on middle- and low-income families. Therefore, we argue that against the background of the "Double Reduction" policy, parents should change their conception of education and raise their expectations for their children and encourage them to strive for higher educational achievements.

Keywords: parental educational expectations, higher education attainment, family background, college enrolment opportunity index, instrumental variables

INTRODUCTION

In the classic model of human capital by Becker (1994), education is an investment, and the profit that an individual makes from receiving an education is the difference between the cash flow of future earnings and the cost of education (time, money, etc.) (Becker, 1994). Education is both an important factor in increasing labor productivity and an important channel for social mobility. Thus, the significance of exploring the factors that influence educational attainment is twofold (Cham et al., 2014). As a core component of human capital, education is an important causative factor for gaining social status and a key mechanism for alleviating

social inequality. However, education is also a reproduction mechanism for the transmission of class dominance (Blau and Duncan, 1967).

In the discussion of factors that affect educational attainment, the Wisconsin School, based on the famous Blau-Duncan Status Attainment Model, argues that as an important mediating variable, parental educational expectations (PEEs) have a significant influence between family background and children's educational attainment. Many scholars have explored the influence of PEEs on children's educational attainment from the perspective of intermediate effects (e.g., Liu et al., 2015; Wang et al., 2018). However, some scholars have argued that PEEs also have an independent impact on children's educational attainment. For example, Lu et al. (2021) revealed the direct effect of PEEs on adolescents' academic performance and claimed that these effects are greater for migrant, one-child and non-poor families. Similarly, by investigating China's left-behind children, Zhang et al. (2020) revealed the direct effect of PEEs on their children's learning input. Most of the papers focused on particular groups, but it remains unclear whether PEEs have a direct effect on children's educational attainment independent of the family background in general using a nationally representative Chinese dataset.

In addition, there are still some shortcomings in previous research in terms of the form of data and estimation methods. First, most studies have used questionnaire-based cross-sectional data that investigated PEEs and children's academic achievement at the same time, which failed to exclude the reverse causality between PEEs and children's current academic performance. The correlation between children's current academic performance and their eventual educational attainment can make the estimation of the effect of PEEs meaningless. Second, in terms of estimation methods, existing studies do not address the issue of endogeneity. For example, unobservable omitted variables, such as the psychology of comparison from parents and measurement error due to differences in parental expression or performance, can lead to attenuation bias.

Studies showed that PEEs were less dependent on family socio-economic status in Asia than in the West, and Asians tended to hold high educational expectations for their children regardless of their family socio-economic status (Li and Chen, 2007; Liu and Xie, 2016; Li and Xie, 2020). Based on literature and observations, the present study hypothesized that in addition to the indirect impact, the PEEs also have a direct influence on children's higher education attainment independent of family background in China. Moreover, the endogenous problem may affect the estimation results of the magnitude of the PEE effect. If this is the case, regressing with instrumental variables could result in a significant difference in estimation compared to regressing with PEEs directly. To test this hypothesis, the present study used longitudinal data from CFPS and average CEOI when the children were 10–12 years old as an instrumental variable for PEEs to test the independence effect of PEEs and its magnitude. Furthermore, we sought to explore the PEE effect on different genders and families of various income levels, in order to make the conclusions more comprehensive.

LITERATURE REVIEW

The Role of Parental Educational Expectations

The Blau-Duncan Status Attainment Model, which treats education as an intermediate factor in the intergenerational transmission of family dominance, has been recognized by many scholars and has led to discussions about how strengths and weaknesses of family background factors can determine differences in the educational attainment of offspring, and thus ultimately influence the occupational and economic status of children (Blau and Duncan, 1967; Ganzeboom et al., 2003). Among these theses, the Wisconsin School incorporated educational expectations into the Status Attainment Model and showed that they had a significant impact on educational attainment, which was subsequently refined as the Wisconsin Psychosocial Model of Status Attainment (hereinafter referred to as the "Wisconsin model") (Sewell et al., 1970). PEEs, as part of educational expectations, crucially impact children's educational attainment (McCoy et al., 2016; Cross et al., 2019; Li and Hu, 2021). Wang et al. (2018b) further argued that PEEs positively predicted Students' test scores.

Regarding the role of PEEs in the educational attainment of children, there are two main perspectives. The first perspective is that PEEs are an intermediate variable of family background. According to the Wisconsin model, family background is an important factor influencing PEEs. For example, higher PEEs are linked to more investment in education, which raises children's own educational expectations through their parents' words and deeds, which in turn leads to better educational attainment (Passeron and Bourdieu, 2002; Qiu, 2012; Liu et al., 2014). The intermediate influence of PEEs has been explored by many Chinese scholars. Yang and Wan (2015), by investigating the education separation of Chinese junior middle school graduates, found that family economic capital was not only positively correlated with PEEs, but that it also indirectly affected children's academic performance through PEEs. Wang and Shi (2014) showed that family background factors influence children's individual educational expectations through PEEs, and that eventually the two kinds of educational expectations would affect children's higher education jointly. Long and Pang (2016) argued that family wealth, home educational resources, and parental education have significant indirect effects on children's academic achievements.

The second perspective is that PEEs have an impact on children's educational attainment independent of family background. Sewell and Shah (1967) constructed a model of family background factors, educational expectations, intelligence factors and higher education attainment and concluded that educational expectations have an impact on educational attainment independent of family background factors and intelligence. Based on a sample of junior students in China, Fang and Huang (2019) found that PEEs helped to improve children's

academic performance which in turn affected the possibility of achieving higher educations. By tracing and investigating two individuals with similar family backgrounds in China, Wang and Qi (2014) examined the differences in children's academic performance under the circumstance that their parents had the same educational level, the family social status and economic conditions, but the PEEs for their children were quite different. The results suggested that higher PEEs significantly improve children's academic performance, although the sample was too small to generalize to a larger population. Our study, instead, focuses on the independent influence of PEEs on children's tertiary education attainment across a wide range of families.

Education has always been an important driver of upward mobility for the lower and middle classes (Blau and Duncan, 1967; Wu et al., 2017; Jin et al., 2019). If PEEs have an impact on children's educational attainment independent of family background, it means that in addition to changing their existing socio-economic status, people can also promote social class mobility by changing their ideas. Influenced by traditional Confucian culture and the long history of imperial examinations, average families in China attach much more importance to education than families in western countries, and this phenomenon is largely independent of family background (Liu and Xie, 2016). Li and Chen (2007) showed that 87.14% of China's parents who were from poor families expected their children to have a college degree or above, while also hoping that their children could change their living environment by receiving a good education. This notion is underscored by traditional Chinese sayings, such as "a noble son coming from a poor family" and "knowledge changes destiny." This unique cultural tradition makes it feasible to change ideas to promote social mobility in China and certainly makes sense in an era of widening disparities between the rich and the poor.

The Inequality Phenomenon of Educational Attainment

As stated above, PEEs may play a great important role in narrowing the gap between different groups. At the macro level, since market-oriented reforms were enacted in China, education has become an important way for people to achieve higher socio-economic status, while the main function of education has changed from eliminating class differences to producing talent for economic growth (Li, 2003). Gender differences in educational attainment have also become one of the main sources of the wage differential between men and women in the labor market which has received considerable scholarly attention (Zhang, 2013). Since the founding of China, gender inequality regarding access to education in China has been on a downward trend (Wu, 2012). One noticeable fact, however, is that the recent educational attainment of Chinese men has been significantly lower than that of women (Wu, 2012). This inequality of educational attainment is worthy of attention not only for females, but also for males.

In addition, the education attainment inequality has also occurred in families of various income levels. Education inequality was an important reason for the widening income gap (Wen, 2007). According to human capital theory, individuals with higher human capital levels have higher labor productivity, so the difference in human capital level leads to an income gap between families (Becker, 1975). Yang and Zhao (2013) found that education expansion helps to control the income distribution gap. Yang and Huang (2010) also found that educational support for low-income groups helped reduce income disparities.

When the Chinese government issued the "Opinions on Further Reducing the Burden of Homework and Off-Campus Training on Students in Compulsory Education" policy (hereinafter referred to as the "Double Reduction" policy) recently, the extracurricular training industry was banned.[1] As a result, access to extracurricular education for children from low- and middle-income families was curtailed. Therefore, there is an urgent need for a new, cheaper way for children from disadvantaged families to get higher education in China. Thus, the findings of this paper may provide a feasible solution in the current context.

The unequal access to educational opportunities is a reflection of the unequal distribution of resources among different social strata and groups. Therefore, investigating the influencing factors of educational inequality can deepen the understanding of the stratification structure and mobility pattern of Chinese society. With the "Double Reduction" policy as a backdrop, this paper has important practical significance for alleviating social contradictions and maintaining social stability.

IDENTIFICATIONS OF INSTRUMENTAL VARIABLES

Potential Endogenous Problems

Endogeneity is a common problem in micro-quantitative analysis, and its causes include reverse causality, omitted variables and measurement error. When there is endogeneity, the estimation results can deviate (over or under) from the true parameter values. When we combed through existing studies, we found that endogenous problems have not received much attention.

First, there is a potential reverse causal relationship between PEEs and children's educational attainment. Most domestic and international studies have used cross-sectional data from single item questionnaires as samples for analysis, such as Thurston et al. (2011), Liu et al. (2014), and Wang and Shi (2014). Pinquart and Ebeling (2020) used meta-analysis and found a positive correlation between PEEs and children's current academic performance. This implied that children's current performance can also influence PEEs. If such a correlation is not excluded, the regression of PEEs on children's final educational attainment would equally explore the influence of children's current academic performance on the final educational attainment, not PEEs.

Second, there exists other possible omitted variables. For example, comparing mentality may lead parents to have high

[1]See the website of the Ministry of Education of the People's republic of China: http://www.moe.gov.cn/jyb_xxgk/moe_1777/moe_1778/202107/t20210724_546576.html.

educational expectations of their children, and result in a downward bias in the estimates (Pinquart and Ebeling, 2020). Similarly, the existence of children's rebellious psychology can also underestimate the influence of PEEs. These omitted variables may lead to an inconsistent result and the extent of the deviation cannot be predicted.

Finally, neglecting the measurement error can affect the result. In reality, the mechanisms by which PEEs influence children's higher education attainment are complex, and it only represents a part of PEEs with any single-dimensional question, which might lead to the typical problem of measurement error. In addition to this, differences in parental expressiveness or execution can exacerbate the problem. These measurement errors can lead to a weakening bias in the results, which may underestimate the influence of PEEs on children's educational attainment.

College Enrolment Opportunity Index

Instrumental variables are one of the most effective ways to address endogeneity. In this paper, the average CEOI when the children were 10–12 years old was selected as an instrumental variable for PEEs to explore its independent impact on children's higher education attainment. College enrolment opportunity was an exogenous variable determined by macro factors such as college entrance rates and was not correlated with control variables such as family background and personal characteristics. However, the probability of entering university can influence the parental expectations of their children's education, and college enrolment opportunities in the past when the children were 10–12 years old would not directly affect the probability of higher education attainment since the children would take the Gaokao at around 18 years old, which meets the exogenous requirements of instrumental variables. We cover these two areas in detail below.

College Enrolment Opportunity

Passing the Gaokao is the most important way for residents of China to enter formal higher education. However, the admission score of the Gaokao is determined by the distribution of colleges and universities, population, economy, and allocation of educational resources under the principle of regional equity (Li, 2010), and the examination papers and scoring methods used by different provinces are different resulting in the inability to make cross-sectional comparisons between the admission scores in different provinces. For example, Hebei and Shanxi provinces use the same set of Gaokao papers; however, a Shanxi candidate with a score of 150 in Science in 2020 would have been able to enter a specialized school, while a candidate with the same score in Henan would not have been admitted into higher education.[2] The difficulty of the Gaokao in different provinces fluctuates and cannot be measured by the admission score. Therefore, we constructed the CEOI to measure this volatility.

Based on the entrance opportunity index with the high school graduates as a benchmark constructed by Li (2010), this paper constructs the CEOI of each province in China since the restoration of the Gaokao and uses it as an instrumental variable to estimate the influence of PEEs on their children's higher education. First, using high school graduates and college enrolment data for each province from 1977 to 2018 in the China Education Statistics Yearbook, we calculated an entrance opportunity index based on high school graduates for province i in year y[3]:

$$\widehat{index_i^y} = \frac{enrolment_i^y}{enrolment_{total}^y} \div \frac{graduates_i^y}{graduates_{total}^y} \quad (1)$$

where *enrolment* indicates the number of high school enrolments, and *graduates* indicates the corresponding number of high school graduates. If the index is greater than one, it means that the examinees in province i have a higher probability (or lower difficulty) of accessing higher education than the national average level in year y, and vice versa.

To make the index longitudinally comparable and eliminate the heterogeneity of provinces, we then multiplied the index calculated by Formula (1) by the national enrolment rate of the Gaokao in the corresponding year (see Formula 2), and then subtracted the mean value of the index derived by Formula (2) of each province over the years to construct the CEOI used in this paper[4]:

$$\widetilde{index_i^y} = \widehat{index_i^y} \times \frac{enrolment_{total}^y}{registration_{total}^y} \quad (2)$$

$$index_i^y = \widetilde{index_i^y} - mean\left(\widetilde{index_i^{1977-2018}}\right) \quad (3)$$

where *registration* indicates the number of people enrolled in the college entrance examination. To control for provincial heterogeneity, we subtracted the CEOI from its mean from the resumption of the Gaokao (year 1977) to year 2018 to ensure the accuracy of the data (see Formula 3).

Effectiveness Discussion

Effective instrumental variables require both correlation and exogenous conditions. In our study, the correlation condition refers to the fact that the probability of university acceptance can influence PEEs. Research from the Wisconsin School has suggested that educational expectations are influenced by national policies, educational settings, and labor markets at the macro-level (Andres et al., 2007). From the above calculation process, it is clear that the value of CEOI depends on macro policies such as the college entrance examination enrolment plan, and the instrumental variable satisfies the correlation condition.[5]

Exogenous conditions mean that there is no correlation between the CEOI and other influencing factors, and CEOI would

[2]In 2020, the Gaokao admission score of Science in Shanxi Province was 130, and that of Henan Province was 180. The examinee with 150 points in Science in Shanxi Province is more likely to enter college, while the same score in Henan province would have been excluded from higher education. Data source: Education Department of Shanxi and Henan Province.

[3]Li (2007) suggests the feasibility of using the number of high school graduates to replace the number of applicants in Gaokao because it is difficult to obtain the data of the number of applicants in each province.

[4]Data source: compiled from China education public data.

[5]Moreover, the methodological proof can be seen in the first-stage regressions of model (3) and (4) in **Table 3**. The coefficient of Index is significant positive, which indicates that the average CEOI when the children were 10–12 years old is positively related to PEEs.

affect the explained variables only through the corresponding endogenous variables (i.e., PEEs). From the first aspect, the probability of entering a university is determined by macro policies, which means it has good externality and would not correlate with other micro factors, such as family backgrounds and individual characteristics. Regarding the second aspect, the past CEOI does not directly affect the college entrance rate of the children when they take the Gaokao at around 18 years old. Because of the sequential nature of education decisions, we assume that the PEEs of children who enter key middle schools would be higher than those of non-key middle schools. In order to avoid this reverse causality, we selected the average CEOI when the children were 10–12 years old (12 years is the node at the beginning of middle school) as the instrumental variable of PEEs to avoid the endogenous problems in the estimation process.

In addition, OLS regression was used to test the exogeneity of the instrumental variable (**Table 1**). The explained variables of the two models in **Table 1** are the children's education level. The second column contains only the variable of the average CEOI when the children were 10–12 years old, and the third column adds the PEEs variable. It can be seen from the regression results that before controlling for PEEs, the average CEOI of children aged 10–12 was significantly positively correlated with their children's educational level. However, after controlling for PEEs, the coefficient is no longer significant, and the coefficient of the PEEs variable is significantly positive, indicating that the instrumental variable influences children's education level only through the path of PEEs. In sum, the instrumental variable has good effectiveness.

DATA AND METHODOLOGY

In response to the previous endogenous problems, this paper focuses on children's tertiary education attainment, and re-estimates the problem in terms of both data and estimation methods. We measured the variable of PEEs using the data from the CFPS Children's Questionnaire (when the children were 10–15 years old); however, the variable of whether the children had obtained higher education was measured by the question answered by samples in adulthood. In terms of estimation methods, the average CEOI when the children were 10–12 years old was selected as an instrumental variable for PEEs to estimate the extent to which PEEs affected the children's higher education attainment after controlling for other factors, such as family background.

TABLE 1 | OLS model of instrumental variables.

Variables	Education level of children	Education level of children
PEEs		0.062***
		(0.006)
Index	0.436*	0.306
	(0.256)	(0.248)
No. of samples	1,835	1,835

*1. Standard errors are in parentheses; 2. *, **, ***indicate significant at 0.1, 0.05, and 0.01 levels, respectively; 3. Index means the average College Enrolment Opportunity Index of children aged 10–12.*

Data Description

Apart from the instrumental variables, all data used in this paper were taken from CFPS 2010 to 2018. The CFPS is a nationwide survey project hosted by the China Social Science Research Centre of Peking University, with data from 25 provinces, municipalities and autonomous regions in China at three levels: individual, household, and community, with wide coverage and more representative sampling data. Data collection began in 2010, from which all sample members and their offspring were permanently tracked. The CFPS tracking survey enables us to obtain the PEEs when their children were minors and the educational level when the children became adults, which is the core explanatory variable and explained variable in this paper, respectively. As such, we circumvented part of the reverse causality problems from the perspective of data.

The explained variable in this paper was the children's higher education attainment, with a value of 1 for attaining and 0 for unattaining.[6] As suggested by China's Compulsory Education Law, children enter primary school at the age of 6, followed by 9 years of compulsory primary education and 3 years of secondary education; they then take the Gaokao (the college entrance examination in China) at the age of 18 if there are no interruptions (Wu, 2010). Meanwhile, we estimated that the average age at which rural and urban residents take the Gaokao is 18.08 years old by using 61,115 samples from the 2013 Chinese Household Income Project. Due to the expansion of college enrolment in China, the enrolment rate of the Gaokao has exceeded 90%.[7] In order to avoid any bias in the measurement of the sample's higher education attainment due to many samples being in the third year of high school, the sample of 18-year-olds was excluded, and we selected a total of 1,835 samples from the survey conducted from 2010 to 2014 who were 10–15 years old and had clear PEEs.[8]

The core explanatory variable in this paper is PEEs, which are derived from the CFPS Children's Questionnaires, where parents were asked to answer the question "What is the highest level of schooling you would like your child to complete?" Eight options were offered ranging from illiterate to PhD.[9] The ninth option was "no need to study" which was treated the same as "illiterate" in this research. As the baseline households participating in the CFPS between 2010 and 2014 would sometimes change their

[6]Subject to the year of the CFPS tracking survey, in 2018, the oldest child of the sample aged older than19 and who had answered the Children's Questionnaire was 23 years old.

[7]Source: Compiled from public data on education in China. The national college enrolment rate for the 2020 is 90.57%.

[8]To ensure the sample is 19 years old or older by 2018, samples aged 11–15 were retained in CFPS 2010; In CFPS 2011, samples aged 12–15 were retained; In CFPS 2012, samples aged 13–15 were retained; In CFPS 2014, only samples aged 15-years-old were retained.

[9]The answers to this question in the CFPS questionnaire were assigned the following values: 1. illiterate/semi-literate; 2. primary school; 3. junior high school; 4. high school; 5. college; 6. undergraduate; 7. master's degree; 8. doctorate; 9. no need to study.

answers to this question, we used the mean value of PEEs between 2010 and 2014 as a measure of PEEs and transformed PEEs (level of education) into the corresponding expected number of years of schooling to avoid the non-continuous integer variable.[10]

To ensure the accuracy of the data, we checked the answers which were "unsuitable" or "I don't know," finding that most of the parents of these samples were illiterate or primary school educated, meaning that no highly educated parents refused to answer the question, which would have resulted in a large number of abnormal phenomena in the sample.

The control variables were the family background factors. Most of the existing literature has used occupational status and parents' education level to indicate family background (Blau and Duncan, 1967; Liu et al., 2014; Wang and Shi, 2014). In our study, we used the higher value of the International Socioeconomic Index (ISEI) of the samples' father or mother to indicate the occupational status of the parents. The values of ISEI usually ranged from 20 to 80, with higher values indicating higher socio-economic status in that occupation. We used the higher education level of either the father or mother to indicate the level of education of the parents and converted it to years of schooling in the same way as above. In addition, we controlled for a range of individual characteristics such as gender, year of birth and type of hukou.[11] The descriptive statistics of the variables used in this paper are shown in **Table 2**.

Methodology Specification

This paper focuses on the independent influence and degree of the PEE effect in childhood on children's higher educational attainment in adulthood. We first use the Logit model to explore whether PEEs have an independent influence on their children's higher education attainment after controlling for family background and personal characteristics variables:

$$Y_i^* = \beta_0 + \beta_1 expectation_i + \beta_0 X_i + \mu_i \quad (4)$$

$$Y_i = 1\left(Y_i^* > 0\right) \quad (5)$$

where Y_i is individual$i$'s educational level, and $expectation_i$ is the PEE. X_i includes a series of family background variables, such as parents' years of schooling and parents' ISEI, and children's personal characteristic variables, such as age, gender, and household type.

Later, in order to address the endogeneity problem and investigate the degree of influence, we used the instrumental variable to measure PEEs. Therefore, the variable of PEEs in Formula (4) is estimated as follow:

$$expectation_i = \gamma_0 + \gamma_1 index_i + \gamma_0 X_i + \varepsilon_i \quad (6)$$

where $index_i$ is the average value of the CEOI when the children were 10–12 years old. This method is the so-called IV-Logit model.

REGRESSION RESULTS AND ANALYSIS

Main Regression Results

As the explained variables are discrete (taking 0 or 1), we used the Logit model for regression to improve the estimation efficiency. The main estimation results are reported in **Table 3**, where models (1) and (2) are estimated without instrumental variables, and models (3) and (4) are estimated with instrumental variables. We first compared models (1) and (2). The difference in the setting of the two models is that model (2) includes family background factors—the parents' ISEI and the parents' schooling years—as explanatory variables. If PEEs are only an intermediary variable between family background factors and children's higher educational attainment, then the coefficient on PEEs will change from significant to insignificant when the model includes family background factors as explanatory variables. Conversely, if PEEs have an independent role in determining children's higher education attainment, the inclusion of family background factors would not affect the significance of the coefficient on PEEs. In particular, the smaller the change in the coefficient of PEEs when the family background factor is included, the more independent the impact of PEEs would be.

Comparing the results of models (1) and (2) in **Table 3**, the coefficient on PEEs remains significant at the 1% level after the inclusion of the parents' ISEI and the parents' schooling years,

[10]Years of education were converted as follows: 0 year for illiteracy; 6 years for primary school; 9 years for junior school; 12 years for high school; 15 years for specialized school; 16 years for university; 19 years for master's degree; and 23 years for doctorate. The conversion method for parents' education level is the same.

[11]Hukou is the unique household registration system in China and has two types: agricultural hukou and non-agricultural hukou.

TABLE 2 | Descriptive statistics.

Variables	Values	No. of samples	Means	*SD*	Min	Max
Children's higher education attainment		1,835	0.374	0.484	0	1
Parental educational expectations (PEEs)		1,835	15.94	3.391	0	23
Parents' ISEI		1,835	33.16	13.983	20	88
Parents' schooling years		1,835	7.21	4.316	0	23
Year of birth		1,835	1997.53	1.156	1996	1999
Gender	Female	1,835	0.49	0.5	0	1
	Male	1,835	0.51	0.5	0	1
Type of hukou	Agricultural hukou	1,835	0.83	0.378	0	1
	Non-agricultural hukou	1,835	0.17	0.378	0	1

TABLE 3 | (a) Logit and IV-Logit models of children's higher education attainment.

	(1) Logit	(2) Logit	(3) IV-Logit (2nd stage)	(4) IV-Logit (2nd stage)
Explained variable	Children's higher education attainment			
PEEs	0.120***	0.105***	0.321**	0.285*
	(0.017)	(0.017)	(0.024)	(0.167)
Year of birth	0.322***	0.343***	0.288***	0.311***
	(0.047)	(0.048)	(0.049)	(0.053)
Gender				
Male	−0.539***	−0.538***	−0.471***	−0.487***
	(0.105)	(0.106)	(0.109)	(0.111)
Type of hukou				
Agricultural	1.001***	0.700***	0.698***	0.555***
Hukou	(0.132)	(0.144)	(0.230)	(0.187)
Parents' ISEI		0.670***		0.429*
		(0.159)		(0.255)
Parents'		0.603***		0.397*
Schooling years		(0.156)		(0.228)
No. of samples	1,835	1,835	1,835	1,835

(b) First stage of IV-Logit models

	(1) Logit	(2) Logit	(3) IV-Logit	(4) IV-Logit
Explained variable			PEEs	PEEs
Average CEOI	–	–	6.402***	5.491***
	–	–	(1.361)	(1.348)
Individual characteristics	–	–	Y	Y
Family backgrounds	–	–	N	Y
F-values	–	–	19.00	22.04
No. of samples	–	–	1,835	1,835

*1. Standard errors are in parentheses; 2. *, **, ***indicate significant at 0.1, 0.05, and 0.01 levels, respectively; 3. Average CEOI means the average College Enrolment Opportunity Index of children aged 10–12; 4. Variables of personal characteristics included: gender, year of birth, and type of hukou; variables of family backgrounds included: parents' ISEI and parents' schooling.*

and the coefficient does not change much (from 0.120 to 0.105).[12] This suggests that although there is some influence of family background factors on PEEs, PEEs still have a role in children's educational attainment independent of family background factors, and this independency should not be ignored.

We then compared models (1) and (3), where the difference between the two models is whether instrumental variables are used for regression. If there were serious endogenous problems with a direct regression on PEEs, the coefficients on PEEs estimated by the two models would differ significantly. By comparing the results of models (1) and (3) in **Table 3**, we found that the coefficient of PEEs increases from 0.120 to 0.321 after regression with instrumental variables and is still significant at the 5% level. This result confirms our previous speculation that there is a serious endogenous problem in regressing PEEs directly. After addressing the endogeneity issue, we found that the effect of PEEs on children's educational attainment is much larger than previously estimated. At this point, the marginal effect at the sample mean is 0.07 ($p < 0.05$), indicating that for every year of increase in PEEs, the probability of their children attending university increases by 7 percentage points.

Finally, we compared models (3) and (4). Similarly, the difference between models (3) and (4) in terms of setting was the inclusion of family background factors. Comparing the results of models (3) and (4) in **Table 3**, we found that although the coefficient on PEEs decreased from 0.321 to 0.285,[13] the latter is still significant at the 10% level. After addressing the endogeneity issue, PEEs remained unaffected by family background, suggesting that the independent impact of PEEs is robust through IV-Logit estimation, and it also implies that the results of IV-Logit estimation are robust.

Within all four regressions, the year of birth was used as a control variable in all models to control the heterogeneity of individuals born in different years. The coefficient of the male variable was significantly negative, indicating that the tertiary education attainment of males is currently lower than that of females. The education level of urban residents was generally higher than that of rural residents. In models (2) and (4), where the family background was included, both parental economic status and education level significantly and positively affected the probability of children's tertiary education attainment.

For Gender Differences

Our study sought to explore the impact of parental educational expectations on their children's higher education attainment on different genders to highlight a new path for the process of equalization of education during rapid economic development. Thus, we added an interaction term of PEEs and children's gender in model (4) (**Table 3**), which is the variable where PEEs interact with the male dummy variable. If the coefficient of the interaction term is significant, it means that the effect of PEEs is gender-differentiated; conversely, if the coefficient of the interaction term is not significant, the effect of PEEs is not gender-differentiated.

Table 4 presents IV-Logit regressions of the differences in the impact of PEEs on higher education attainment for children of different genders. In the second stage of the regression, while the coefficient of the PEEs variable remained significantly positive (row 3, column 2), the gender variable and the interaction term of PEEs and males were not significant, indicating that PEEs still positively affected children's tertiary education attainment and that there was no significant gender difference in the effect on children's tertiary education attainment. Notably, the coefficient for males in the model (4) of **Table 3** was significantly negative, but after the interaction term was added, the coefficient was not significant, so we further investigated whether the lower probability of higher education attainment for males than females was due to the different educational expectations of parents for their children by gender. The first stage regression in **Table 4** shows that PEEs did not differ significantly according to the gender of their children (row 2, column 4). Therefore, the change

[12]The two coefficients were significantly different according to the Seemingly Unrelated Model (SUEST) test, which was not reported in detail due to space constraints, and the same below.

[13]SUEST test showed that there was no significant difference in these two coefficients.

of the coefficient of gender variable may have been caused by other reasons. We did not conduct an in-depth investigation, and this phenomenon does not affect the conclusion that there was no gender difference regarding the influence of PEEs on their children's higher education.

For Families of Varied Income

We divided the sample into low-, middle-, and high-income households by referring to the parental ISEI at two nodes in the 25th and 75th quartiles and divided the sample into six groups by combining the sample's type of hukou. The IV-Logit regression and the sample means in each group were used to test the degree of influence of PEEs on different households (**Table 5**). **Table 5** shows that the PEE effect is greater when the initial probability of gaining tertiary education approaches 50%. This means that the effect of increased PEEs is more significant for low- and middle-income households which are at the margins (i.e., the initial probability is 50%) of gaining tertiary education. For example, for middle-income households in rural areas, the initial probability of the children obtaining higher education is 46.69%, and it increases by 7.11 percentage points if their parents increase PEEs by 1 year. In contrast, the effect is 4.58 percentage points when the initial probability is 77.50%.

With extracurricular education for low- and middle-income families now banned by the "Double Reduction" policy, the conclusion of this paper provides strong theoretical support for such families who hope their children can attain higher degrees without spending too much money. PEEs are not necessarily a proxy for the economic status of the household; however, the positive effect of PEEs on their children's higher education attainment can also be shown by the model (4) in **Table 3**, which reveals another possible contributor to the emergence of "a noble son coming from a poor family," i.e., parental expectations.

DISCUSSION

As an important investment in human capital accumulation, the importance of education has been recognized by most, if not all societies. As for the influential factors of educational attainment, there is no lack of discussion asserting that family background or parents' economic status positively influences PEEs, which in turn positively influence children's education attainment (Ganzeboom et al., 2003; Wang and Shi, 2014; Pinquart and Ebeling, 2020). However, there are still cases in which parents with low economic status want their children to improve their living environment by receiving a good education (Li and Chen, 2007), which in turn motivates their children to study hard and obtain a higher level of education. In addition, many of the studies on parental expectations and children's educational attainment have used data with unavoidable endogenous problems, such as reverse causality, omitted variables, and measurement errors (Thurston et al., 2011; Liu et al., 2014; Wang and Shi, 2014). If these endogeneity issues are ignored, the estimates of the effect of PEEs on children's educational attainment may be biased.

This study used CFPS tracking survey data from 2010 to 2018 to estimate whether PEEs have a direct influence on children's higher education attainment independent of family background factors besides the intermediate effects. To address the endogenous problems, we explored the magnitude of that effect using an average CEOI of children at age 10–12 as an

TABLE 4 | (a) Second stage of IV-Logit models of gender differences.

Explained variables	PEEs	Average CEOI	Gender (Male)	PEEs × Male	Other control variables	No. of samples
Children's higher	0.412**	–	2.758	−0.201	Y	1,835
Education attainment	(0.189)	–	(2.111)	(0.131)		
(b) First stage of IV-Logit models						
PEEs	–	5.491***	−0.217	–	Y	1,835
	–	(1.348)	(0.153)	–		

*1. Standard errors are in parentheses; 2. *, **, ***indicate significant at 0.1, 0.05, and 0.01 levels, respectively; 3. Average CEOI means the average College Enrolment Opportunity Index of children aged 10–12; 4. Other control variables included: gender, year of birth, type of hukou, parents' ISEI, and parents' schooling.*

TABLE 5 | IV-Logit models of families of varied income.

Parents' ISEI	Probability of obtaining higher education of children with agricultural hukou			Probability of obtaining higher education of children with non-agricultural hukou		
	Initial probability	1 year increasing of PEEs	Differences	Initial probability	1 year increasing of PEEs	Differences
Low	34.75%	41.45%	6.70%	59.80%	66.42%	6.62%
Middle	46.69%	53.80%	7.11%	69.68%	75.34%	5.66%
High	62.34%	68.76%	6.42%	77.50%	82.08%	4.58%

1. Low-, meddle-, and high—income households are defined as those with parents' ISEI below the 25th percentile, between the 25 and 75th percentile, and above the 75th percentile of the samples, respectively.

instrumental variable. This study, however, is the first one we know of that uses the instrumental variable method to explore the PEE effect in the Chinese context. In contrast to existing research, we found that PEEs have a significant positive effect on children's higher education attainment after controlling for family background factors such as parents' occupational status and parents' schooling years, which means that in addition to the indirect effect, PEEs also have a direct positive effect on children's higher education attainment independent of family background.

What's more, there is a strong positive correlation between the average CEOI when the children were 10–12 years old and PEEs. After using this instrumental variable, the PEEs have a far greater impact on the children's higher education attainment than Logit estimates. The reasons may be due to the influence of Confucianism and the imperial examination system; Chinese tend to attach more importance to education and the cultural atmosphere than people in Western countries (Kipnis, 2011). Therefore, the link between PEEs and family background may not be as strong as in Western countries. Other conclusions drawn from the coefficients of control variables regarding the higher educational attainment of female/urban residents surpassing male/rural residents, and parents' ISEI or years of schooling being positively related to the children's tertiary education attainment, were consistent with previous research (Charles, 2011; Wu, 2012; Long and Pang, 2016), increasing the credibility of the present study.

Further, we examined the PEE effect on different genders. First, the first-stage regression for the male and female samples showed that there were no gender differences in PEEs. By investigating the parental educational expectations of primary and secondary school students in Urumqi and Changchun, Yang Chunhua (2006) found that both boys and girls had the same educational expectations as their parents, which was verified by our regressions. Second, the results showed that there were no significant differences in the effect of PEEs on the probability of higher education attainment for children of different genders from the second-stage regression. Although education inequality between genders has declined due to the educational expansion around the whole country, poverty still contributed to gender inequality in rural areas (Yang et al., 2014). A cheap and effective way to eliminate education inequality between genders is in urgent need. Our findings provide theoretical support for the PEE effect in solving this problem.

Finally, we explored the PEE effect on families of varied incomes. The results showed that the effect of increased PEEs was particularly significant for low- and middle-income households, especially for middle-income households in rural areas, where each 1-year increase in PEEs increased the probability of children obtaining tertiary education by 7.11 percentage points. Given the new "Double Reduction" policy in China, the educational incentives of youth from low-income families may be weakened, which may lead to a further rise in class consolidation (Lv and Wu, 2013). The findings of this paper provide an important theoretical basis for encouraging parents in low- and middle-income families to have high educational expectations for their children and express them appropriately to their children. Parents who value their family culture and raise their children's education expectations can enhance their children's motivation to learn and improve their learning efficiency, which can lead to higher educational achievement.

The results of our analysis do not imply that PEEs are completely independent of family background factors and are determined by the difficulty of access to university. We stress that PEEs are influenced by many other factors besides family background, of which the college entrance opportunity is only one of these factors. However, as college entrance opportunity is exogenous, it can be seen as a useful tool for isolating the impact of PEEs on children's higher education attainment. The increase of parents' educational expectations brings higher benefits to their children's higher education, and raising parent awareness of the importance of education may be a new way to increase future human capital accumulation.

While this paper focuses on the independent influence of PEEs on children's higher education attainment, it still neglects important questions such as how PEEs influence children's educational attainment at other stages of education; or how inconsistencies in the "expression" or "action" of PEEs for their children may lead to differences in the educational achievement of children with the same parental expectations. These questions offer directions for future research.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

TL was the primary lead author of the article and did most of the data cleaning, regressions, and much of the analyses. After finished the first draft, FL helped to write up the manuscript and contributed much to the revision and submission of the manuscript. YH modified the text part and made a lot of contributions to the empirical result analyses. All authors contributed to the article and approved the submitted version.

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Exploring family educational involvement and social skills in Chinese preschoolers: The moderating role of parent-child relationship

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The purpose of this study was to examine parent-child relationship as a moderator of the association between family educational involvement and the social skills of preschoolers. A total of 4,938 children (*M* = 5.09-years-old, *SD* = 0.81) were sampled from 18 preschools in Hebei province, China, and their parents completed a survey packet to collect demographic information, as well as ratings of parental involvement, relationships with their children, and child social skill development. The results of multivariate regression analysis suggested that: (1) both home-based involvement and home-school conferencing could significantly predict preschoolers' social skills, (2) there was stronger evidence for a relationship of home-based involvement and preschoolers' social skills, (3) closeness in parent-child relationship moderated the path from home-based involvement to preschoolers' social skills, and (4) there was no interactive effect between family educational involvement and parent-child conflict. These findings highlight the significance of the joint influences of family educational involvement and parent-child relationship in shaping children's social skills. The impact of home-based involvement was boosted in the context of a close parent-child relationship.

KEYWORDS

home-based involvement, parent-child closeness, social skills, preschool children, China

Introduction

A considerable body of research has established a positive relationship between the social skills of preschoolers and their readiness for school (e.g., McClelland et al., 2000; Rhoades et al., 2011). Parents are considered an important source of support for the development of child social skills and the significant role of family educational

involvement in fostering children's social skills is well documented (e.g., McWayne et al., 2004; Brajša-Žganec et al., 2019). Family educational involvement is characterized by both micro- and mesosystems, which not only serve as an immediate environment, but also bridge the home and school settings during child development (Seginer, 2006; El Nokali et al., 2010).

According to Darling and Steinberg's (1993) Integrative Model of Parenting, relationships between parents and children cultivate the emotional context for unfolding parenting practices, including their involvement in children's development and learning; however, few empirical studies have been conducted to examine the moderating effect of parent-child relationship. Furthermore, previous research has been heavily focused on school-age children and within the context of Western culture (Fan and Chen, 2001; See and Gorard, 2015). To consider the associations between family educational involvement, parent-child relationship, and preschoolers' social skills, in the present research we investigated whether parent-child closeness and conflict moderated the potential relationship between family educational involvement and preschoolers' social skills in the Chinese context.

Association between family educational involvement and children's social skills

As a multifaceted construct, family involvement refers to a variety of parental behaviors in the home, school, and community environments, that promote positive educational outcomes for their children (Seginer, 2006). Focusing on the home-school partnership, Epstein (1995) developed a framework to illustrate six types of family involvement, including parenting, participating in communication with schools, volunteering in school activities, providing learning support at home, getting involved in school decision-making processes, and engaging with community resources. In consideration of developmentally appropriate family involvement for young children, Fantuzzo et al. (2000) categorized it into three types: school-based involvement, home-school conferencing, and home-based involvement. As Chinese traditional culture places a great emphasis on the responsibility of parents for their children's education, Chinese parents generally exhibit high levels of parental involvement (Cheung and Pomerantz, 2011); however, previous research has suggested that Chinese parents of young children were less involved in school than at home (Lau et al., 2011; Xia et al., 2020), probably due to respect for and deference to the authority of teachers (Pang, 2004).

Although previous studies on the impact of family educational involvement have primarily focused on academic performance, a growing literature has documented positive relationships between family involvement and social functioning (e.g., Torres et al., 2014; Cohen and Anders, 2020). For example, using data from the NICHD Study of Early Childcare and Youth Development, El Nokali et al. (2010) found that children with highly involved parents showed better social skills and fewer problem behaviors, and that increases in parent involvement longitudinally predicted rapid growth in social skills and decreases in problem behaviors. Furthermore, dimensions of family involvement were found to be differently associated with child outcomes. In a sample of 103 kindergarten children and their mothers, Hill and Craft (2003) found parental involvement at home was positively linked to children's prosocial communication and emotional regulation. Researchers further suggested the home-based parental involvement had a greater impact on young children's self-control, cooperative behaviors, and social engagement, when compared with other family involvement dimensions (Fantuzzo et al., 2004; McWayne et al., 2004). The relationships between school-based involvement, home-school conferencing, and child outcomes are mixed. Some researchers found parental involvement at school positively predicted young children's social skill (Powell et al., 2010) and school adjustment (Kang et al., 2017). It has been suggested that school-based involvement and home-school conferencing increase parents' awareness of their child's social and behavioral difficulties at school, make them better prepared to address these issues at home, and have them be more informed of school and community resources that could benefit their child both socially and academically (Hill and Taylor, 2004; Lau et al., 2011). However, several other studies found no or even negative relationships. For example, Rimm-Kaufman et al. (2003) found family involvement activities at school were not associated with seven of the nine social and academic outcomes, and more school-based involvement was linked to higher behavior problems in kindergarten children. When children exhibit more behavior problems at school, parents are more likely to get involved and communicate with teachers.

Parent-child relationship as a moderator

The relationship between parents and children during the early years is recognized as a critical protective factor for children's developmental outcomes. High-quality parent-child relationships provide children with a context where they can learn and develop social skills. Substantial studies have documented that children with better relationships with parents exhibited higher levels of social and academic development than their counterparts with lower-quality relationships (e.g., Connell and Prinz, 2002). Specifically, parental warmth and expressivity (Zhou et al., 2002), emotional support (Denham et al., 1997), and closeness in parent-child relationship (Leidy et al., 2010)

are significantly and positively linked to preschoolers' social skills. A close relationship with parents in the early years fosters a secure attachment and forms the foundation of the child's future social interactions. In a warm and positive relationship atmosphere, parents openly and effectively communicate with their child, become sensitive to their child's needs and cues, and show emotional availability toward the child (Edwards et al., 2010). When having a close parent-child relationship, children tend to learn how to self-regulate through observing and mimicking their parents, and practice friendship skills with their parents. However, research on conflict in parent-child relationships has yielded inconsistent results. There have been reports that parent-child conflict is associated with problem behavior of children, peer rejection, and school adjustment (Weaver et al., 2015; Xu et al., 2018), while other researchers support the benefits of parent-child conflict in promoting social skills (Laible and Thompson, 2002; Boyer et al., 2016). For example, researchers suggest that family conflict experiences can provide children with potential learning opportunities to discuss social rules and behavioral expectations (Zhang, 2013), regulate negative emotions such as anger, sadness, and hurt (Denham, 2007), and engage in social problem solving with their parents (Nelson, 2015), which serve as a basis for their development of social skills.

Based on the Integrative Model of Parenting (Darling and Steinberg, 1993), the overarching emotional climate of the parent-child relationship is considered a contextual variable that moderates associations between parenting practices (including parental involvement) and child development. Parent-child relationship provides an emotional context in which children are experiencing parental involvement in their education. When parental involvement is characterized by emotional support and positive affect, it can be beneficial to children; but when it is marked by control, negative affect, and intrusiveness, it can be detrimental to children (Pomerantz et al., 2007). In the context of high parent-child closeness, children tend to perceive their parents' educational involvement as an expression of love and support, and therefore, are more motivated to perform better; however, in the context of high parent-child conflicts, children might perceive their parent's educational involvement as an intrusion into their daily lives, and are less motivated to well behave (Stright and Yeo, 2014). Within a close atmosphere, children are more open to their parents' socialization practices (Spera, 2005). Increases in parent-child closeness may support children's internalization of parental beliefs and behaviors, and make them more likely to engage in expected activities/interactions, which would, in turn, lead to children's higher achievement. In contrast, when parents are perceived as more demanding, controlling, and negative, children are more likely to be resistant to their parents' educational involvement; and thus the benefits of parents' educational involvement may be weakened (Xia et al., 2020). In a sample of 175 kindergartners in the United States

TABLE 1 Demographic information of the sample (n = 4,938).

Variables	M (SD) or %	
Type of Respondent		
Father	17.1%	
Mother	82.0%	
Other	0.9%	
Child Characteristics		
Age (year)	5.09 (.90)	
One-only child	23.1%	
Gender		
1. Boys	51.4%	
2. Girls	48.6%	
Family Characteristics		
Region		
1. Urban	68.1%	
2. Rural	31.9%	
Monthly household income (scored below from 1 to 7)		
1. Less than ¥1,500	1.1%	
2. ¥1,501 to ¥4,500	13.5%	
3. ¥4,501 to ¥6,000	17.8%	
4. ¥6,001 to ¥10,000	37.8%	
5. ¥10,001 to ¥15,000	17.8%	
6. ¥15,001 to ¥20,000	6.2%	
7. ¥20,001 or more	5.8%	
Parental education (scored below from 1 to 7)	Father	Mother
1. Less than 3 years	0.1%	0.1%
2. 4–6 years	0.7%	0.5%
3. Middle school or below	11.2%	9.7%
4. High school or vocational school degree	18.9%	16%
5. Vocational college degree	30.1%	26.3%
6. Bachelor's degree	35.7%	43.8%
7. Master's degree or above	3.3%	3.6%
Parental occupation (scored below from 1 to 5)	Father	Mother
1. Unemployed, non-technical worker, or farmer	6.3%	17.8%
2. Semi-technical worker or self-employed small business owner (e.g., construction worker)	23.2%	13.9%
3. Technical worker or semi-professional (e.g., driver)	22.2%	20.9%
4. Professional or officer (e.g., doctor, teacher, technician)	35.5%	42.2%
5. High-level professional or administrator (e.g., manager)	12.8%	5.2%
Parental age	Father	Mother
1. 25 years old or younger	0.4%	0.8%
2. Between 26 and 30 years old	10.4%	15.0%
3. Between 31 and 35 years old	44.0%	45.7%
4. Between 36 and 40 years old	27.1%	25.3%
5. 41 years old or older	18.0%	13.2%

and their mothers, Simpkins et al. (2006) found that the associations of family educational involvement to children's academic outcomes differed depending on the mother-child relationship. Specifically, as maternal perceptions of mother-child warmth increased, the favorable relationship between family involvement and children's mathematics and literacy achievement became stronger. Focused on elementary students and their parents in Singapore, Stright and Yeo (2014) also found that the warmth of parent-child relationship enhanced the linkage between parental school-based involvement and their children's academic achievement. However, empirical evidence on the moderating role of parent-child relationship on children's social skills is rare. In addition, further studies are needed to better understand the context in which family educational involvement predicts children's social skills (Xia et al., 2020).

The present study

Given the strong links between both family educational involvement and parent-child relationship and social skills of young children, it's critical to explore the relationship between these two factors, especially in the context of how these variables interact. The purpose of this study was to examine the moderating effect of parent-child relationship in the association between family educational involvement and their children's social skills. Informed by previous studies showing that child development outcomes are a product of the interplay between family educational involvement and parent-child relationship (e.g., Darling and Steinberg, 1993; Simpkins et al., 2006; Stright and Yeo, 2014), we proposed that parent-child relationship emerged as a moderator in this study (see **Figure 1**). Specifically, the present study focused on the following two research questions: (1) To what extent is family educational involvement associated with preschoolers' social skills? and (2) Does parent-child relationship (closeness or conflict) moderate the relationship between family educational involvement and preschoolers' social skills?

Materials and methods

Participants

Study participants were from Hebei province, which is located on the northern coast of China. With a population of more than 74 million, the gross domestic product of Hebei province ranked 12 out of 31 mainland Chinese provincial-level administrative regions in 2020 (National Bureau of Statistics of China, 2021). We used stratified sampling to select study participants. Three cities in Hebei province were purposively selected to represent low, middle, and high levels of economic development, which were classified by the Hebei provincial government. Then, in each of the three cities, we selected 5–6 preschools, giving a total of 16 preschools. Finally, from each sampled preschool, nine classes were selected, with three for each age group: 3–4, 4–5, and 5–6 years old. All parents with children enrolled in the selected classes were invited to participate in this study. A total of 5,300 survey packets were sent home to parents and 4,938 were returned, indicating a 93.2% response rate.

As shown in **Table 1**, the mean age of children was 5.09 years (*SD* = 0.81). The sample included 2,402 (48.6%) girls and 2,536 (51.4%) boys, and 1,139 (23.1%) were the only child in their families. Of the respondents, 4,049 (82.0%) of the questionnaires were completed by mothers, 843 (17.1%) were completed by fathers, and 46 (0.9%) were completed by other guardians. Of the fathers, 39.0% had obtained a bachelor's or higher degree, as had 47.4% of the mothers. Further, 44.0% of fathers and 45.7% of mothers were between the ages of 31 and 35 years, and 35.5 and 42.2% of fathers and mothers, respectively, reported their occupation as professionals or officers (e.g., teachers, doctors, technicians). In terms of household income, a majority of the families (55.6%) reported a medium-level monthly income (¥6,001 to ¥15,000).

Measures

Family involvement questionnaire-short form

The family involvement questionnaire-short form (FIQ-SF; Fantuzzo et al., 2013) was used to measure the type and extent of participation of parents or other primary caregivers in their children's education. The FIQ-SF consists of three subscales that assess specific involvement behaviors associated with: (1) Home-based involvement, (2) School-based involvement, and (3) Home-school conferencing. The Home-based involvement subscale characterizes family involvement in the home environment (seven items; e.g., "I bring home learning materials for my child, such as tapes, videos, and books."); the School-based involvement subscale depicts family involvement in the school environment (seven items; e.g., "I attend parent workshops or training offered by my child's school."); and the Home-school conferencing subscale describes the communication between parents and teachers (seven items; e.g., "I talk to my child's teacher about my child's accomplishments."). Each FIQ-SF item is rated on a four-point Likert-type scale (1 = *rarely*, 2 = *sometimes*, 3 = *often*, and 4 = *always*) and ratings are summed across items for each subscale as measures of parental involvement. Previous validation studies have demonstrated that the FIQ-SF is an adequate measure of parental involvement in both the Western (e.g., Bulotsky-Shearer et al., 2016) and Chinese (e.g., Liu and Li, 2019) contexts. In the present study, Cronbach's alpha value was 0.966 for the Home-based involvement subscale, 0.939

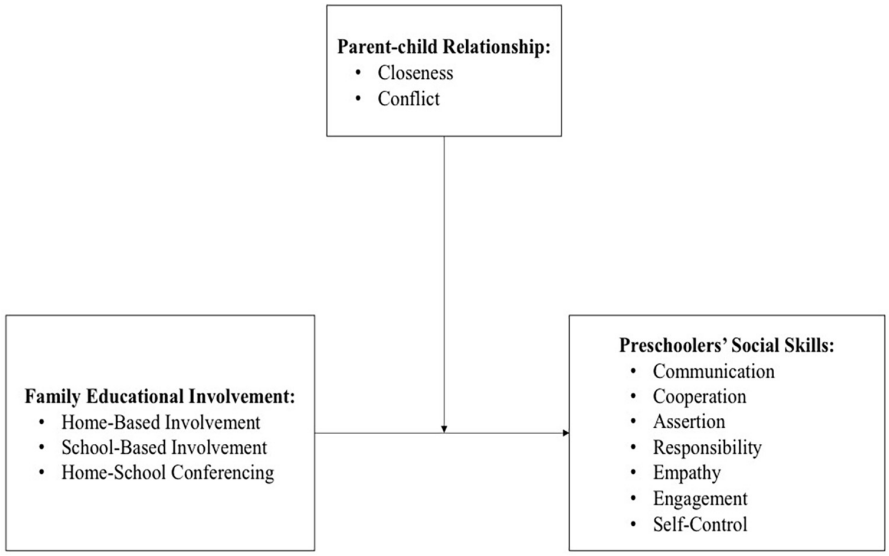

FIGURE 1
Conceptual model of the relation between family educational involvement, parent-child relationship, and social skills among preschoolers.

for the School-based involvement subscale, and 0.915 for the Home-school conferencing subscale.

Child-parent relationship scale

In this study, Chinese parents were asked to report their relationship with their children using the short form of the child-parent relationship scale (CPRS; Pianta, 1992). The CPRS comprises 15 items categorized into two subscales: Closeness and Conflict. The Closeness subscale measures parents' perception of open communication and affection with their child (seven items; e.g., "I share an affectionate, warm relationship with my child."), whereas the Conflict subscale assesses parents' perception of negativity and collision with their child (eight items; e.g., "My child and I always seem to be struggling with each other."). Each item on the CPRS is rated on a five-point Likert-type scale, ranging from 1 (*definitely does not apply*) to 5 (*definitely applies*). The CPRS has been widely used across many cultures, including in China, due to its adequate psychometric properties (e.g., Zhang et al., 2008; Zhang and Chen, 2010). The Closeness and Conflict subscales had Cronbach's alpha values of 0.840 and 0.837, respectively, in the current study.

Social skills improvement system-rating scales

We used the parent version of the social skills improvement system-rating scales (SSIS-RS; Gresham and Elliott, 2008) to measure preschool children's social skills. In this study, the social skills subscale of the SSIS-RS was applied, and comprises seven dimensions: (1) Communication (seven items; e.g., "Takes turns in conversations."), (2) Cooperation (six items; e.g., "Pays attention to your instructions."), (3) Assertion (seven items; e.g., "Questions rules that may be unfair."), (4) Responsibilities (six items; e.g., "Respects the property of others."), (5) Empathy (six items; e.g., "Tries to comfort others."), (6) Engagement (seven items; e.g., "Invites others to join in activities."), and (7) Self-control (seven items; e.g., "Stays calm when disagreeing with others."). Items were rated on a four-point Likert-type scale (0 = *never*, 1 = *seldom*, 2 = *often*, 3 = *almost always*), with a higher total score interpreted as better social skills. The validity and reliability of the SSIS-RS social skills subscale for Chinese parents of preschool-aged children have been supported (e.g., Wu et al., 2019). In this study, Cronbach's alpha values ranged from 0.780 to 0.854 for the seven dimensions.

Demographic questionnaire

The demographic questionnaire was used to collect study participant background information, including the child's age, sex, and sibling status. Further, family socioeconomic status (SES) was indexed according to five indicators: (1) paternal education, (2) paternal occupation, (3) maternal education, (4) maternal occupation, and (5) household income. In the current study, paternal/maternal education was divided into 7 categories ranging from 1 (*less than three years*) to 7 (*master's degree or above*), paternal/maternal occupation contained 5 categories, with a rage from 1 (*unemployment, job-waiting, part-time job, or farmer*) to 5 (*senior management personnel and senior professional*), and household income was coded into 7 levels ranging from 1 (*less than ¥ 1500*) to 7 (*more than ¥ 20,000*). Following previous research (e.g., Lin and Bian, 1991; Hu et al., 2017), we standardized the scores of the above five indicators to z-scores and then averaged these to produce the

TABLE 2 Bivariate correlation, mean, and standard deviation of studied variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Communication	1.00													
2. Cooperation	0.94**	1.00												
3. Assertion	0.96**	0.83**	1.00											
4. Responsibility	0.94**	0.98**	0.85**	1.00										
5. Empathy	0.98**	0.92**	0.94**	0.93**	1.00									
6. Engagement	0.94**	0.83**	0.92**	0.81**	0.93**	1.00								
7. Self-Control	0.90**	0.89**	0.87**	0.94**	0.91**	0.79**	1.00							
8. Family SES	0.10**	0.08**	0.11**	0.08**	0.10**	0.08**	0.09**	1.00						
9. Child age	0.07**	0.09**	0.05**	0.10**	0.07**	0.07**	0.09**	−0.10**	1.00					
10. HSC	0.42**	0.38**	0.42**	0.39**	0.41**	0.40**	0.40**	0.09**	0.01	1.00				
11. SBI	0.42**	0.39**	0.42**	0.40**	0.42**	0.41**	0.40**	0.10**	0.06**	0.83**	1.00			
12. HBI	0.53**	0.50**	0.52**	0.50**	0.52**	0.51**	0.50**	0.21**	0.01	0.70**	0.75**	1.00		
13. Closeness	0.42**	0.41**	0.39**	0.40**	0.40**	0.39**	0.35**	0.09**	−0.02	0.22**	0.23**	0.35**	1.00	
14. Conflict	−0.24**	−0.27**	−0.18**	−0.25**	−0.22**	−0.20**	−0.20**	−0.10**	0.00	−0.01	−0.02	−0.11**	−0.55**	1.00
Mean	2.05	2.13	1.94	1.98	1.99	2.09	1.66	0.00	5.09	2.34	2.25	2.62	4.51	2.44
SD	0.40	0.40	0.43	0.44	0.43	0.44	0.44	0.53	0.81	0.79	0.82	0.66	0.50	0.77

HSC, home-school conferencing; SBI, school-based involvement; HBI, home-based involvement.

** 0.01.

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family SES index score, where a higher index score indicates a greater family SES.

Data analysis strategies

To address our research questions, we analyzed data in the following two steps: Step 1, confirmatory factor analysis (CFA) and Step 2, multivariate regression analysis. In Step 1, a CFA model was fitted to the item-level data for each instrument (i.e., SSIS-RS, FIQ-SF, and CPRS). A CFA model was specified according to the initial measurement structure of each instrument. Specifically, for SSIS-RS, a seven-factor model was specified, where each factor corresponded to a subscale of SSIS-RS. Similarly, a three-factor model was specified for FIQ-SF and a two-factor model for CPRS. According to Kline (2016), the aforementioned models were identified because they presented a standard structure, where there were at least two indicators (i.e., items) of each factor, with no cross-loadings or correlated residuals. To complete model identification, we fixed the factor variance at one. By the end of this step, we examined the measurement structure underlying each instrument by reviewing model fit indices and factor loadings, then factor scores for the subscales of each instrument were saved for use in subsequent multivariate regression analysis.

In Step 2, we conducted a multivariate regression analysis to examine the effects of parental involvement (three subscales) and parent-child relationship (Closeness and Conflict), as well as their interactions, on the seven aspects of preschoolers' social skills, as measured by SSIS-RS. We treated children's age and family SES as covariates in the model. This chosen analytical technique fits adequately to our research interest, where we focused on predicting several outcomes from the same set of predictors (Stevens, 1996) and, hence, was sufficient to answer our research questions. From this step, standardized path coefficients were reviewed. Prior to multivariate regression analysis, we fitted a structural equation model with latent variable interactions, and the model could not be estimated, due to the high computational intensity caused by the large number of latent variable interactions (three FIQ-SF subscales $\times$two CPRS subscales = six).

For the studied models, we reviewed the following statistical indices to assess model fit (Kline, 2016) χ^2 (statistical non-significance suggests perfect model fit), Comparative Fit Index (CFI; CFI $\geq$ 0.95), Tucker-Lewis Index (TLI; TLI $\geq$ 0.95), Root Mean Square Error of Approximation (RMSEA; RMSEA $\leq$ 0.08), and the Standardized Root Mean Square Residual (SRMR; SRMR $\leq$ 0.08), where the χ^2 test is a test of exact model fit and the others are indicators of approximate fit. Correspondingly, the evaluation of model fit primarily relied on approximate fit indices. Data analysis was conducted using Mplus 8.4 (Muthén and Muthén, 1998-2017). As the children were nested within classrooms, we further specified CLUSTER = CLASSID and TYPE = COMPLEX, to account for the nesting structure of child data within classrooms, as well as the non-independence therein. Diagonally weighted least square (WLSMV) and robust maximum likelihood (MLR) were used for CFA and the multivariate regression analysis, respectively.

Results

Evaluation of measurement structure

Results from CFA are presented in **Supplementary Tables 1–4**. Overall, acceptable fit was found for all tested CFA models. The values of model fit indices for measures of social skills (SSIS-RS) and parent-child relationship (CPRS) were well within the range of adequate fit (RMSEA = 0.052, 90% *CI* [0.051, 0.053], CFI = 0.95, TLI = 0.95, SRMR = 0.05, for SSIS-RS; RMSEA = 0.079, 90% *CI* [0.076, 0.081], CFI = 0.96, TLI = 0.95, SRMR = 0.06, for CPRS). For the measure of parental involvement (FIQ-SF), values of CFI/TLI and SRMR fell within the acceptable range (CFI = 0.99, TLI = 0.98, SRMR = 0.04), but RMSEA slightly exceeded the cutoff (RMSEA = 0.096, 90% *CI* [0.095, 0.098]). The disagreement between RMSEA and CFI, as noted in Lai and Green (2016), does not necessarily suggest a model fits data poorly or model misspecification. Hence, in addition to the reported global fit indices, we further reviewed correlation residuals (differences between observed and model implied correlations) for understanding of local fit. Accordingly, the absolute values of the correlation residuals varied from 0.00 to 0.14, indicating the three-factor model of FIQ-SF was able to closely reproduce the observed correlation matrix. Also, considering the latent construct of FIQ-SF as supported in existing literature (e.g., Fantuzzo et al., 2013; McWayne et al., 2015; Bulotsky-Shearer et al., 2016) and the high factor loadings of items on the designated dimensions (**Supplementary Table 3**), we decided to retain this three-factor solution.

Descriptive statistics and correlations

Means and standard deviations of the key study variables, as well as bivariate correlations, are presented in **Table 2**. Mean family educational involvement was at moderate levels across all three dimension subscales: Home-school conferencing, M = 2.34 (SD = 0.79); School-based involvement, M = 2.25 (SD = 0.82), and Home-based involvement, M = 2.62 (SD = 0.66). Mean preschoolers' social skills scores lay between moderate and upper levels, including: Communication, M = 2.05 (SD = 0.40); Cooperation, M = 2.13 (SD = 0.40); Assertion, M = 1.94 (SD = 0.43); Responsibility, M = 1.98 (SD = 0.44); Empathy, M = 1.99 (SD = 0.43); Engagement, M = 2.09 (SD = 0.44); and Self-control, M = 1.66 (SD = 0.44).

Regarding parent-child relationship, perceptions of parent-child Closeness (M = 4.51, SD = 0.50) scored higher than those of parent-child Conflict (M = 2.44, SD = 0.77).

As shown in **Table 2**, significant positive correlations were found between preschoolers' social skills in the seven subscale aspects and Home-school conferencing, School-based involvement, and Home-based involvement ($0.53 \geq r \geq 0.38$; $p < 0.01$). Closeness in parent-child relationship was positively correlated with preschoolers' social skills ($0.42 \geq r \geq 0.35$; $p < 0.01$), whereas negative correlations were observed with Conflict in parent-child relationship ($-0.18 \geq r \geq -0.27$; $p < 0.01$). Closeness in parent-child relationship and scores for each of the family educational involvement subscales were positively correlated (r, 0.22–0.35). Conflict in parent-child relationship was negatively correlated with Home-based involvement ($r = -0.11$; $p < 0.01$); however, no significant correlations were found between Conflict in parent-child relationship and Home-school conferencing ($r = -0.01$; $p > 0.05$) or School-based involvement ($r = -0.02$, $p > 0.05$).

Associations between family educational involvement, parent-child relationship, and social skills

Multivariate regression analysis revealed a similar pattern of the effects of family educational involvement and parent-child relationship on social skills among preschoolers. First, as shown in **Table 3**, the R^2 value ranged from 0.31 to 0.37 for the seven SSIS-RS subscales, which suggests that over 30% of the variance in SSIS-RS subscale scores was predicted by the studied factors; according to Cohen (1988), this indicates a large effect.

Second, of the three types of family educational involvement measured by FIQ-SF, significant main effects were detected for Home-school conferencing ($\beta_{Communication} = 0.12$, $\beta_{Cooperation} = 0.10$, $\beta_{Assertion} = 0.14$, $\beta_{Responsibility} = 0.11$, $\beta_{Empathy} = 0.12$, $\beta_{Engagement} = 0.12$, $\beta_{Self-Control} = 0.13$; $p < 0.01$ for all effects) and Home-based involvement ($\beta_{Communication} = 0.37$, $\beta_{Cooperation} = 0.36$, $\beta_{Assertion} = 0.35$, $\beta_{Responsibility} = 0.35$, $\beta_{Empathy} = 0.36$, $\beta_{Engagement} = 0.34$, $\beta_{Self-Control} = 0.34$; $p < 0.01$ for all effects). No statistically significant effects related to School-based involvement were detected.

Third, there were significant main effects of parent-child Closeness ($\beta_{Communication} = 0.23$, $\beta_{Cooperation} = 0.20$, $\beta_{Assertion} = 0.23$, $\beta_{Responsibility} = 0.19$, $\beta_{Empathy} = 0.22$, $\beta_{Engagement} = 0.22$, $\beta_{Self-Control} = 0.16$; $p < 0.01$ for all effects) and Conflict ($\beta_{Communication} = -0.09$, $\beta_{Cooperation} = -0.15$, $\beta_{Assertion} = -0.03$, $\beta_{Responsibility} = -0.13$, $\beta_{Empathy} = -0.08$, $\beta_{Engagement} = -0.06$, $\beta_{Self-Control} = -0.10$; $p < 0.01$ for all effects) on the scores of SSIS-RS subscales. Notably, across the SSIS-RS subscales, the impact of parent-child Conflict was relatively subtle compared to that of parent-child Closeness.

Lastly, of the six interactive effects between subscales of FIQ-SF and CPRS, only the interaction between parent-child Closeness and Home-based involvement was statistically significant, with standardized coefficient values ranging from 0.05 to 0.07 across the seven SSIS-RS subscales. This suggests that a close parent-child relationship positively moderates the effect of home-based involvement on social skills among preschoolers. Given the significant interaction of Closeness and Home-based involvement, we conducted two follow-up analyses at high (Mean + 1 SD) and low (Mean−1 SD) levels of Closeness, respectively. This simple slope analysis enables further examinations of the simple main effect of Home-based involvement on child social skills, and hence affords an in-depth understanding of the change in predictive effect of Home-based involvement as a function of Closeness. Accordingly, when Closeness was at low level, statistical significance was found on the simple main effect of Home-based involvement ($\beta_{Communication} = 0.30$, $\beta_{Cooperation} = 0.30$, $\beta_{Assertion} = 0.29$, $\beta_{Responsibility} = 0.30$, $\beta_{Empathy} = 0.29$, $\beta_{Engagement} = 0.27$, $\beta_{Self-Control} = 0.29$; $p < 0.001$ for all effects). Similarly, for the high-level of Closeness, the simple main effect of Home-based Involvement was significant on all domains of child social skills ($\beta_{Communication} = 0.43$, $\beta_{Cooperation} = 0.42$, $\beta_{Assertion} = 0.41$, $\beta_{Responsibility} = 0.41$, $\beta_{Empathy} = 0.42$, $\beta_{Engagement} = 0.41$, $\beta_{Self-Control} = 0.39$; $p < 0.001$ for all effects). This collectively suggested that a higher level of parental involvement at home was associated with a positive impact on children's social skill development. Further, compared with children who had a less close relationship with their parents, Home-based involvement had a relatively stronger impact on social skills among children who maintained a close relationship with their parents. Visualizations of the interaction between Closeness and Home-based involvement are presented in **Figure 2**. Nevertheless, this interactive effect led to a subtle difference relative to the main effects of Home-based involvement and parent-child Closeness. Additionally, age showed significant yet subtle effects on SSIS-RS subscales, with standardized coefficient values varying from 0.06 to 0.10. No significant effect of family SES was found on any of the seven SSIS-RS subscales.

Discussion

This study explored the effect of family educational involvement on preschoolers' social skills and, of primary interest, the susceptibility of their associations to parent-child relationship (i.e., the moderator). As described, the scores for subscales of each measure (family educational involvement by FIQ-SF, social skills by SSIS-RS, and parent-child relationship by CPRS) are reported and were analyzed, affording a fine-grained investigation of their associations. In the sections that follow, we discuss the direct links between family educational involvement

TABLE 3 Standardized coefficients from multivariate regression analysis.

Coefficients	Communication		Cooperation		Assertion		Responsibility		Empathy		Engagement		Self-control	
	β	*SE*	β	*SE*	β	*SE*	β	*SE*	β	*SE*	β	*SE*	β	*SE*
SES	−0.01	0.01	−0.02	0.01	0.01	0.01	−0.02	0.01	0.00	0.01	−0.02	0.01	−0.01	0.01
AGE	0.07**	0.01	0.09**	0.01	0.06**	0.01	0.10**	0.01	0.07**	0.01	0.07**	0.01	0.09**	0.01
HSC	0.12**	0.02	0.10**	0.02	0.14**	0.02	0.11**	0.02	0.12**	0.02	0.12**	0.02	0.13**	0.02
SBI	−0.03	0.02	−0.03	0.03	−0.02	0.03	−0.02	0.03	−0.01	0.03	−0.01	0.02	−0.02	0.03
HBI	0.37**	0.02	0.36**	0.02	0.35**	0.02	0.35**	0.02	0.36**	0.02	0.34**	0.02	0.34**	0.02
Closeness	0.23**	0.02	0.20**	0.02	0.23**	0.02	0.19**	0.02	0.22**	0.02	0.22**	0.02	0.16**	0.02
Conflicts	−0.09**	0.02	−0.15**	0.02	−0.03*	0.02	−0.13**	0.02	−0.08**	0.02	−0.06**	0.02	−0.10**	0.02
Closeness ×HSC	0.00	0.03	0.01	0.03	0.00	0.03	0.02	0.03	0.02	0.03	0.00	0.03	0.02	0.03
Closeness ×SBI	0.02	0.03	0.02	0.03	0.03	0.03	0.01	0.03	0.01	0.03	0.02	0.03	0.02	0.03
Closeness ×HBI	0.07*	0.03	0.06*	0.03	0.06*	0.02	0.05*	0.03	0.06*	0.03	0.07*	0.03	0.05*	0.03
Conflicts ×HSC	0.05	0.03	0.06	0.04	0.03	0.03	0.06	0.04	0.04	0.04	0.04	0.03	0.05	0.03
Conflicts ×SBI	0.01	0.04	0.01	0.04	0.02	0.04	0.01	0.04	0.02	0.04	−0.01	0.04	0.04	0.04
Conflicts ×HBI	0.04	0.03	0.04	0.03	0.04	0.03	0.04	0.03	0.04	0.03	0.05	0.03	0.04	0.03
R^2	0.37		0.34		0.34		0.34		0.35		0.33		0.31	

HSC, home-school conferencing; SBI, school-based involvement; HBI, home-based involvement.
* 0.05; ** 0.01.

and preschoolers' social skills, as well as the moderating role of parent-child relationship.

Family educational involvement and preschoolers' social skills

Our study found that Home-based involvement and Home-school conferencing, but not School-based involvement, were positively and significantly related to preschoolers' social skills. Existing studies examining the impact of different dimensions of parental involvement have suggested a stronger relationship of home-based involvement with child outcomes relative to other types of involvement (Fantuzzo et al., 2004; Lau et al., 2011; Xia et al., 2020). Home-based involvement includes providing children with a stimulating home environment conducive to learning, such as offering learning materials, reading to children, discussing daily events, and creating learning experiences. During these activities, parents are modeling and reinforcing interpersonal interactions, as well as building relationships with their child; whereas, children can observe role models of appropriate behavior and practice social interaction skills with their parents. Children with highly involved parents in home settings tend to have increased ability to self-regulate (Mistry et al., 2010), higher self-esteem (Hung, 2005), better internal and external motivation (Mccollough and Ramirez, 2010), and more communication skills/interactions with peers and emotional regulation (Hill and Craft, 2003). Home-school conferencing involves the communication and interaction between parents and teachers about children's educational experience and progress, such as talking about children's difficulties or accomplishments. It provides parents (or teachers) with information regarding children's learning and development at school (or at home), which is associated with higher levels of social skills (Powell et al., 2010). Home-school conferencing increases parents/teachers' knowledge about the school/home' expectations for behavior and strategies for improvement, and parents and teachers are likely to reach a consensus about appropriate behavior at both home and school (Hill and Taylor, 2004).

No significant influence of school-based involvement was found in this study. School-based involvement includes activities such as attending school events and volunteering in the classroom. Given that these activities entail direct parent contact with teachers and are less visible to children, previous research suggests that the impact of school-based involvement on child outcomes is limited (Fantuzzo et al., 2004; Dove et al., 2015). Furthermore, in the Chinese context, parents usually play a passive role in school-based involvement and lack opportunities to have constructive discussions with teachers about effective strategies to improve child outcomes (Xia et al., 2020). Although the positive effects of school-based involvement on the academic outcomes of children, such as reading and math, have been reported previously in studies based in Western culture (Schulting et al., 2005; Cooper et al., 2010), its impact on the social outcomes of children requires further investigation.

The moderating role of parent-child relationship

Our findings indicated that parent-child closeness moderated the relationship between home-based involvement and preschoolers' social skills. Specifically, home-based

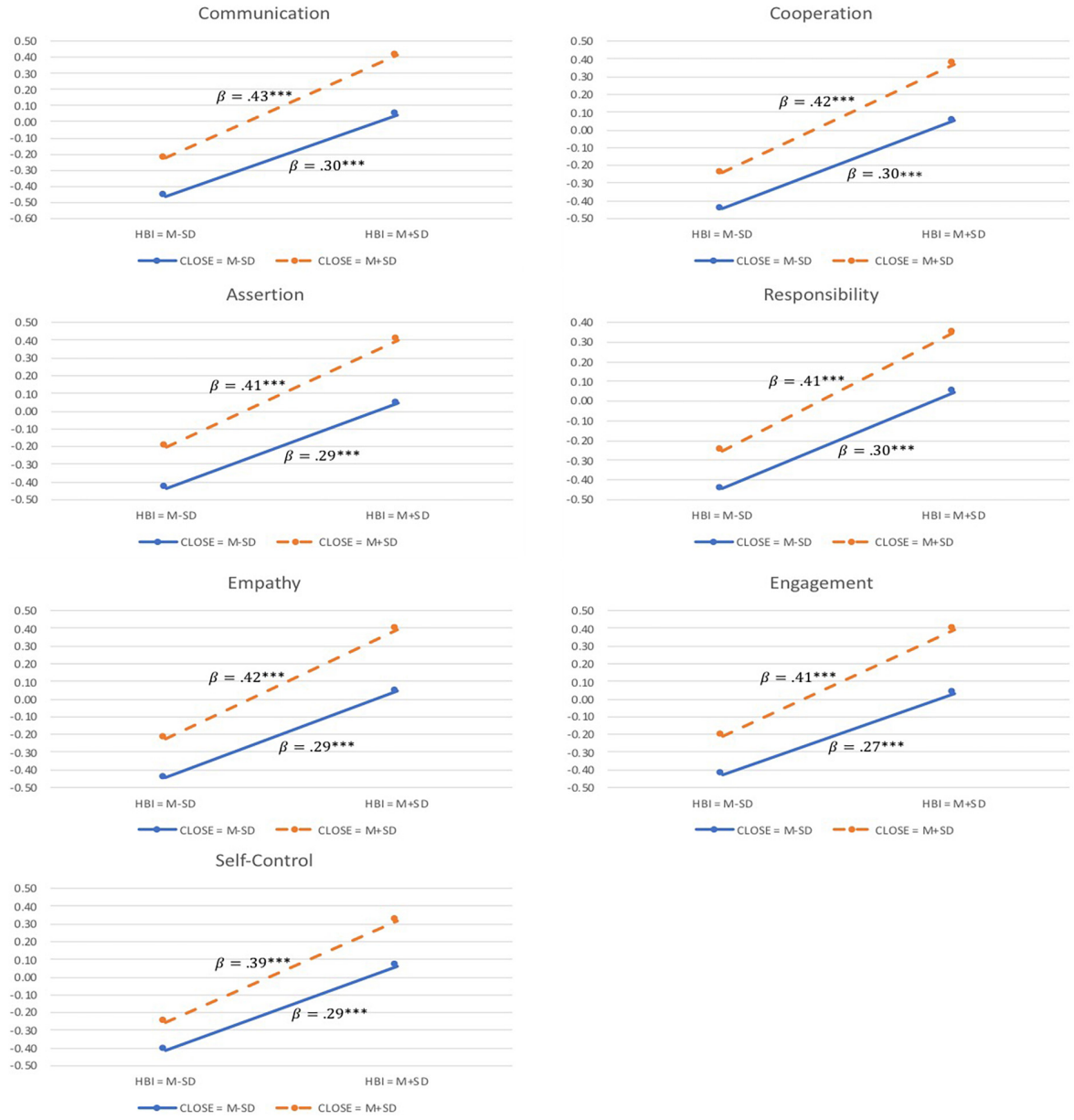

FIGURE 2
Moderation effect of parent-child closeness on the impact of home-based involvement on preschoolers' social skills. βs are regression coefficients of Home-based Involvement from simple slope analyses. ***$p < 0.001$.

involvement and preschoolers' social skills were more strongly positively associated when the parent-child relationship was characterized by high closeness compared with low closeness. This finding partially supports Darling and Steinberg (1993) Integrative Model of Parenting, which postulates that the emotional atmosphere of the parent-child relationship can change the effectiveness of parenting practices. The emotional climate provides a context from which parents practice their behaviors and interact with their children. In the context of a relationship with warmth and respect, children are more likely to engage in their parents' socialization practices (Spera, 2005). Previously reported evidence also revealed a positive association between home-based involvement and child development outcomes when the parent and child have a close relationship (e.g., Simpkins et al., 2006; Stright and Yeo, 2014). When building a close relationship with their parents, children might perceive parental involvement activities at home as an expression of love, care, and emotional support; and thus were more motivated to learn, behaved more appropriately, and performed better (Xia et al., 2020). Increases in parent-child

closeness may make it easier for children to internalize their parents' views and actions through identification and modeling processes (Grolnick et al., 1997). In the context of this study, closeness in parent-child relationship may have helped children internalize the values of social interactions and facilitated their engagement in social behaviors (such as perspective-taking and self-control), leading to higher levels of social skills.

In this study, parent-child conflict was not identified as a significant moderator of the associations between family educational involvement and preschoolers' social skills, consistent with findings from previous studies showing a lack of evidence for a significant moderating effect of parent-child conflict (e.g., Simpkins et al., 2006). Although the power of parental involvement may be reduced because of a poor quality parent-child relationship (Cooper et al., 2010), closeness and conflict in parent-child relationships contribute independently to the prediction of children's social, emotional, and behavioral outcomes (Zhang, 2013). Theories of motivation place a great emphasis on the importance of positive relationships/interactions, rather than on the negative nature of relationships; this does not mean that negative aspects of a relationship, such as conflict, are not important, rather, parent-child conflict may have a significant impact when the level of negativity or conflict is relatively high. Notably, participants in this study reported a relatively low level of parent-child conflict. Further research involving samples of Chinese parents with high levels of parent-child conflict is needed to examine whether parent-child conflict moderates the association between parental involvement and child development outcomes.

Implications and limitations

This study is among the first to explore the moderating effect of parent-child relationship on the association between family educational involvement and preschoolers' social skills in the Chinese context. This study has examined the mechanisms underlying how family educational involvement is moderated by parent-child relationship and related to preschoolers' social skills in the Chinese context. Further, the investigation extends our understanding of family processes and provides empirical evidence of the importance of family educational involvement and parent-child relationship in facilitating the development of social skills in preschoolers. As families are considered as a key source of support for young children, promoting family educational involvement is a growing priority for early childhood policymakers and practitioners. In this study, we found that home-based involvement had the strongest evidence for an association with children's social skills, indicating that increasing home-based parental involvement may better promote children's social skills. That is, improving parental involvement in the home environment has the potential to be an effective way to support the social skills of preschoolers. Furthermore, findings from this study underscore the significance of considering the joint influences of family educational involvement and parent-child relationship. Specifically, the relations between home-based involvement and preschoolers' social skills were enhanced when parents and their child demonstrate high levels of closeness. Implications for practice are highlighted with a particular emphasis on strengthening the home-based involvement and parent-child closeness. Educators should advise parents to increase their involvement in the home setting, while maintaining a close relationship with their children. Both the quantity and quality dimensions of family educational involvement are important. The amount of family educational involvement does not necessarily produce benefits, while the quality of family educational involvement may exert a greater influence on child development outcomes (Moroni et al., 2015). It is necessary to consider the emotional climate that parents establish by participating in their children's learning and development. Educators should convey to parents the significance of family educational involvement in a close and warm atmosphere, and suggest ways to implement high-quality home-based involvement in their children's learning and development.

A number of limitations of the present study are noted, which could be further improved in future studies. First, although a relatively large sample was involved, participants were only recruited from one province in China, which potentially limits the generalizability of our findings to other regions of China. Future studies are needed to involve participants from more diverse economic, geographic, and educational backgrounds. Second, this study collected data from parents and children during a single period of time. Such a cross-sectional design enables examination of concurrent relationships, but provides little information regarding the long-term impact of family involvement on the development of social skills of young children, or on the moderating role of parent-child relationship over time. Longitudinal studies are needed to gain a more thorough understanding of the effects of family involvement and parent-child relationship. Third, parental involvement and parent-child relationship were measured *via* self-report, and preschoolers' social skills were parent-reported. Future studies employing other measures, such as independent observation and direct child assessment, will provide a deeper understanding of the relationships among the studied variables. Fourth, the respondents in this study were children's primary caregivers, and we did not distinguish fathers and mothers in terms of their involvement and relationships with their children. The level of parental involvement and the pattern of parent-child relationship may differ between fathers and mothers. Future research may compare the influence of fathers' and mothers' involvement/relationship on their children's early learning and development, as well as investigating their underlying mechanisms.

Conclusion

This study confirms the benefits of family educational involvement in child outcomes. Among different dimensions of family educational involvement, home-based involvement evidenced the strongest relationship to preschoolers' social skills. This study contributes to the existing literature by empirically investigating the moderating role of parent-child relationship in the associations between family educational involvement and preschoolers' social skills. According to our findings, home-based involvement is more beneficial for children when the parent and child share a relationship characterized by high levels of closeness than for those in a relationship with low closeness. These findings reinforce the importance of considering home-based involvement in the context of parent-child closeness in fostering preschoolers' social skills.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by the Capital Normal University. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

Author contributions

Conceptualization and design of the research were conducted by HL, YQ, and LL. All authors contributed to the data analyses and interpretation, and were involved in the manuscript writing and revisions.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2022.911421/full#supplementary-material

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Father presence and resilience of Chinese adolescents in middle school: Psychological security and learning failure as mediators

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Introduction: This study aimed to explore the association between father presence and adolescent resilience and the mediating role of psychological security and learning failure. Examining the mediating effects of learning failure and the chain mediating effect of psychological security and learning failure elucidated the link between father presence and adolescent resilience.

Methods: The present study conducted a questionnaire survey among Chinese middle school students on father presence, resilience, psychological security, and learning failure. The survey collected 626 valid responses.

Results: The findings showed that father presence, psychological security, learning failure, and resilience were significantly positively correlated; father presence had a direct effect on adolescent resilience, and psychological security and learning failure both mediated the relationship between father presence and adolescent resilience; psychological security and learning failure served as chain mediators between father presence and adolescent resilience.

Discussion: This study aimed to provide theoretical and practical insights into the field of family education.

KEYWORDS

father presence, adolescent's resilience, psychological security, learning failure, mediator

Introduction

Traditional Chinese culture attaches great importance to the father's crucial role in children's growth. However, fathers have not done so well in modern times. The contemporary Chinese family has been characterized by father absence. According to a survey on family education in Shanghai, the phenomenon of father absence has increased. In terms of daily care, the proportion of children whose lives are mainly taken care of by their fathers decreased from 12.2 % in 2005 to 9.6% in 2015. The division of family responsibilities in children's lives began to change from "maternal care mode" to "mother is the main, grandparents are auxiliary" mode. Fathers' responsibility for their children's education was 23.7% in 2015 compared to 30.2% in 2005. According to a report

on Chinese Family Development (2015), Chinese fathers' involvement in their children's education and accompanying needs needs to be greatly improved. Therefore, Chinese society expects the father to shoulder childcare and children's education responsibilities. Families also expect father absence to turn into father presence, as the father's active attendance will benefit the children's mental and physical health.

Father presence has been described as "his psychological presence in the offspring" (Neufeldt and Guralnik, 1994). According to the Western definition, a father connotes being before the other, being at hand, being in attendance, and showing his existence (Neufeldt and Guralnik, 1994). Hence, the father's psychological presence signifies his psychological closeness and availability to the child (Krampe, 2009). Studies indicated that high-quality father presence contributes to various positive developmental results (Pruett et al., 2017), such as promoting healthy psychological development (Li et al., 2007). Meanwhile, father absence leads to poor adaptability and resilience (Li and Tian, 2018).

Scholars investigated whether a higher level of positive father presence leads to stronger resilience. Zhao (2021) asserted that, in China, father involvement could positively affect adolescents' mental health. Specifically, father involvement can increase problem-oriented coping, decrease emotion-oriented coping, and maintain children's mental health levels. Another study also alluded to the association of father involvement with psychological security (Yang and Zhang, 2016; Yin, 2016). As individuals with a strong learning orientation gain experience from failure (Yu et al., 2004), Chinese adolescents may be resilient when facing hardships. The aforementioned factors might lead to the development of resilience. However, no evidence has been collected either on the role of father presence in promoting resilience or on the interaction of factors during this process. Thus, we examined each of these issues in a sample of adolescents. As the saying goes in China, "born to raise, raise and teach, teach them properly." We look forward to enlightening Chinese fathers on how to become "fathering-capable fathers."

In the present study, our primary aim was to assess the effects of father presence on adolescents aged 12–18 years in the Chinese context. Based on the framework of resilience in action, we hypothesized that high-quality father presence, as an external resource, could directly affect adolescents' resilience. Further, it could directly induce a feeling of internal security. A strong father presence might help troubled adolescents solve problems through internalized learning failure. Thus, we hypothesized that learning failure and psychological security might mediate the association between father presence and adolescent resilience. Finally, father presence would affect adolescent resilience through the chain of mediators of psychological security and learning failure. We expected that our findings could help design interventions that promote the development of adolescents.

Literature review

Father presence and adolescent resilience

Based on research on father upbringing, we investigated the relationship between father presence and adolescent resilience. We defined father presence as follows: "fathers [being] involved in their children's cognition, emotion, and behaviors" (Gao et al., 2020). This concept contains seven dimensions: material insurance, emotional communication, guidance participation, future planning, teaching experience, model demonstration, and overall intentions (Krampe and Newton, 2006; Xue, 2019). We adopted the following definition of resilience: "the function of mental processes and behaviors in boosting personal assets and protecting individuals from the potentially negative effects of stressors" (Fletcher and Sarkar, 2013). The concept encompasses five dimensions: goal concentration, emotional control, positive cognition, family support, and interpersonal assistance (Hu and Gan, 2008).

A team of psychologists from scientific research institutions put forward a framework of resilience in action (using the Resilience and Youth Development Module. http:www.wested.orghks, 2003). According to the model, resilience is an innate adolescent potential. Adolescents have psychological needs for safety, love, belonging, challenge, talent, and value during the development process. The satisfaction of these needs depends on protective factors or external resources from school, family, society, and peer groups. If external resources provide the psychological needs of adolescents, then adolescents will naturally develop individual characteristics that will constitute internal resources, including cooperation, empathy, problem-solving, and self-efficacy. These internal resources will protect adolescents from risk factors and promote healthy development.

Based on the aforementioned model, the presence of a father might be inferred to be related to adolescent resilience. While peers and circumstances may be equally influential, parents and family are unchanged elements in most young people's lives. Among adolescents, vulnerability and resilience largely depend on the family environment (Rutter, 1993). Studies confirmed the multiple psychological effects of father presence on children's growth and development, constituting a new perspective in father-child relationship research. Krampe and Newton (2006) pointed out that the level of father presence is of great concern for young individuals' psychological health and personality development. Good family function (e.g., conjugal/couple relationship, parent-child relationship, father involvement) is an important protective factor of individuals' resilience (Wright and Masten, 2005). In China, a large body of evidence also suggested that fathers are of great importance in developing children's intelligence, personality characteristics, sociality, and gender roles (Pu and Lu, 2008). Family elements,

particularly those related to the father, are closely related to children's mental health.

Social learning theory (Bandura, 1991) helps elucidate "father presence." It states that individuals' social behaviors are not generated by nature or instinct but are rather gradually formed through continuous observation, learning, imitation, and reinforcement. The essence of observational learning is imitation. For children, imitation is a crucial behavior acquisition, and parents are their primary objects of imitation. Parents' daily behavior, habits, and emotional attitudes have an essential impact on the growth and development of children. In the development of individual psychology or behaviors, a father's importance must not be ignored. Traditional Chinese culture attaches great importance to the father's care and upbringing of his children, namely, his presence. In the current Chinese society, owing to the rapid change and development of the social economy, fathers can achieve direct (e.g., daily care) and indirect interaction (e.g., *via* various media). This interactive parent–child mode could demonstrate multiple aspects associated with father presence. Hence, it might have a deep influence on adolescent resilience (***Hypothesis 1***).

Psychological security

Psychological safety includes implicative, cognitive, and affective structures. As such, safety may be treated as a psychological phenomenon with a standard structure. Security can be viewed as a state of inner peace, confidence, a positive attitude, trust, subjective wellbeing, openness, and relaxation (Zotova and Karapetyan, 2018). Maslow et al. (1945) described psychological security as "a feeling of confidence, security, and freedom from fear and anxiety, particularly when one's present (and future) needs are met." In the early Chinese studies of psychological security, security was defined as the emotion one experiences when escaping from a dangerous situation or being protected (Huang, 2004). Psychological security is a premonition of potential physical or psychological danger or risk, as well as a sense of power and powerlessness when handling affairs, mainly referring to the sense of certainty and control (Cong and An, 2004). We adopted the definition of psychological security proposed by Cong and An (2004): a good and stable psychological experience of teenagers in their study, family, daily lives, and social interactions.

Krampe and Newton (2006) argue that participation helps children coordinate with their fathers by helping them approach, recognize, and understand him and eventually embrace and internalize his influence. In this process, if the perceived quality of the parent–child relationship is good, then the children's security level is correspondingly high. The father plays an equally important role as the mother in forming the children's security (Zhang, 2012a). In contrast, according to Horney's (1950) theory of anxiety, growing up without the love of parents and the warmth of family creates insecurities. Meanwhile, resilience is remarkably positively correlated with the psychological security of left-behind children (namely, students with poor academic performance) (Xu et al., 2013). Hence, children's security is closely linked to their fathers and their resilience.

Yang and Tan (2007) found that the level of individual security is significantly correlated with family type, parental income, and the parent–child relationship. Yin (2016) considered that the dimension of physical interaction between junior high school students and their fathers could significantly predict their psychological security level. Wang (2009) reported that the father's parenting style is greatly correlated with the daughters' sense of security, among which emotional warmth and understanding are positively correlated with a sense of security.

Meanwhile, some studies found differences in social frustration in groups with high and low levels of psychological security. People with high levels demonstrate markedly reduced social frustration and increased resilience (Akhmadeeva and Galyautdinova, 2021). The effects of psychological security on an individual's social adaptation (Xu et al., 2013), self-esteem (Zeng et al., 2017), interpersonal relationship, interpersonal trust (Chen and Yin, 2018), and resilience (Wang and Zhang, 2018) have also been confirmed. Thus, we aimed to examine whether psychological security may exist in the association between father presence and adolescent resilience (***Hypothesis 2***).

Learning failure

Politis (2005) argued that failure should be viewed as a personally cherished learning resource. Learning failure, as an internal force, is defined as "an individual learning from a failed experience." It relies on the individuals to reflect on their thoughts and actions as a strategy to reduce the probability of future failure (Holger et al., 2011). Failure can create tremendous value and experience, and the learning behaviors after failure determine the acquisition of knowledge and experience (Wang et al., 2021).

The home is the best school for adolescents, and parents are the primary teachers. Experienced parents can help children develop different abilities, including learning from failure. Morgan (1894) introduced the concept of "trial and error" as a learning method. This topic has been explored in different areas to find effective ways to promote learners' improvement. According to the experiential learning circle theory, learning is a process of "starting from experience, then returning to experience, reforming or changing experience, and then creating knowledge" (Kolb, 1984). As adolescents grow, they are exposed to all kinds of life experiences, including their own, those taught by others, and successes and failures. These valuable resources can be transformed into an important driving force

to promote an individual's growth and development based on rational utilization.

Edmomdson (1999) pointed out that a high level of psychological security, which is conducive to speaking out and expressing opinions freely, positively impacts learning failure. Tang et al. (2014) also found that psychological security could significantly predict an individual's positive learning failure. Furthermore, studies showed that people with higher learning orientations enjoy the experience of failure. Compared with those with less learning motivation, they may be more resilient when working hard (Yu et al., 2004). The active involvement of fathers in this learning process encourages the youth to take action to deal with failure—that is, a father's presence could indirectly promote resilience (Opondo et al., 2016). Therefore, a high-quality father's presence would positively impact adolescent resilience by fostering the latter's internal strengths of psychological security and learning failure. In this study, we aimed to examine whether father presence influences adolescent resilience *via* the mediator of learning failure (***Hypothesis 3***) and whether psychological security and learning failure play chain mediating roles in this association (***Hypothesis 4***).

Research methodology

Participants and procedure

The participants are Chinese students who studied in the four middle schools of Jiangsu Province and Shanxi Province. The cluster sampling method was used to choose some classes from the above schools for research. Information about students' perceptions of father presence, psychological security, learning failure, and resilience was voluntarily provided. The questionnaire included assurances of confidentiality and anonymity.

We distributed 720 questionnaires. After eliminating unusable ones (such as regular answers and answers with a missing rate of over 50%), 626 survey questionnaires were retained, with an answer rate of 86.9%. Junior high school students account for 58.5%, and senior high school students represent 41.5%. The students' average age was 14.89 years (SD = 2.17), ranging from 12 to 18. In our sample, there were 44.1% men, 55.9% women, 65.2% urban students, and 34.8% rural students.

Materials

We employed four scales to measure the four variables mentioned above: father presence, adolescent resilience, psychological security, and learning failure. Answers were rated on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Father presence scale in China

The father's presence was assessed using the scale compiled by Xue (2019). The scale contained seven dimensions: material insurance ($\alpha = 0.824$), emotional communication ($\alpha = 0.909$), participation in the guidance process ($\alpha = 0.829$), future plans ($\alpha = 0.877$), teaching experience ($\alpha = 0.916$), model demonstration ($\alpha = 0.851$), and overall intentions ($\alpha = 0.934$). It included 38 items (e.g., "My father can meet my basic material needs in life and study"). The reliability of this scale, Cronbach's α, was 0.859.

Adolescent resilience scale

Adolescent resilience was measured by the scale developed by Hu and Gan (2008). The scale contained 27 items involving five dimensions: goal concentration ($\alpha = 0.904$), emotional control ($\alpha = 0.876$), positive cognition ($\alpha = 0.831$), family support ($\alpha = 0.779$), and interpersonal assistance ($\alpha = 0.889$). Sample items included, "I like the course to be able to stimulate curiosity, even if it may be difficult to learn." Cronbach's α for this scale was 0.879.

Psychological security scale

Psychological security was measured using the scale developed by Cong and An (2004). The scale consisted of the following two dimensions: interpersonal security ($\alpha = 0.846$) and certainty in control ($\alpha = 0.857$). The scale contained 16 items (e.g., "I feel that life is full of uncertainty and unpredictability"). The reliability of this scale, Cronbach's α, was 0.914.

Learning failure scale

Adolescents' failure to learn was measured by the scale of Xue (2019). The scale contained 25 items and four dimensions: failure cognition ($\alpha = 0.866$), reflective analysis ($\alpha = 0.841$), experience transformation ($\alpha = 0.880$), and prudent attempt ($\alpha = 0.919$). Sample items included, "I had to figure out what was causing my failure." Cronbach's α was 0.920.

Data analysis

We ran SPSS version 21.0 for descriptive statistics, correlation analysis, and regression analysis, and AMOS version 17.0 for mediating analysis.

TABLE 1 Descriptive statistics and correlations among study variables ($N = 626$).

Variables	M	SD	1	2	3	4	5	6
1. Gender	1.52	0.28	1					
2. Age	14.89	2.16	0.35	1				
3. Father's presence	145.39	33.23	0.07	−0.12*	1			
4. Psychological security	53.42	14.09	0.13	−0.09*	0.50***	1		
5. Failure to learn	98.03	16.19	0.12	0.26*	0.33***	0.33**	1	
6. Resilience	96.27	16.36	0.28*	0.15	0.43**	0.63***	0.55***	1

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Common method variance

Based on the index data of Williams and McGonagle (2016), we tested for common method variance bias with a one-factor test. The results stated a total variance of 10%, with a threshold of <25%, indicating that our study did not have a problem with common method variance.

The specific analysis proceeded as follows. We ascertained the maximum explanation rate of the factors, with consideration for the reference value of 40%. A rate lower than 40% indicated the absence of significant common method bias in the study. We conducted an unrotated exploratory factor analysis on a total of 21 research variables. The results indicated that four factors had characteristic roots >1, which explained 65.58% of the total variance. The variance explanation rate of the first factor was 24.65%. Therefore, the data in this study were less affected by the common method bias.

Data analysis and results

Descriptive and correlational analysis

Descriptive statistics and correlations among the studied variables are reported in Table 1.

Father presence, psychological security, learning failure, and adolescent resilience were significantly correlated. Specifically, the father's presence positively affected psychological security, learning failure, and adolescent resilience. Higher levels of father presence, psychological security, and learning failure ability were related to a higher level of adolescent resilience.

Aim 1: Does Father Presence Directly Affect Adolescent Resilience?

We used Mplus software (version 7.0) to conduct a mediating effect. The independent variable was father presence, while the adolescent's resilience was the dependent variable.

$\chi^2/df = 3.582$, RMSEA = 0.067, CFI = 0.924, TLI = 0.909, SRMR = 0.065, The normalized path coefficient C presented in this study was significant, indicating that the x→ y path was significant; that is, father presence significantly positively predicted the resilience (β = 0.397, $P < 0.001$). The data indicated that the direct effect of father presence and resilience was significant (Figure 1).

Aim 2: Does Father Presence Affect Adolescents' Resilience via the Mediator's Psychological Security?

We used Mplus software (version 7.0) to conduct a mediating effect. The independent variable was father presence, and the dependent variable was the adolescent's resilience. At the same time, psychological security was an intermediary variable.

$\chi^2/df = 3.728$, $RMSEA = 0.077$, $CFI = 0.923$, $TLI = 0.929$, $SRMR = 0.062$, the data stated that psychological security served as a mediator between father presence and resilience, with a mediating effect of 0.112 (Figure 2).

Aim 3: Does Father Presence Affect Adolescents' Resilience via the Mediator-Learning failure?

Mplus 7.0 (version 7.0) software was used in our study to conduct a mediating effect. The independent variable was father presence, and the dependent variable was the adolescent's resilience. Conversely, learning failure was an intermediary variable.

χ^2/df = 2.736, RMSEA = 0.055, CFI = 0.932, TLI = 0.944, SRMR = 0.031, the data indicated that learning failure severed as a mediator between father presence and resilience, with a mediating effect of 0.279 (Figure 3).

Aim 4: Do Psychological Security and Learning failure Play the Chain Mediating Roles in the Association Between Father Presence and Adolescent Resilience?

The bootstrap method was used to further test the significance of the mediation model. The results showed that psychological security significantly mediated the relationship between father presence and resilience (95% CI = 0.004–0.063) and that interpersonal security significantly mediated the relationship between father presence and resilience (99% CI = 0.022–0.071).

As examined in the previous section, learning failure and psychological security are simple mediators between father presence and adolescents' resilience. A correlation analysis showed a significant correlation between learning failure and

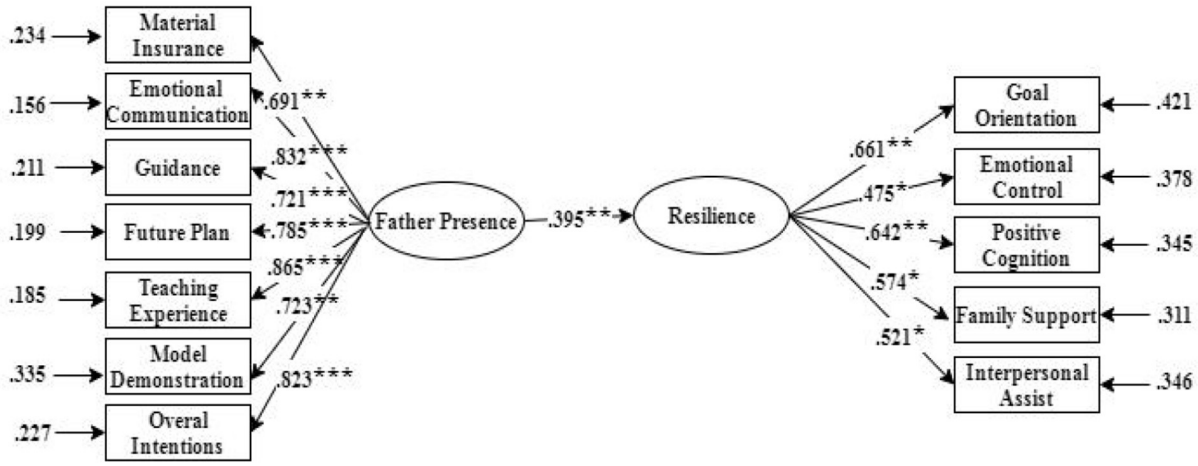

FIGURE 1
Model of direct effect of father presence on resilience. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

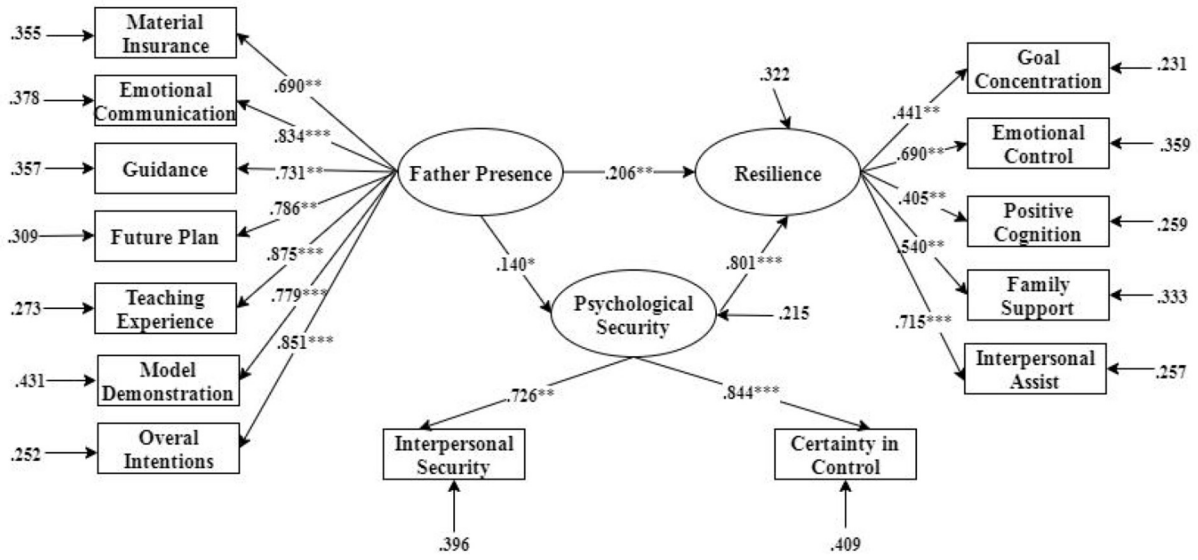

FIGURE 2
Mediating model of psychological security between father presence and resilience. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

psychological security ($r = 0.312^{***}$, $p < 0.01$). Psychological security and learning failure were included as mediators in the structural equation model to discover the chain effect of psychological security and learning failure on father presence and adolescent resilience.

$\chi^2/df = 2.938$, RMSEA = 0.055, CFI = 0.955, TLI = 0.927, SRMR = 0.055. The above indicators were up to standard, and the model fit well. It showed that psychological security and learning failure mediate between father presence and resilience, and a chain mediating role model was obtained (Figure 4).

According to the path coefficients of Model 1, father presence significantly positively predicted resilience (β = 0.229, $P < 0.001$), psychological security (β = 0.299, $P < 0.001$), and learning failure (β = 0.189, $P < 0.01$). Psychological security observably predicted learning failure (β = 0.121, $P < 0.05$) and resilience (β = 0.227, $P < 0.001$). Learning failure remarkably positively predicted resilience (β = 0.227, $P < 0.001$).

The 95% confidence interval was further calculated, and the results are shown in Table 2. The confidence intervals for the direct effect of father presence on resilience and the mediating effect of father presence on resilience through psychological

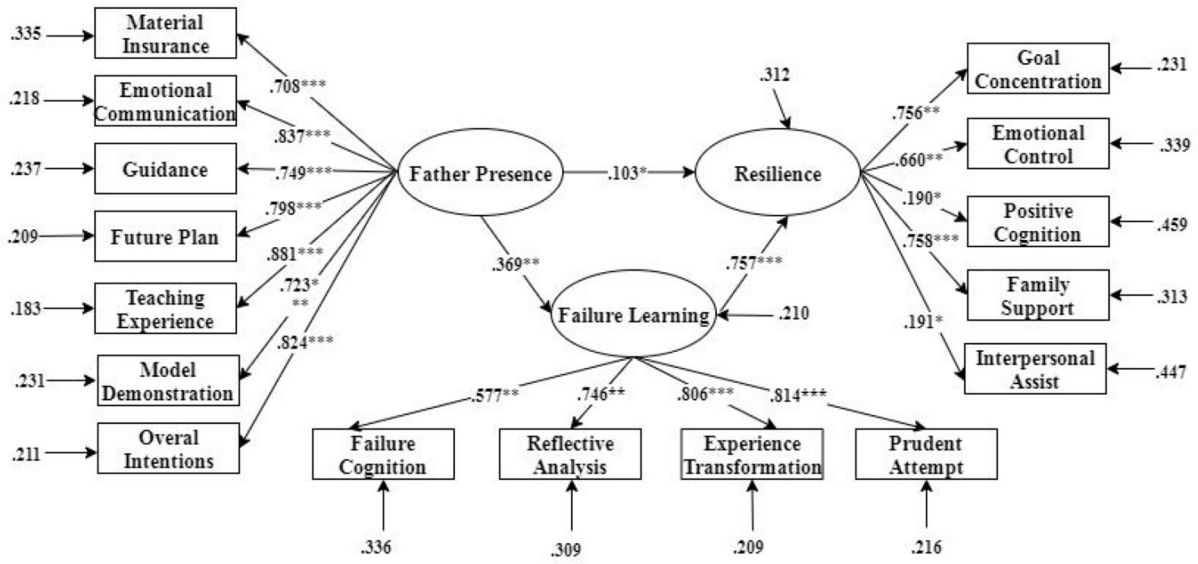

FIGURE 3
Mediating model of learning failure between father presence and resilience. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

security and learning failure, respectively, did not include 0; hence, the mediating effect was established.

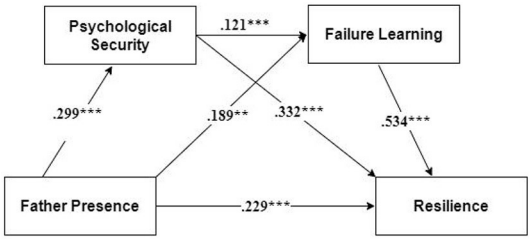

FIGURE 4
Chained mediation model with psychological security and learning failure as mediators (Model 1). **$p < 0.01$; ***$p < 0.001$.

Discussion and conclusions

Findings

We explored the relationship between father presence, psychological security, learning failure, and adolescent resilience in the context of contemporary society in China. Our analysis showed the direct and indirect paths among the concepts.

Direct path: Father presence and adolescent resilience

When testing whether external assets such as father presence can promote resilience development, we found that resilience tended to be stronger as the level of father presence increased. This is consistent with the results of the study by Pu et al. (2012a) and Wu et al. (2017). Pu et al. (2012b) reported a significant correlation between father presence and college students' resilience. Wu et al. (2017) also confirmed that the level of father presence has a significant predictive effect on left-behind teenagers' resilience. Zakeri et al. (2010) found that parents' active involvement is significantly positively correlated with children's resilience. Zhang (2012b) examined the sub-dimensions of parenting styles in a sample of high school students and found correlations with resilience: the father's emotional warmth and overprotection have positive predictive effects on high school students' resilience, whereas the father's rejection has negative predictive effects.

According to the resilience framework in action, individuals can build their resilience through external factors. Father's presence provides adolescents with material insurance and emotional communication, among others, to satisfy their needs. Hence, adolescents' internal resilience can be greatly developed.

The indirect path from father presence to adolescent resilience

Next, we examined whether external assets, such as father presence, could promote resilience development *via* psychological security and learning failure. We proved the mechanism of influence of internal resources on resilience (see Figure 4 and Table 2).

TABLE 2 Chain mediating effect analysis of psychological security and learning failure (N = 626).

Path effect		95% Confidence Interval		Indirect effect value	Effect of the amount
		Boot CI Upper limit	*Boot CI* Lower limit		
Direct effect	Father's presence- resilience	0.048	0.112	0.231	
Mediating effect	Father presence-psychological security-resilience	0.005	0.055	0.12	26.1%
	Father presence-learning failure- resilience	0.033	0.068	0.045	11.5%
	Father presence-psychological security-learning failure- resilience	0.002	0.008	0.007	2.3%
	Overall mediating effect			0.172	39.9%
Overall effect				0.403	

Psychological security

We found a strong mediating path between father presence, psychological security, and resilience (see Table 2). According to the theory of anxiety, adolescents attach great importance to their parents' concern and love, which offer them strong psychological security and support to cope with difficulties. Xu et al. (2013) noted that a good family relationship is crucial for individuals to establish a sense of security. A positive and harmonious parent–child relationship represents parents' acceptance of and intimacy with their children, affecting the latter's daily communication, boosting their confidence in dealing with interpersonal relationships, and improving their sense of security. Meanwhile, a good sense of interpersonal security translates into positive external support that helps children deal with risk factors. Thus, the high-quality parent–child relationship represented by the father's presence can give individuals a higher sense of security in interpersonal communication. Their sense of safety allows them to draw on support from others and to adjust effectively in the face of challenges, which allows for greater adaptation.

Learning failure

Learning failure played an important mediating role. According to experiential learning circle theory (Kolb, 1984), the rich experience and knowledge from the father and positive interpersonal support can help the individual be more proactive in the next attempt after failure and obtain better problem-solving abilities and adaptability. The impact of learning failure in domestic settings has received scant attention compared to its prominence in the business world. We focused on how father presence influenced adolescent resilience through learning failure. As such, our work expanded the application of learning failure to family research based on experiential learning circle theory.

As an important companion and guide in individual growth, the father is also an important transmitter of individual life experience. High-quality father presence represents the transmission of rich life experience, through whom adolescents can gain plenty of knowledge, experience, and spiritual resources, apart from material security. This learning process leads to better failure-coping abilities and indirectly cultivates resilience (Niobe and Gillman, 2000; Thomas et al., 2008).

Psychological security and learning failure

Regarding the path of psychological security and learning failure, we identified the mechanism through which father presence affected resilience through the aforementioned key mediating factors. Both of the mediators were internal resources. Under the driving force of the father's presence, psychological security, a kind of inner feeling of support, transferred confidence and courage for learning failure, an outward-oriented internal resource. Both psychological security and learning failure supported the development of resilience.

Hershenberg et al. (2011) found that American adolescents (89% Caucasian) in close family relationships have high levels of security and positive behavior. Moreover, Van Ryzin and Leve (2012) reported that children (88% Euro-American, 7% mixed ethnic background, 2% Hispanic, 1% African American, 1% Native American, and 1% Asian American) with a good sense of security are more likely to be liked by their peers, get positive responses from their interactions with peers, and have better emotional adjustment abilities. Therefore, positive family resources may lead to beneficial results.

As a unique positive family resource, a high-quality father's presence can help build a harmonious and open family atmosphere. On the one hand, individuals can feel warmth and security while growing up and form a high level of secure attachment. On the other hand, father presence can address individuals' problems and mistakes with an open and inclusive mind, fostering positive externalization behavior. Meanwhile, psychological security has a significant positive effect on learning failure (Tang et al., 2014). With the improvement of individuals' security, for one thing, they can fully express their attitudes, feelings, and opinions without too much concern when talking

about their own failures and defects. For another, in a high-quality parent–child relationship, individuals can also obtain more guidance from their fathers, promoting individuals' reflection and the formation of a positive attitude toward failure. In turn, the ability to analyze and solve problems is enhanced, contributing to the improvement of resilience. The chain effect of psychological security and learning failure verified the influence of father presence on adolescent resilience through chain mediation and the internal mechanism of the influence of father presence on adolescent resilience.

Limitations

Our study had some limitations, which may provide directions for future research. First, in the context of Chinese culture, this study focused on the impact of Chinese fathers on adolescent resilience. We did not compare Chinese fathers with those in Western countries. Future research can explore different fathers from different cultural backgrounds, such as those who express concern and love and their influence on adolescent resilience.

Second, we did not explore the role of mother presence on adolescent resilience. Mothers offer support for adolescents, but whether the role of the mother is different from that of the father merits in-depth investigation. Thus, future research can examine the functional differences between fathers and mothers in the family and whether fathers and mothers produce different influences on children's resilience development.

Finally, our research tools had certain limitations. In addition to the youth resilience and psychological security scales, we used other scales that we developed, compiled, and revised based on their suitability with respect to our research objectives. The adaptability of the questionnaire was confirmed by cross-sectional tests; however, additional time and follow-up research are needed to ensure suitability for broader samples.

Conclusions and implications

The data indicated that father presence, as an external influencing factor, affected resilience in the sample of Chinese adolescents. The high-quality presence of fathers greatly benefited the sample adolescents' psychological development. Our study's results confirmed the father's role in the family as an important external support for Chinese adolescents (Pu et al., 2011).

Our findings also affirmed the mediator role of psychological security and learning failure in the association between Chinese father presence and adolescent resilience. Our study underlined the function of psychological security and learning failure in promoting the resilience of adolescents facing trouble. When an individual encounters stress or challenges, they can appropriately interact with the environment. The internal resilience factors (e.g., cognitive, emotional, mental, physical, and behavioral) come into play to help the individual cope with maladjustment. According to attachment theory, when an individual experiences secure attachment, they can interact effectively and as desired with the environment (Cassidy, 1999). Moreover, failure could serve as a learning tool, which creates experiences and drives individuals to attempt something repeatedly (Andrew et al., 2021). Thus, fathers and their children could benefit from the failure of their adolescents.

We expected to contribute realistic and profoundly significant insights to the field of family education.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Jiangnan University. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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Cognitive emotion regulation for improved mental health: A chain mediation study of Chinese high school students

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High school is a critical time for individual development, during which significant physical and mental changes related to puberty occur. Therefore, high school students' mental health requires more attention from schools, families, and society. Our study explored high school students' present status and family functioning characteristics, psychological capital, cognitive-emotion regulation, and life satisfaction by surveying 917 students in China. Data were analysed using independent sample *t*-tests, one-way analysis of variance, regression analysis, structural equation modelling, and path analysis. Our results showed that family function was positively correlated with life satisfaction, psychological capital, and positive emotion regulation strategies. Negative emotion regulation strategies were inversely correlated with these variables. The variable of cognitive emotion regulation has two dimensions, *positive* and *negative*. Cognitive-emotional regulation and psychological capital had sequential mediating effects between family function and life satisfaction. The results of this study offer new explanations for the mechanisms of family functioning on life satisfaction, how family functioning affects life satisfaction *via* cognitive-emotional regulation and psychological capital, and have some implications for family parenting. It also provides critical theoretical and practical guidance for schools to emphasise the use of positive cognitive-emotional regulation and the development of students' psychological capital levels in teaching and learning, thereby improving individual life satisfaction further. These findings highlight the importance of considering emotion regulation strategies and psychological capital when determining students' life satisfaction, and ensuring a healthy family environment.

KEYWORDS

family function, cognitive-emotion regulation, psychological capital, life satisfaction, high school students

1. Introduction

Families play a vital role in adolescents' growth, significantly affecting their physical and mental health and facilitating individual socialisation (Barth, 2017; Shalchi and Esmaeili Shahna, 2018). Bronfenbrenner's ecological system theory of developmental psychology refers to the interaction between an individual and the environment as a

behavioural system. Accordingly, the family acts as an immediate environment in an individual's life, bridging the relationship between individual development and social adaptation. The social learning theory emphasises that complex behaviours are mainly acquired through observation. Hence, the actions and communication of family members, who serve as role models for learning, parental rearing styles, parent–child relationships, and family structure, will profoundly impact young people (Chi and Ziqing, 2004; Lv, 2019; Huang et al., 2020).

Additionally, the high school period is a critical stage in an individual's lifespan development. Due to social pressure, the youth tend to face difficulties in their studies and lives. Adolescence is marked by physical and psychological changes, along with an increased frequency of psychological problems. With increased academic pressure regarding the 'High School Entrance Examination,' studies have shown that students face issues surrounding peers, parent–child, teacher-student relationships, and other areas (Chen, 2018). Such conflicts can contribute significantly to psychological problems, thereby reducing life satisfaction. A study of 2,861 high school students revealed that 16.79% had severe psychological problems (Zhao et al., 1993).

Effective family functioning helps promote the formation of social abilities and skills, enabling youth to inculcate exemplary habits and experience positive emotions. Conversely, high school students living in an environment with poor family functioning tend to experience more unpleasant emotions. Therefore, this unhealthy environment affects their physical and mental health, interfering with their studies and overall life (Tao et al., 2016). The family functioning theory posits that a family's failure to achieve basic functions can easily cause various clinical problems for its members. Individuals with poor family functioning experience alienation and psychological dilemmas, such as anxiety and depression (Fang and Sun, 2018). Therefore, students' mental health is closely related to family factors.

Mental health involves the absence of mental illness and the presence of a positive mental state. A mentally healthy individual is efficient, satisfied, displays a healthy range of emotions, and has excellent social adaptive intelligence. Life satisfaction is a critical indicator of positive mental health (Yang and Ye, 2014) and can be used to measure students' mental health. In the context of quality education, we need to promote students' overall development, stimulate their potential and monitor their mental health. Previous studies have shown that family functioning is closely related to life satisfaction (Proctor et al., 2017). When family functioning is better, teenagers' subjective well-being is enhanced (Herawati and Endah, 2016). Thus, family functioning positively predicts adolescents' life satisfaction (Oberle et al., 2011). Another study discovered a significant positive correlation between family functioning and the subjective well-being of middle school students (Jia et al., 2018). Therefore, the characteristics and influencing factors of the current life satisfaction of high school students, alongside the relationships between family, school, and the individual, need to be explored. This knowledge will provide a framework of strategies for the mental health development of high school students to enhance their life satisfaction.

Cognitive-emotion regulation strategy refers to an individual's effort to extract information and adapt to the external environment's requirements. When faced with an external event, individuals first form a specific understanding of its requirements and then respond accordingly. Researchers have found that cognitive components in individual emotion regulation have a more significant impact on behaviour. Existing studies have shown that individuals can maintain their mental health through an adaptive adjustment of emotions (Luthans et al., 2015). Liu (2009) found that adopting negative cognitive-emotion strategies to deal with negative emotions increased the impact of life events on mental health, whilst positive cognitive-emotion strategies alleviated this impact. The study also investigates the relationship between psychological capital (PsyCap) and family functioning. PsyCap, or psychological energy, refers to the psychological resources that an individual possesses throughout growth and development (Barth, 2017). These emotions primarily encompass hope, optimism, self-efficacy, and resilience. High school is a critical period for the development of PsyCap. According to the conservation-of-resources theory, when an individual lacks resources, they will experience more psychological pressure and negative emotions.

Conversely, when one possesses sufficient resources, their sense of self-worth and ability is strong. Family factors such as family environment, parent–child communication, and parenting styles directly or indirectly impact an individual's PsyCap. Studies have found that individual self-esteem is low when family functioning is impaired (Shi et al., 2017). Parental rearing patterns can affect adolescents' life satisfaction through PsyCap (Niwako et al., 2011). Many researchers have confirmed the link between family functioning, individual life satisfaction, and PsyCap. Family functioning processes can directly predict adolescent emotional regulation (Kelada et al., 2018).

Additionally, Lerner (1989) states that personal development is primarily the result of interactions between individuals and key members. Therefore, according to developmental theory, family factors, as well as individual factors, can influence life satisfaction.

Although some studies have revealed the relationship between family functioning and life satisfaction, few have examined the mediating effects of PsyCap and cognitive-emotional regulation on the life satisfaction of high school students. The present study explored the direct relationship between family functioning and the life satisfaction of high school students. Furthermore, it examines the mechanisms of cognitive-emotional regulation and PsyCap in this regard. This study proposes the following research hypotheses: (1) A significant correlation exists between high school students' family functioning and life satisfaction; (2) Cognitive-emotional regulation plays a mediating role between high school students' families and life satisfaction; (3) PsyCap mediates between high school students' family functioning and life satisfaction;

(4) Cognitive-emotional regulation and PsyCap The role of cognitive-emotional regulation and PsyCap in mediating the chain between secondary school students' family functioning and life satisfaction. Factors influencing students' psychological development and enabling the synergy between family, school, and the individual warrant future family education interventions promoting good student mental health.

2. Materials and methods

2.1. Participants

This study used cluster sampling to sample 5 schools in Fujian, Hebei, and Shanxi randomly. In total, 1,000 questionnaires were distributed to five Chinese high schools in a class-based unit, and 957 questionnaires were returned, with a recovery rate of 95.7%. Altogether, there were 427 males and 490 females. The mean age was 14.99 years, and the standard deviation was 1.81 years; Incomplete questionnaires or those considered invalid due to extreme response bias were eliminated. The final sample comprised 917 participants, and the response rate was 91.7% (Supplementary Table S1).

2.2. Measures

2.2.1. Family function rating scale

The Family Function Rating Scale was compiled by Epstein et al. (1983) according to McMaster's family function model theory. This study adopted the Chinese version of the scale revised by Li et al. (2013). The scale has 30 test questions across five dimensions: *emotional* (A1–A8) and *active communication* (A9–A13), *egoism* (A14–A19), *problem-solving* (A20–A25), and *family rules* (A26–A30). A four-point Likert scale (1, completely non-conforming to 4: completely conforming) is adopted. The scale involves reverse scoring of some items. The higher the score, the better the family function. The scale's Cronbach's α is 0.91. In this study, Cronbach's α was 0.858, indicating high reliability (see Table 1 for details).

2.2.2. Adolescent life satisfaction scale

The Youth Life Satisfaction Scale was compiled by Xing et al. (2004) and includes six dimensions: *friendship* (B1, B7, B13, B19, B25, B31, B35), *family* (B2, B8, B14, B20, B26, B32, B36), *school* (B3, B9, B15, B21, B27, B33), *environment* (B4, B10, B16, B22, B28), *academic* (B6, B12, B8, B24, B30, B34), and *freedom satisfaction* (B5, B11, B17, B23, B29). Its seven-point scoring ranges from one (*completely non-conforming*) to seven (*completely conforming*). Items B3, B4, B9, and B10, are reverse-scored questions. Each dimension's total score, summed, gives the overall life satisfaction score. The scale's Cronbach's α is 0.91. In this study, Cronbach's α was 0.907, indicating high reliability.

2.2.3. Cognitive-emotion regulation questionnaire

This study used the Alblea Cognitive-emotion Regulation Scale, revised by Zhu et al. (2007), having 36 questions and nine dimensions: *self-blame* (D1–D4), *acceptance* (D5–D8), *contemplation* (D9–D12), *positive re-focus* (D13–D16), re-focus plan (D17–D20), *positive re-evaluation* (D21–D24), *rational analysis* (D25–D28), *catastrophising* (D29–D32), and *blaming others* (D33–D36). Among the nine dimensions, self-blaming, contemplation, catastrophising, and blaming others are negative emotion regulation strategies. Active re-focusing, re-focusing on plans, positive re-evaluation, acceptance, and rational analysis are positive. A five-point scoring is used, ranging from one (*never*) to five (*always*). The scale's Cronbach's α is 0.81. In this study, Cronbach's α was 0.805, indicating high reliability.

2.2.4. Young students' PsyCap questionnaire

This study used the youth PsyCap questionnaire compiled by Ye and Fang (2015). It includes four dimensions: *hope* (C1, C5, C9, C13, C17–C22), *optimism* (C2, C6, C10, C14), *self-confidence* (C3 C7), and *resilience* (C4, C8, C12, C16). Items, C1, C7, C11, and C15 are reverse-scoring questions. A six-point scale is used, ranging from one (*fully non-compliant*) to six (*fully compliant*). A higher score indicates a better student PsyCap. The scale's Cronbach's α is 0.905. In this study, Cronbach's α was 0.891, indicating high reliability.

2.3. Research process and statistical analyses

In this study, the test was administered uniformly in a classroom setting. Before questionnaire administration, the subjects were informed of the survey's significance, purpose, and requirements, and their right to withdraw at any time during the survey. Once informed consent was obtained, the test was administered uniformly by the master testers according to the instructions. The questionnaire was submitted immediately upon completion.

This study used Epidata 3.1 for dual entry and verification of original data; a database was established. The SPSS 22.0 macro, PROCESS, was used to analyse the data. The primary data processing methods were independent sample *t*-tests, one-way analysis of variance (ANOVA), regression analysis, structural equation modelling, and path analysis.

2.4. Research ethics and patient consent

This study was approved by the Shanghai Lida University Ethics Committee (Approval Number: SHLDE-2021-02). Verbal informed consent was obtained from all participants. They were informed that participation was voluntary. This study adhered to

the latest version of the Ethical Principles of Psychologists and Code of Conduct.

3. Results

Whilst distributing and collecting the questionnaires, confidentiality and anonymity were emphasised, and the data collected were limited to scientific research. The participants provided data for all questionnaires. Therefore, any common method deviation sources were reduced by eliminating invalid questionnaires. Harman's single-factor test was used to assess common method bias. The results revealed 29 factors with characteristic roots greater than one. The variance explanation rate of the first common factor was 14.461%, lower than the critical value of 40%. Therefore, no serious common method deviation existed in this study.

The results showed that participants' family function, life satisfaction, PsyCap, and, in particular, cognitive-emotion regulation were generally higher than average (Table 2).

A significant correlation was found between family function, cognitive-emotion regulation, PsyCap, and life satisfaction. Family functioning was positively correlated with life satisfaction, PsyCap, and positive emotion regulation strategies; negative emotion regulation strategies were negatively correlated with family function, life satisfaction, and PsyCap (Table 3).

First, the mediating effect of PsyCap between family functioning and life satisfaction was assessed using the family function-PsyCap-life satisfaction model (Table 4). The results showed that $c = 0.501$ ($t = 17.517$, $p < 0.001$), $a = 0.395$ ($t = 13.024$, $p < 0.001$), and $b = 0.569$ ($t = 22.879$, $p < 0.01$), indicating that the indirect effect of PsyCap on family function was significant. Additionally, $c' = 0.276$ ($t = 11.118$, $p < 0.01$), indicating that family functioning's direct effect on life satisfaction was significant.

Further, the mediating effect of the negative emotion regulation strategies between family function and life satisfaction was examined using the family functioning-negative emotion regulation strategies-life satisfaction model (Table 5). The results showed that $c = 0.501$ ($t = 17.517$, $p < 0.001$), $a = -0.199$ ($t = -6.132$, $p < 0.001$), and $b = -0.131$ ($t = -4.534$, $p < 0.001$), indicating that the indirect effect of negative emotion regulation strategies on life satisfaction was significant. Additionally, $c' = 0.475$ ($t = 16.449$, $p < 0.001$), indicating that the direct effect of family functioning on life satisfaction was significant.

Next, the mediating effect of negative emotion regulation strategies between family function and life satisfaction was examined using the family functioning-positive emotion regulation strategies-life satisfaction model (Table 6). The results showed that $c = 0.501$ ($t = 17.517$, $p < 0.001$), $a = 0.133$ ($t = 4.073$, $p < 0.001$), and $b = 0.131$ ($t = 4.578$, $p < 0.001$), indicating that the indirect effect of positive emotion regulation strategies on life satisfaction was significant. Additionally, $c' = 0.484$ ($t = 16.938$, $p < 0.001$), indicating that the direct effect of family function on life satisfaction was significant.

To further verify the previous hypothetical medium-chain intermediary model, this study used the bootstrap method to repeat sampling 2,000 times through the SPSS macro PROCESS. Validation model six analysed the chain mediation effect of cognitive-emotion regulation and PsyCap. Direct testing of the mediation effect showed the total indirect effect of positive emotion regulation strategies. PsyCap with a bootstrap 95% confidence interval did not contain any zero values. This result indicated that these two variables had a significant mediating effect between family functioning and life

TABLE 1 Scales used in this study.

Name of the scale	Year of publication	Author	Dimensions	Cronbach's α in this study
Family function rating scale	1983	Epstein et al.	Emotional communication; active communication; egoism; problem-solving; and family rules.	0.858
Adolescent life satisfaction scale	2004	Xing et al.	Friendship; family; school; environment; academic; freedom satisfaction.	0.907
Young students' PsyCap questionnaire	2015	Ye and Fang	Hope; optimism; self-confidence; resilience.	0.891
Cognitive-emotion regulation questionnaire	2007	Zhu et al.	Negative emotion regulation strategies; positive emotion regulation strategies.	0.805

TABLE 2 Total variable score.

Dimension	*n*	*Min*	*Max*	*M*	*SD*
Total family function score	917	50	117	92.72	11.46
Total life satisfaction score	917.00	73.00	241.00	165.67	28.84
Total PsyCap score	917.00	31.00	130.00	88.43	15.69
Negative emotion regulation strategies	917.00	23.00	77.00	46.86	7.84
Positive emotion regulation strategies	917.00	34.00	96.00	68.14	8.47

TABLE 3 Correlation analysis of family function, life satisfaction, PsyCap, and cognitive-emotion regulation.

Variable	Family function	Life satisfaction	PsyCap	Negative emotion regulation strategies	Positive emotion regulation strategies
Family function	1.00				
Life satisfaction	0.501**	1.00			
PsyCap	0.395**	0.678**	1.00		
Negative emotion regulation strategies	−0.199**	−0.225**	−0.285**	1.00	
Positive emotion regulation strategies	0.133**	0.195**	0.304**	0.270**	1.00

**$p < 0.01$.

TABLE 4 Regression analysis of family function, life satisfaction, PsyCap, and cognitive-emotion regulation.

Regression equation		Global fit index		Significance of regression coefficient		
Result variable	Predictor variable	R	R^2	β	F	t
Life satisfaction	Family function	0.501	0.251	0.501***	306.837	17.517
PsyCap	Family function	0.395	0.156	0.395***	169.618	13.024
Life satisfaction	Family function	0.724	0.524	0.276**	502.729	11.118
	PsyCap			0.569**		22.879

***$p < 0.001$; **$p < 0.01$.

TABLE 5 Regression analysis of the relationship between family function, negative emotion regulation strategies, and life satisfaction.

Regression equation		Global fit index		Significance of regression coefficient		
Result variable	Predictor variable	R	R^2	β	F	t
Life satisfaction	Family function	0.501	0.251	0.501***	306.837	17.517
Negative emotion regulation strategies	Family function	0.199	0.039	−0.199***	37.598	−6.132
Life satisfaction	Family function	0.517	0.268	0.475***	166.975	16.449
	Negative emotion regulation strategies			−0.131***		−4.534

***$p < 0.001$.

TABLE 6 Regression analysis of the relationship between family function, positive emotion regulation strategies, and life satisfaction.

Regression equation		Global fit index		Significance of regression coefficient		
Result variable	Predictor variable	R	R^2	β	F	t
Life satisfaction	Family function	0.501	0.251	0.501***	306.837	17.517
Positive emotion regulation strategies	Family function	0.133	0.018	0.133***	16.588	4.073
Life satisfaction	Family function	0.518	0.268	0.484***	167.244	16.938
	Positive emotion regulation strategies			0.131***		4.578

***$p < 0.001$.

satisfaction. Similarly, regarding the total indirect effects of negative emotion regulation strategies and PsyCap, the bootstrap 95% confidence interval did not contain any zero value. This result indicates that these two variables had a significant mediating effect between family functioning and life satisfaction.

The first mediating effect was composed of three indirect effects. First, the indirect effect 1 produced by family functioning → positive emotion regulation strategies → life satisfaction had its confidence interval including a value of zero, indicating that positive emotion regulation strategies played a role in family functioning and life. No significant indirect effect between family functioning and life satisfaction was detected. Second, indirect effect 2 was produced by family function → PsyCap → life satisfaction. The confidence interval did not include zero,

TABLE 7 Analysis of the mediation effect.

Indirect effect	BootSE	BootLLCI	BootULCI	Relative effect	Percentage
Total indirect effect	0.2246	0.0217	0.1836	0.2689	49.45
Indirect effect 1	−0.0021	0.0037	−0.0100	0.0047	
Indirect effect 2	0.2071	0.0207	0.1672	0.2496	44.86
Indirect effect 3	0.0195	0.0060	0.0087	0.0321	4.59

SE, standard error; LLCI, lower-level confidence interval; ULCI, upper-level confidence interval.

indicating that a significant indirect effect of PsyCap existed between family functioning and life satisfaction (0.2071, 44.86% of the total effect). Third, in the indirect effect 3 produced by family functioning → positive cognitive-emotion regulation strategies → PsyCap → life satisfaction, the confidence interval did not include a value of zero, indicating that the indirect effect produced by this path (0.0195, accounting for 4.59% of the total effect) was significant (Table 7). Figure 1 shows the path diagram from high school students' family function to life satisfaction.

The second mediating effect was composed of three indirect effects. First, in the indirect effect 1 of family functioning → negative emotion regulation strategies → life satisfaction, the confidence interval included a value of zero. This result indicates that negative emotion regulation strategies played a role in family functioning and life satisfaction. No significant indirect effect between family functioning and life satisfaction was detected. Second, indirect effect 2 was produced by family functioning → PsyCap → life satisfaction. The confidence interval did not include zero, indicating that PsyCap had a significant indirect effect between family functioning and life satisfaction (0.1998, accounting for 44.86% of the total effect). Third, for indirect effect 3, produced by family functioning → negative cognitive-emotion regulation strategies → PsyCap → life satisfaction, the confidence interval did not include the zero value, indicating an indirect effect produced by this path (0.0242, accounting for 6.75% of the total effect; Table 8). The path diagram from family functioning of high school students to life satisfaction is shown in Figure 2.

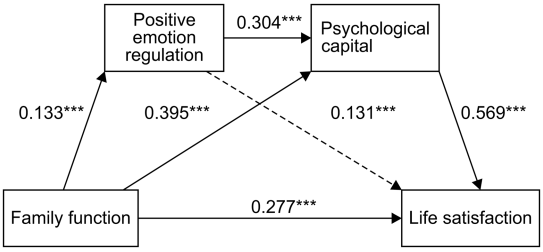

FIGURE 1
Chain mediation model of family functioning, PsyCap, positive emotion regulation strategy, and life satisfaction. ***is the marked path prominence.

4. Discussion

Our findings showed that high school students' family functioning and life satisfaction were significantly positively correlated. Further regression analysis found that family function had a significant positive predictive effect on life satisfaction. This result is consistent with Hong et al. (2016) and Ye (2014). Based on these results, we suggest that family is a child's first classroom. Parents act as the first teachers contributing towards their growth. In healthy functioning families, the members are more inclined to face life with a positive attitude and gain experience whilst solving problems. These strategies improve life satisfaction and promote the development of good mental health.

A significant positive correlation was found between family functioning and the PsyCap of high school students, with family functioning predicting PsyCap. Studies have confirmed that family plays a vital role in psychological development and socialisation (Barth, 2017; Shalchi and Esmaeili Shahna, 2018; White et al., 2018). This finding is consistent with Ji et al. (2018). In other words, better family functioning results in higher PsyCap scores. Individuals with good family function will have better mental health. When high school students face challenges, their families with better family functioning will guide them appropriately, improving their problem-solving ability with subsequent gains in PsyCap.

The family functioning of high school students was significantly negatively and positively correlated with negative and positive emotion regulation strategies, respectively. Further regression analysis found that family functioning could negatively and positively predict negative and positive emotion regulation strategies, respectively. Whilst adolescents' cognitive-emotion regulation strategies are influenced by many factors, family functioning is critically important (Wang, 2011). Parents specifically act as role models for their children. In well-functioning families, parents are more sensitive to their children's emotional responses, and they often interact with their children. Communication further promotes the formation of children's positive emotion regulation strategies. Individuals with inadequate family functioning are treated more poorly by their parents. Their parents' evaluation further affects their self-evaluation, adversely influencing their cognitive-emotion regulation strategies.

The PsyCap of high school students was significantly negatively and positively correlated with inadequate and effective emotion regulation strategies, respectively. Further regression analysis found that PsyCap could positively and negatively predict healthy and impaired emotion regulation strategies, respectively. Therefore, individuals with high PsyCap should have increased mental energy, thus adopting more constructive cognitive-emotion regulation strategies when

TABLE 8 Analysis of the mediation effect.

Indirect effect	BootSE	BootLLCI	BootULCI	Relative mediating effect	Percentage
Total indirect effect	0.2258	0.0217	0.1848	0.2694	51.61
Indirect effect 1	0.0018	0.0051	−0.0083	0.0119	
Indirect effect 2	0.1998	0.0213	0.1609	0.2435	44.86
Indirect effect 3	0.0242	0.0055	0.0142	0.0359	6.75

SE, standard error; LLCI, lower-level confidence interval; ULCI, upper-level confidence interval.

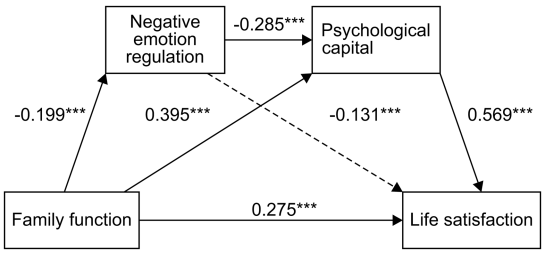

FIGURE 2
Chain mediation model of family functioning, PsyCap, negative emotion regulation strategy, and life satisfaction. ***is the marked path prominence.

facing life events and confronting problems with an optimistic attitude.

The PsyCap of high school students was significantly positively correlated with life satisfaction. Further regression analysis revealed that PsyCap could predict life satisfaction. This finding is consistent with Wang (2014) and Wang (2012), who concluded that family functioning and PsyCap were significantly positively correlated. Thus, the better the individual's family functioning, the higher the level of PsyCap. The healthier the family functioning, the more constructive high school students' experiences are with their families. This situation enables them to learn effective problem-solving, communication, and adaptation to unpleasant emotions or unfavourable life events. Healthy family functioning is conducive to improving junior high school students' subjective evaluation, thereby increasing life satisfaction.

High school students' unhealthy or constructive emotion regulation strategies were significantly negatively and positively correlated with life satisfaction, respectively. Further regression analysis found that positive and negative cognitive-emotion regulation strategies could positively and negatively predict life satisfaction. Individuals who adopt constructive emotion regulation strategies are in a healthy mindset when they encounter problems or challenging life events, adopting rational analysis, positive re-evaluation, and refocusing on planning, acceptance, and rationalisation. However, individuals who adopt unhealthy cognitive-emotion regulation strategies adopt catastrophic thinking, blame others, engage in self-blaming, and ruminate when encountering problems. When looking at problems pessimistically, individuals are more likely to fall into an impaired emotional state. When they vent their emotions, they are more likely to engage in harmful behaviours. These actions damage interpersonal relationships. The continuous accumulation of painful emotions is difficult to manage. Without a change in attitude, high school students' cognition will be slow to mature, and their emotional experience will be diminished.

The present study discovered that family functioning influences life satisfaction *via* cognitive emotion regulation strategies and PsyCap when these two mediating variables are introduced as mediating variables. Previous research has primarily focused on family functioning, PsyCap, and life satisfaction. Few researchers have investigated cognitive-emotional regulation's role in these areas. The current study discovered a novel relationship between these four factors, particularly the role of cognitive-emotional regulation in them, adding to the theory of family functioning from the perspective of cultural differences. The Chinese culture emphasises 'filial piety' and the idea that 'filial piety is the first of all virtues,' Thus, the family has a profound and lasting influence on the individual's growth and development. Simultaneously, this study reveals the influence of family on individual life satisfaction and family functioning's influence *via* cognitive-emotional regulation and PsyCap, and the relationship between them, which has some guiding significance for family parenting in the Chinese cultural context. From the perspective of school education, active roles played by family and school are crucial. This finding suggests that future education and teaching work should improve students' attribution strategies and teach constructive cognitive-emotion regulation, and raise PsyCap levels. Whilst school education is important for influencing life satisfaction, we must also consider the impact of family education on individuals.

4.1. Research significance

4.1.1. Theoretical implications

The findings of this study add to the theory of family function by providing a new explanation for the mechanism of family function on life satisfaction.

4.1.2. Practical implications

Family parenting can benefit from understanding how family functions affect life satisfaction through cognitive emotion regulation and PsyCap. Simultaneously, schools must teach students accurate attributions and constructive cognitive-emotional regulation to increase PsyCap and promote beneficial psychological qualities such as self-confidence, hope, optimism,

and resilience in future education and teaching. Finally, schools should also use the combined efforts of the school, family, and society to influence students. This line of thought provides essential theoretical and practical guidance.

4.2. Strengths and limitations

This study found that the chain mediation effect of cognitive-emotion regulation enriched the relationship between family function and life satisfaction. However, the following shortcomings exist: (1) The use of variables in this study has limitations, and the variables can be expanded in the follow-up study based on the content of this study. (2) The study's population is students, but it can be expanded to adults in the follow-up study, which could lead to new findings. (3) Cross-cultural limitations and differences may exist in the Chinese context, which focuses more on family culture.

However, the information was gathered through a questionnaire survey. Experimental and interview methods can be used to supplement future research content.

4.3. Relevance to the practise of school psychology

This study identified the essential mediating role of cognitive-emotional regulation strategies and PsyCap. In addition, based on the research findings combined with real-life contexts, this study concludes that school psychologists must focus on improving the accuracy of students' attributions. They should encourage students to adopt reasonable cognitive-emotional regulation strategies to increase their PsyCap. Furthermore, school psychologists could play a pivotal role in the combined efforts of school, family, and society to influence students. Finally, the role of family education in individual development is emphasised.

5. Conclusion

Our study examined the relationship among high school students' family functioning, PsyCap, cognitive-emotion regulation, and life satisfaction. It found that practical methods of improving life satisfaction and implementing strategies for effective mental health development are long-term challenges that must be addressed.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by Shanghai Lida University Ethics Committee. The patients/participants provided their written informed consent to participate in this study.

Author contributions

MX: conceptualisation, methodology, software, validation. BC: visualisation, investigation. YY: reviewing and editing. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2022.1041969/full#supplementary-material

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The influence mechanism of parental emotional companionship on children's second language acquisition

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It has become a consensus that parental emotional companionship can promote the healthy growth of children. However, the theoretical circle still knows little about the relationship between parental emotional companionship and children's second language acquisition and the internal processes. In this study, the path analysis method was adopted to analyze the academic quality testing data of Grade 5 and Grade 9 students obtained by questionnaire survey method in Jiangsu Province in 2020, so as to explore the influence mechanism of parental emotional companionship on children's second language acquisition. The results show that parental emotional companionship promotes second language acquisition. Learning confidence and internal learning motivation play an intermediary role in this relationship. Learning confidence positively influences internal learning motivation and plays a chain mediating role. The indirect effect of internal learning motivation in the middle school group is the masking effect. The conclusion of this study reveals the influence mechanism of parental emotional companionship on children's second language acquisition, which enriches and deepens the theoretical understanding of the affective factors affecting second language acquisition. Theoretical and practical implications, along with limitations and future research directions were discussed.

KEYWORDS

parental emotional companionship, second language acquisition, internal learning motivation, further study motivation, learning confidence

Introduction

The General Offices of the CPC Central Committee and The State Council issued the Opinions on Further Reducing the Burden of Homework and After-school Training for Students in Compulsory Education, with a view to reducing the burden of homework and after-school training for primary and middle school students in China. Therefore, primary and middle school students can have more free activity time and parent–child interaction time. Under the background of globalization, international exchanges are increasing day by day in all walks of life. Students' second language learning promotes personal socialization and contributes to international communication. In addition, the second

language learning has also been shown to help individual cognitive development, for example, bilingual need to constantly switch between the two languages, when said a language inhibition of another, it is said that they have an enhanced inhibitory control mechanism, this can make them in other non-verbal cognitive tasks in regulating and control their attention (Adesope et al., 2010; Bialystok et al., 2016). Under the background of double subtraction, the time and energy that students devote to second language learning are shortened and the parent–child interaction time is prolonged. However, many parents do not treat their children's second language learning in the right way when spending time with their children. Under the new background, what kind of parent–child interaction is beneficial to children's second language acquisition and its internal mechanism has become a topic worthy of research. This subject has important times value and social value.

Article 17 of the Law of the People's Republic of China on the Promotion of Family Education, adopted in October 2020, stipulates that parents or other guardians of minors shall reasonably use methods in the implementation of family education, including strengthening parent–child companionship, attaching equal importance to care and strict requirements, and respecting, understanding and encouraging them. It is enough to show that parent–child companionship and emotional companionship based on love, respect, understanding, and encouragement play an important role in promoting the growth of minors.

The subject of this study considers parental emotional companionship as one of the antecedents of children's second language acquisition, so this study reviews such literature, which shows that most studies focus on learners' cognitive factors (Semaan and Yamazaki, 2015), learners' own emotional factors (Xie and Wang, 2022), and school teaching (Sadikoglu and Oktay, 2018; Bai and Robinson, 2022) on second language acquisition. As an indirect influencing factor, parental factors seem to be irrelevant and easy to be ignored. Few studies have looked at the impact of parental companionship on academic performance in specific subjects (Dearing et al., 2004; Englund et al., 2004), only a few studies focused on the differences in the influence of family preconditions on academic achievement in different subjects. For example, studies have found that Chinese students rely more heavily on their family background in second language acquisition than on other subjects such as Chinese and mathematics. By analyzing China's large-scale survey data (CEPS tracking data), Fang and Huang (2018) prove that economic input affected by family background has a particularly significant impact on urban students' second language learning. This means that interdisciplinary research may obscure the patterns of learning in particular disciplines (Arens and Jude, 2017). Teachers and parents should adopt different behaviors and attitudes toward students according to the characteristics of different subjects (Régner et al., 2009). In addition, there may be significant differences in the relationship between parental involvement style and academic achievement in specific subjects under different ethnic and cultural backgrounds (Jeynes, 2010). In view of the greater dependence of second language acquisition on family factors and the possible influence of cultural background on this relationship, it is very necessary to study the influence of parents on their children's second language acquisition under the background of Chinese culture. Among the few literatures on parents' influence on their children's second language acquisition, most focus on such issues as parents' English level, participation in school activities (Jung and Zhang, 2016), expectation level (Suárez-Orozco and Suárez-Orozco, 2001; Cheng and Starks, 2002), Creating a language environment (Goldenberg et al., 2008). Few studies focused on the antecedent cause of parental emotional companionship, and most of them were small sample studies.

In view of the above policy background, practical background, and academic background, this study will use large-scale survey data to explore the impact of parental emotional companionship on children's second language acquisition and its internal influencing mechanism.

Literature review and hypothesis

Theoretical basis

In the second language learning model of Krashen (1981), the "affective filtering hypothesis" holds that learners' emotional states or attitudes, such as motivation and self-confidence, can affect the comprehensibility input of language learners. According to this model, learners' good emotional state positively influences their second language learning results. Maslow's hierarchy of needs theory puts forward five types of needs: physiological needs, safety needs, social needs (belonging and love needs), respect needs, and self-actualization needs. These needs are not only hierarchical but also sequential (Maslow, 1987). Parental emotional companionship satisfies children's social needs and respect needs, and satisfies the higher level needs. According to Maslow's hierarchy of needs theory, parents satisfy their children's emotional needs which are closer to the need of self-actualization through emotional companionship, which is conducive to children's pursuit of self-worth. As a way of self-actualization, second language learning performance is more likely to be valued by children whose emotional needs are met. Parents adopt an encouraging and supportive attitude in the interaction with their children, timely relieve their children's bad emotions, and keep learners in a good emotional state, which may improve their children's second language learning effect. Based on this theory, the following hypotheses are proposed:

> *H1*: Parental emotional companionship promotes children's second language acquisition.

The "affective filtering hypothesis" in Krashen's (1981) second language learning model focuses on the role of learners' emotional factors. This study focuses on external emotional factors closely

related to learners' emotional factors. Therefore, this study introduces the cognitive-motivation model theory, which believes that self-cognition and motivation factors mediate the influence of emotional factors on academic achievement (Pekrun, 1992). Among them, the most important mediating factors include students' learning motivation and learning self-regulation, and positive emotions help to enhance learning motivation (Pekrun et al., 2010). Self-regulation of learning means planning, monitoring, and evaluating one's own learning in a flexible way, and adjusting learning strategies to meet task demands and progress in the process. Positive emotions contribute to self-regulation of learning (Pekrun et al., 2010). According to this theory, second language learning performance, as a kind of academic achievement, may be influenced by emotional companionship from parents, and motivational factors may play a mediating role in this relationship. Learning self-confidence is an individual's positive judgment of his ability to complete learning tasks, a positive cognition and evaluation of learning ability, and an important aspect of self-cognition, so learning self-confidence may also mediate this relationship.

Learning confidence

By discussing school activities with their children, parents can understand their difficulties and provide necessary emotional support. Marsh and Craven (2006) showed that the behavior of parents discussing school activities with their children can improve their children's academic self-concept, namely the cognition of their own abilities. Such good cognition of self-ability is confidence in learning, and the emotional support of parents conveyed through discussion activities may enhance their children's learning confidence. Other studies have found that girls will discuss school activities with their parents more, have greater advantages in second language learning, and have higher self-concept in second language subjects. It can be seen that the cognition of their second language learning ability can help learners form learning advantages. Therefore, it can be inferred that parental emotional companionship may promote children's second language acquisition by improving their learning self-confidence. Arens and Jude's (2017) study demonstrated that students' academic self-concept (perception of self-competence) mediates the relationship between family interaction and academic achievement in second language. The family interaction in this view can reflect the emotional companionship of parents, which has some similarities with the inference of this study. In addition, according to the cognitive-motivation model theory, learning self-confidence may mediate the influence of emotional factors on academic achievement. Accordingly, the following hypothesis is proposed:

> *H2a*: Parents' emotional companionship enhances their children's learning confidence;
>
> *H2b*: Parental emotional companionship promotes second language acquisition by enhancing learning confidence.

Internal learning motivation

Deci and Ryan (1985) believe that intrinsic motivation originates from learners' interest in the task itself and is the positive emotional experience generated by learners in the process of completing the task, which is a powerful factor to maintain motivation. The greatest common denominator of human beings is their dependence on emotion. Adequate emotional companionship provided by parents can enhance children's secure attachment and make children more satisfied with their parent–child relationship. Butler (2015) showed in her research that children's secure attachment to their parents and relationship satisfaction could enhance their internal learning motivation. Therefore, it can be inferred that parents' emotional companionship may improve their children's internal motivation in second language learning. Parents are the main factors influencing children's learning motivation (Butler, 2015). The "affective filtering hypothesis" in Krashen's (1981) second language learning model shows that motivation is an important factor affecting second language learning. Rumbaut's (1994) research also showed that some students who had few opportunities to speak a foreign language at home did well in English as a foreign language art class. Their motivation is an important factor in overcoming adverse circumstances and achieving higher academic performance in second language (Fuligni, 1997). Based on the above analysis, it can be concluded that parents' emotional companionship may improve the second language learning effect by improving their children's internal learning motivation. Cognitive-motivation model theory believes that motivation factors mediate the influence of emotional factors on academic achievement, which is fully supported by the theory. Accordingly, the following hypothesis is proposed:

> *H3a*: Parental emotional companionship enhances children's internal learning motivation;
>
> *H3b*: Parental emotional companionship promotes second language acquisition by enhancing internal learning motivation.

Learning confidence and internal learning motivation

Shih (2005) showed that in the process of foreign language learning, the higher confidence children have in language skills, the higher their choice of goals, and the stronger their interest in language learning. This indicates that students' confidence in second language learning may improve their internal learning motivation. Dörnyei (2009) and Dörnyei and Ushioda (2011)

proposed that when completing a certain behavior, we constantly evaluate whether the behavior meets certain conditions and estimate the feasibility of completing the task. The resulting emotional experience will also affect the motivational behavior. In the process of second language learning, students may constantly evaluate their own language learning ability. Positive evaluation of second language learning ability indicates that students have high confidence in this aspect; otherwise, it is low. Such emotional experience in turn affects students' motivation for second language learning. Based on the above analysis, students' confidence may improve students' motivation. Combining this inference with the above hypothesis, it can be inferred that learning self-confidence may play a chain mediating role between parental emotional companionship and second language acquisition outcomes by improving internal learning motivation. Accordingly, the following hypothesis is proposed:

> *H4a*: Learning self-confidence positively affects internal learning motivation;
> *H4b*: Learning confidence plays a chain mediating role between parents' emotional companionship and children's second language acquisition by positively influencing internal learning motivation.

Based on the above theoretical basis and literature analysis, this study puts forward the theoretical model in Figure 1, and makes an exploratory analysis of the model based on the provincial survey data of Jiangsu Province in 2020.

Research method

The data of this study come from the monitoring of the academic quality of basic education in Jiangsu Province in 2020, which is a cooperative project between Provincial Institute of Education and Science and a normal university. By adopting stratified sampling method, 204,205 students in grade 5 and 147,805 students in grade 9 are selected for questionnaire survey and academic level assessment. The data have two advantages: First, the sample size is large to ensure that the data results have the characteristics of a large group. Second, the provincial Institute of Education and Science and normal university professors cooperate in the investigation, and the quality of the data is guaranteed. The survey was approved by the Education Bureau and supported by parents. The questionnaire was filled out in class anonymously, and each group's advisor had received special training. The survey collected all the data needed for the project of cooperation between the Normal University and the Provincial Institute of Education and Science, covering a wide range of information related to schools, teachers, families, and students. By matching and sorting the data and removing invalid data with missing key information or anomalies, the study obtained valid data for 140,576 fifth-grade students and 100,156 ninth-grade students. Finally, based on the theoretical basis, path analysis is conducted on the independent variables involved in this study (parents' emotional companionship), intermediary variables (learning confidence and internal learning motivation), and dependent variables (children's second language acquisition level).

Participants

The participants of the whole project include researchers of the provincial Institute of Education and Science, professors and graduate students of a normal university, school leaders, teachers, and students, etc. This study focused on the impact of parental emotional presence on second language acquisition. Participants included researchers who organized the project survey and 204,205 students in grade 5 and 147,805 students in grade 9. The Parental Emotional Companionship Questionnaire, filled out by students, measures the degree of emotional companionship perceived by children.

Instruments

In addition to the basic information of the students, the five-point Likert scale was used for the survey, ranging from strongly disagree (1) to strongly agree (5). The questionnaire was written in Chinese, the first language of the participants.

The proxy variable of the dependent variable: The dependent variable is the final test score of the survey as the proxy variable. This test paper is unified and standardized, which can effectively measure students' second language learning level.

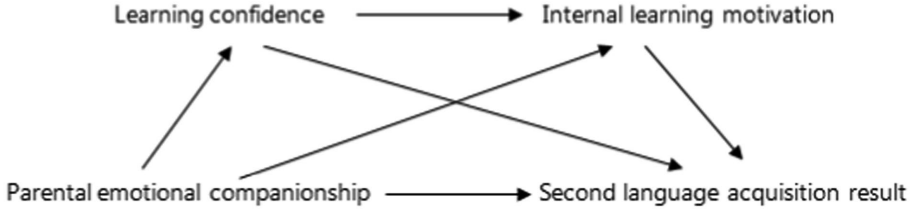

FIGURE 1
Theoretical model diagram.

The scale of Independent variable: The independent variable of this study is parental emotional companionship, which is to investigate the degree of students' perceived emotional companionship from the perspective of students. The scale developed by Feng (2011) was adopted. There were three questions, and the questions were scored using Likert's five-point scale. Example item: "When things go wrong, I can feel my parents trying to encourage and comfort me" (1 = strongly disagree, 5 = strongly agree).

The scales of intermediate variables: The scales of learning confidence and internal learning motivation were developed by the provincial test project team according to relevant theories, and strict reliability and validity tests were carried out. There are five items in each scale. Five-point Likert scale was used for scoring. The example item of learning confidence is "If a problem seems too complicated, I do not want to try it (reverse course)." The example item of internal learning motivation is "as long as I can learn knowledge, difficult learning content or topics are also attractive to me" (1 = strongly disagree, 5 = strongly agree).

Data analysis

After the survey data were obtained, the mean values of parental emotional companionship, learning confidence, and internal learning motivation were calculated using SPSS software. Then, all variables were standardized by SPSS. Finally, the PROCESS 3.5 program was embedded in SPSS, and the mediation model 6 which was consistent with the theoretical model of this study was selected. Through the Bootstrap method, the regression results between variables and the mediation effect index were obtained by repeated sampling 5,000 times within the 95% confidence interval.

Research results

Descriptive statistics

Table 1 shows the descriptive analysis results of variables, including the maximum value, minimum value, average value, standard deviation of each variable, and sample size, showing the basic information of the samples, among which the more important information is that parents' emotional companionship, students' learning confidence, and internal learning motivation in primary school are all higher than those in middle school, which lays the foundation for the subsequent test of main effect and mediating effect.

Scale reliability and validity test

In this study, Cronbach's α value and combined reliability CR values were used to measure the reliability of the scale. The results in Table 2 show that the Cronbach's α values are all greater than 0.8, and the combined reliability CR values are all greater than 0.7, indicating that the internal consistency reliability of variables is relatively ideal. Meanwhile, the average extraction variance value (AVE) was used to measure the scale validity. AVE values were all greater than 0.5, which proved that the scale had good internal validity. In addition, the factor loading of all the questions is greater than 0.6, CIF values are all greater than 0.92, the RMSEA values were all less than 0.06, and the model fit was good.

Main effect and mediating effect test

In order to examine the subjective effect of parental emotional companionship in promoting children's second language acquisition and the mediating effect between learning confidence and internal learning motivation, the Bootstrap method was adopted. PROCESS 3.5 program was embedded in SPSS, 95% confidence interval was selected, and sampling was repeated 5,000 times. Tables 3, 4 report the fitting indexes and regression coefficients of the path model of the primary school group and the middle school group. According to the regression results, the p values were all less than 0.001, and the 95% confidence interval did not contain 0, indicating a good model fitting. Tables 5, 6 report the results of mediating effect size and proportion.

Hypothesis 1 focuses on the direct impact of parental emotional companionship on second language acquisition. As can be seen from Tables 3, 4, the direct effect of parental emotional companionship on second language acquisition of children in primary school group is significant ($\beta = 0.252$, $p < 0.001$), the direct effect was also significant in the middle school group ($\beta = 0.025$, $p < 0.001$). And the results of both groups showed that the 95% confidence interval did not contain 0, which further verified the stability of the results. Hypothesis 1 is verified by empirical results.

Hypothesis 2a focuses on the effect of parental emotional presence on children's academic confidence. As can be seen from Tables 3, 4, the influence of parents' emotional companionship on their children's learning self-confidence is significant in the primary school group ($\beta = 0.603$, $p < 0.001$), the effect was also significant in the middle school group ($\beta = 0.348$, $p < 0.001$). And the results of both groups showed that the 95% confidence interval did not contain 0, which further verified the stability of the results. Hypothesis 2a is verified by empirical results.

Hypothesis 3a focuses on the influence of parental emotional companionship on children's internal learning motivation. As can be seen from Tables 3, 4, the influence of parents' emotional companionship on children's internal learning motivation in primary school group is significant ($\beta = 0.089$, $p < 0.001$), the effect was also significant in the middle school group ($\beta = 0.163$, $p < 0.001$). And the results of both groups showed that the 95% confidence interval did not contain 0, which further verified the stability of the results. Hypothesis 3a is verified by empirical results.

Hypothesis 4a focuses on the influence of learning confidence on internal learning motivation. As can be seen from Tables 3, 4, the

TABLE 1 Descriptive statistics of data.

Variable name	Primary school				Middle school			
	Minimum value	Maximum value	Average value	SD	Minimum value	Maximum value	Average value	SD
Second language acquisition results	232.1	636.98	510.10	68.41	227.24	707.05	516.35	75.80
Parental emotional companionship	1	5	4.28	0.93	1	5	3.49	1.10
Learning confidence	1	5	4.46	0.72	1	5	3.94	0.84
Internal learning motivation	1	5	4.56	0.74	1	5	3.36	0.67
Number of active cases	140,576				100,156			

TABLE 2 Reliability and validity test results of variables.

Variable name	Item of measurement	Cronbach's α	AVE	CR
Parental emotional companionship	My parents often discuss things with me about school.	0.877/0.887	0.545/0.611	0.712/0.756
	When things are not going well, I can feel that my parents are trying to encourage me and comfort me.			
	I share my secrets and personal feelings with my parents.			
Learning confidence	If I work hard, I can overcome the difficulties in my study.	0.801/0.837	0.501/0.512	0.797/0.836
	If a problem seems complicated, I do not want to try it. (reverse)			
	I'm not cut out for learning. (reverse)			
	I'm sure I can do well in the exam.			
	I think the goals I set for myself are generally achieved.			
Internal learning motivation	Reading learning books is a pleasure.	0.859/0.884	0.558/0.614	0.862/0.887
	I often experience a kind of happiness in the process of learning.			
	As long as I can learn knowledge, difficult learning content or topics are also attractive to me.			
	I like to study, so I will study hard.			
	I hope I can make some achievements in my study in the future.			

The first numbers in the table belong to the primary school group, and the last numbers belong to the middle school group.

influence of learning self-confidence on internal learning motivation of primary school children is significant ($\beta = 0.841$, $p < 0.001$), the effect was also significant in the middle school group ($\beta = 0.337$, $p < 0.001$). And the results of both groups showed that the 95% confidence interval did not contain 0, which further verified the stability of the results. Hypothesis 3a is verified by empirical results.

TABLE 3 Regression results of variables in primary school group.

Outcome variable	Predictive variable	R^2	F	β	SE	t	LLCI	ULCI
Learning confidence	Parental emotional companionship	0.213***	37288.4	0.603***	0.003	193.1	0.597	0.609
Internal learning motivation	Parental emotional companionship	0.762***	221269.6	0.089***	0.002	45.8	0.085	0.093
	Learning confidence			0.841***	0.001	567.7	0.838	0.844
Second language acquisition results	Parental emotional companionship	0.074***	3687.7	0.117***	0.004	30.5	0.110	0.124
	Learning confidence			0.105***	0.005	19.7	0.094	0.115
	Internal learning motivation			0.120***	0.005	22.7	0.110	0.131
Second language acquisition results	Parental emotional companionship (direct effect)	0.037***	5343.2	0.252***	0.003	73.1	0.245	0.259

***$p < 0.001$.

TABLE 4 Regression results of each variable in the middle school group.

Outcome variable	Predictive variable	R^2	F	β	SE	t	LLCI	ULCI
Learning confidence	Parental emotional companionship	0.209***	26491.7	0.348***	0.0021	162.8	0.344	0.352
Internal learning motivation	Parental emotional companionship	0.349***	26793.5	0.163***	0.0018	92.9	0.16	0.166
	Learning confidence			0.337***	0.0023	146.1	0.333	0.342
Second language acquisition results	Parental emotional companionship	0.073***	2638.4	0.01***	0.0005	20.3	0.009	0.011
	Learning confidence			0.044***	0.0007	62.3	0.043	0.046
	Internal learning motivation			−0.001	0.0009	−2.14	−0.004	0.000
Second language acquisition results	Parental emotional companionship(direct effect)	0.031***	3195.5	0.025***	0.0004	56.5	0.024	0.026

***$p < 0.001$.

Hypothesis 2b Focusing on parental emotional companionship promotes second language acquisition by enhancing learning confidence. From Tables 5, 6, as can be seen from Tables 5, 6, in the primary school group, the indirect effect size of learning confidence between parents' emotional companionship and second language acquisition is 0.063, confidence interval is [0.057, 0.07], excluding 0, and the indirect effect is significant. The indirect effect size of the middle school group was 0.0154, and the confidence interval was [0.0149, 0.016], excluding 0, which was also significant. Hypothesis 2a is verified by empirical results.

Hypothesis 3b focusing on parental emotional companionship promotes children's second language acquisition by improving internal learning motivation. Tables 5, 6 show that in the primary school group, the indirect effect size of internal learning motivation between parental emotional companionship and second language acquisition is 0.011, confidence interval is [0.01, 0.012], excluding 0, and the indirect effect is significant. Hypothesis 3b has been verified by the empirical results of the primary school group. This indirect effect size was −0.0003 for the middle school group. According to the research results of Wen and Ye (2014), if the mediating effect has the same sign as the total effect, it belongs to partial mediating effect; if the total effect has different sign, it belongs to masking effect. The absolute value of the ratio between indirect effect and direct effect is reported without considering whether the result is significant or not. Therefore, it can be inferred that the internal learning motivation of the middle school group shows a masking effect on the

TABLE 5 Results of Bootstrap test of mediating effect in primary school group.

	Effect	Boot SE	Boot LLCI	Boot ULCI	Ratio of indirect to total effect	Ratio of indirect to direct effect
Total effect	0.252	0.003	0.245	0.259		
Direct effect	0.117	0.004	0.11	0.125		
Total indirect effect	0.135	0.002	0.131	0.139	53.57%	115.38%
Parental emotional companionship–Learning confidence–Second language acquisition	0.063	0.003	0.057	0.07	25.00%	53.85%
Parental emotional companionship–Internal learning motivation–Second language acquisition	0.011	0.0006	0.01	0.012	4.37%	9.40%
Parental emotional companionship–Learning confidence–Internal learning motivation–Second language acquisition	0.061	0.003	0.055	0.067	24.21%	52.14%

TABLE 6 Results of Bootstrap test of mediating effect in middle school group.

	Effect	Boot SE	Boot LLCI	Boot ULCI	Ratio of indirect to total effect	Ratio of indirect to direct effect
Total effect	0.0253	0.0004	0.0244	0.0262		
Direct effect	0.0104	0.0005	0.0094	0.0114		
Total indirect effect	0.0149	0.0003	0.0143	0.0155	58.89%	143.27%
Parental emotional companionship–Learning confidence–Second language acquisition	0.0154	0.0003	0.0149	0.016	60.87%	148.08%
Parental emotional companionship–Internal learning motivation–Second language acquisition	−0.0003	0.0002	−0.0006	0		2.88%
Parental emotional companionship–Learning confidence–Internal learning motivation–Second language acquisition	−0.0002	0.0001	−0.0004	0		

relationship between parents' emotional companionship and children's second language acquisition.

Hypothesis 4b focusing on learning confidence positively influences internal learning motivation, which plays a chain mediator role between parents' emotional companionship and children's second language acquisition. As can be seen from Tables 5, 6, the chain mediating effect size in primary school group is 0.061, and the confidence interval is [0.055, 0.067], excluding 0, and the chain effect is significant. Influenced by the masking effect of internal learning motivation, the indirect effect size of the

middle school group is also negative (−0.0002). The masking effect of internal learning motivation will be discussed in the discussion section combined with relevant theories.

The assumed theoretical model focuses on whether the influence between variables is significant, whether the mediating effect of learning confidence and internal learning motivation is significant, and whether the chain mediating effect of learning confidence enhancing internal learning motivation is significant between parents' emotional companionship and children's second language acquisition. As can be seen in Figure 2, the influence coefficients among all variables in the primary school group are significant. Combined with the test results of the mediation effect mentioned above, the model is established. As shown in Figure 3, in the middle school group, the influence coefficient of internal learning motivation on second language acquisition was not significant, but all the others were significant. The product sign of the influence coefficient of parental emotional companionship to internal learning motivation multiplied by the influence coefficient of internal learning motivation to second language acquisition was opposite to the sign of the influence coefficient of parental emotional companionship to children's second language acquisition, then the masking effect of internal learning motivation was considered, and the model was still valid.

Discussion

Theoretical model

Based on the second language learning model "affective filtering hypothesis," cognitive-motivation model, and related literature review, this paper constructs a theoretical model of the influence of parental emotional companionship on children's second language acquisition. Through Bootstrap method, PROCESS 3.5 program was embedded in SPSS to analyze the quality detection data of academic level in Jiangsu Province in 2020, and verify the theoretical model. The results of data analysis support the theoretical model: Learning confidence and internal learning motivation play a mediating role in the relationship between parents' emotional companionship and children's second language acquisition. In addition, learning confidence positively influences internal learning motivation, which plays a chain mediating role. Among them, the internal learning motivation of the junior middle school group showed masking effect. On the basis of discussing the theoretical model of parental affective companionship affecting children's second language acquisition, this study will discuss the masking effect of the junior middle school group based on the internal motivation theory of Desi and Frast.

In terms of the direct impact of parental emotional companionship on children's second language acquisition, the empirical results of both the elementary and middle school groups are significant, verifying the subject effect of the research hypothesis. In addition, from the perspective of Maslow's need theory, parents' emotional companionship can satisfy their children's needs of belonging, love, and respect, thus helping them to pursue a higher level of self-realization. The influence of parental emotional companionship on second language acquisition as a way of self-actualization is consistent with the idea contained in this theoretical model. Existing studies also provide some support for this study. For example, parents' emotional support can help second language learners' academic achievement and literacy ability (Percy et al., 2013; Shin and Seger, 2016). Kim and Lee (2019) proved the importance of teachers' and parents' emotional support to children's English academic achievement through empirical research, and encouraged more emotional support for students. The study of Ham et al. (2020) shows that students' perception of parental emotional support is higher, and the second language learning effect is better. Students with lower perceived academic support have lower academic performance. These conclusions are consistent with the results of this study, but they are all drawn in the context outside of China. This study shows that under the background of Chinese culture, parents' emotional companionship still promotes children's second language acquisition, which brings inspiration to family interaction in China. In addition, these relevant studies did not deeply explore the internal influencing mechanism, and this study goes further in theoretical depth.

In terms of the mediating effect of children's internal learning motivation and learning confidence, the establishment of this

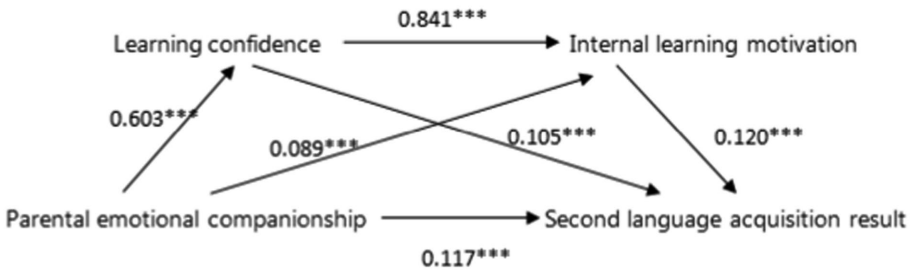

FIGURE 2
Verification result of primary school group theoretical model.

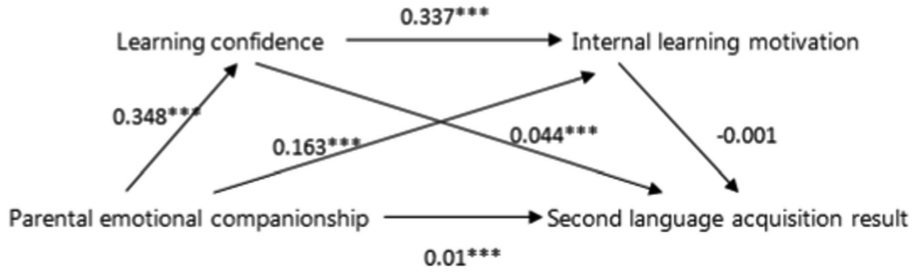

FIGURE 3
Verification result of the theoretical model of the middle school group.

hypothesis is consistent with the cognitive-motivation model which emphasizes that self-cognition and motivation play a mediating role between affective factors and academic achievement. There are few completely consistent results, but they also provide some support. Csizér and Kormos (2009) found that parents' emotional support was an important factor affecting Hungarian students' attitude and motivation in second language learning. Morris et al. (2013) also found that in the second language learning of Korean students, parental encouragement is positively correlated with learning motivation, while parental neglect is negatively correlated with motivation. Both studies support the motivational boost of parental emotional companionship. Crookes and Schmidt's (1991) research shows that higher learning motivation helps foreign language learners to improve their attention while using more cognitive strategies，one of the factors determining motivation is whether personal needs are met. This study emphasizes that demand fulfillment affects learners' behaviors in the process of foreign language learning by influencing their motivation, which is somewhat related to, but not completely consistent with this study, which focuses specifically on the emotional needs and the outcomes of second language learning rather than behaviors. Crookes and Schmidt's (1991) study brings some enlightenment to this research: as the closest people of children, parents' emotional companionship can especially meet their children's emotional needs, thus promoting the improvement of learning motivation, and then learners will be more focused on their second language learning and use more strategies, thus improving their second language academic level. In addition, according to the emotional security hypothesis, a good parent–child relationship can satisfy the emotional support that primary and secondary school students need for their ability development, thus promoting them to explore the outside world more bravely and openly (Davies and Cummings, 1994). Exploring the outside world bravely and openly is a sign of confidence, and the emotional support from parents provided by a good parent–child relationship can promote children to explore new things confidently. The first language is something everyone is familiar with, while the second language is a new and challenging thing from the outside world for learners. Parents' emotional support can improve their children's confidence in exploring the second language world and thus improve their second language learning. The higher the learner's confidence in second language learning, the more willing they are to learn this language independently, and at the same time, they will challenge higher learning goals. Students' confidence in second language learning positively promotes the internal learning motivation. Falout and Maruyama (2004) found that impaired self-confidence was the main factor leading to negative motivation. Although the research focused on the opposite direction, it was consistent with the relationship between self-confidence and motivation emphasized in the chain mediation of this study.

As for the masking effect of internal learning motivation in the middle school group, the effect of internal learning motivation on the relationship between parents' emotional companionship and children's second language acquisition may be affected by the degree of perceived autonomy of children. The theory of motivation by Desi and Forrester (2021a) shows that supporting and affirming the social environment of people's perceived autonomy will enhance intrinsic motivation, while weakening that will destroy intrinsic motivation. The research of Ryan and Lynch (1989) found that teenagers express their will under the premise of relying on their parents, rather than strongly demanding to live independently from their parents. Teenagers are more likely to strive for a certain degree of autonomy from the will. In this critical period, if parents' emotional companionship fails to support their pursuit of autonomy, it will destroy their children's internal learning motivation and negatively affect their academic achievement. As one of the influential factors of social environment, parental emotional companionship can both enhance and destroy children's internal learning motivation, which is related to the degree of parental control and autonomy felt by children. Therefore, the masking effect of internal learning motivation may be related to junior middle school students' pursuit of autonomy and their failure to fully realize it. Desi and Forrester (2021b) argue that people are born to establish emotional connection with others and then rely on others. Dependence is motivated by the need to love and be loved. If we feel autonomous dependence, it is natural, beneficial, and healthy. Therefore, parents should pay attention to the realization of children's autonomy while providing emotional support for their children. Nikolov (1999) took students aged 6–14 as the research object and studied their motivation for learning a foreign language. The

results showed that children aged 11–14 were more likely to be affected by utilitarian factors of language rather than intrinsic motivation. This is consistent with the results of this study. The conclusion that adolescents are less susceptible to internal motivation is consistent with the results of this study. Existentialist philosophy holds that people always have a choice, that people create their own existence through their own choices every moment; therefore, they are fully responsible for themselves, rather than yielding to the forces of chaos and control. Parents should avoid using the power of control while providing emotional support for their children, so that their children can fully feel competent and independent, form a healthy and natural dependence, and promote the improvement of internal learning motivation.

Theoretical significance

Based on the theory, this study explores the relationship and internal mechanism between parents' emotional companionship and their children's second language acquisition, and enhances the understanding of cognitive improvement through emotional flow between parents and children. The "affective filtering hypothesis" in the second language learning model has been widely accepted, which emphasizes the influence of learners' emotional state on language learning. Existing literature has shown that learning confidence and motivation can effectively promote learners' second language acquisition, and learners' emotional factors have attracted much attention. The path by which emotional flow between parents and children promotes cognition is not clear. Therefore, based on the cognitive-motivation model theory, this study explores the influence of parental emotional companionship on learners' learning-related emotional factors through emotional flow, and then promotes second language acquisition. The theoretical framework of this study deepens the theoretical understanding of the role of parental affective companionship in children's second language acquisition and broadens the thinking of future research.

Practical significance

In real life, parents most often choose to directly participate in their children's learning process to help their children acquire second language, which often leads to parent–child relationship tension and children's learning anxiety. This study has important guiding significance for parents' companionship and children's second language acquisition. On the one hand, in order to promote their children's second language acquisition, parents should pay attention to emotional companionship and treat their children in an understanding, encouraging, and inclusive way. Only in this way can their children's learning motivation and learning confidence be enhanced. Through the input of external emotions, the inner emotional problems in second language acquisition can be solved. However, parents should pay attention to fully respect their children's autonomy and freedom in the process of emotional companionship, and should not turn emotional companionship into emotional shackles. On the other hand, in the process of second language learning, children can turn to their parents for understanding, encouragement, and support if they encounter lack of self-confidence or lack of motivation. Even though parents may not be proficient in a second language, they can still be helpful in terms of emotional stimulation.

Limitations and future prospects

This study still has some limitations. First, there are few similar studies, so it is difficult to find the same results for comparative demonstration. In future studies, repeated demonstrations in different cultural backgrounds can be considered to further verify the validity of this theoretical model. Second, the data used in this study are panel data, which affects the determination of the stability of the results to a certain extent. In future studies, panel data can be used to verify the validity of the model again.

Conclusion

Scholars have been devoted to exploring the influencing factors of learners' second language acquisition, but few studies have focused on the influence of parents' emotional companionship on children's second language acquisition. Based on the second language learning model "affective filtering hypothesis," cognitive-motivation model, and related literature review, this paper constructs a theoretical model of the influence of parental emotional companionship on children's second language acquisition. Based on the academic quality monitoring data of Jiangsu Province in 2020, the Bootstrap method was used for empirical test. The results showed that parental emotional companionship positively promoted their children's second language acquisition through the mediating effects of learning confidence and internal learning motivation, and learning confidence affected internal learning motivation and played a chain mediating role between this relationships. The data analysis results in the middle school show certain particularity, and the indirect effect of internal learning motivation is the masking effect. Based on the motivation theory, the mediating effect of internal learning motivation between parents' emotional companionship and children's second language acquisition may be influenced by the degree of perceived autonomy of children. Due to the current data, this study can only explain this result from a theoretical perspective. Future studies may consider including the degree of children's

perceived autonomy as a moderating variable between parents' emotional companionship and children's internal learning motivation to provide empirical evidence. In addition, the most important thing is that parents should strengthen the emotional accompaniment to their children, while paying attention not to turn emotional accompaniment into emotional shackles, and should fully meet their children's needs for autonomy.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the author, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Jiangsu Institute of Educational Science Research. Written informed consent to participate in this study was provided by the participants' legal guardian/ next of kin.

Author contributions

XC: data analysis, article writing, and most of the later revision work were done. SZ: completes the search, analysis and supplement of new literature at the time of revision and proofreads all the revised manuscripts.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Knowledge, attitudes, and practices of parents toward sexuality education for primary school children in China

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This cross-sectional study provides insight into the perceptions of Chinese parents of primary school children with respect to sexuality education. A sample of 19,745 parents was surveyed using an online questionnaire in Beijing, Tianjin, and Hebei, China. SPSS version 23.0 was used for data analysis. In this study, nearly 90% of parents had positive attitudes toward the sexuality education of children in primary schools. However, Chinese parents had limited knowledge of sexuality education. More than 60% of parents were unaware of the sexuality questions that children may encounter at different ages and did not have any accurate information on child sexual abuse prevention education. Although ∼ 70% of parents (both fathers and mothers) reported that they had used television and Internet resources to talk with their children about sexuality and 63% reported that they had read books with their children about sexuality, < 30% reported using appropriate terminology with their children on sexuality education and only 40% reported talking to their children about sexuality comfortably. The multivariate linear regression equation showed some factors associated with the practices of parents in sexuality education, including parental knowledge, attitudes, their experience in receiving sex education in childhood, and their educational level. The findings from this study suggest that it is important to develop culturally relevant training programs for parents of primary schools in Chinese society. The implications and limitations of these findings are discussed.

KEYWORDS

sexuality education, influencing factors, primary schools, parents, China

Introduction

Sexuality education is one of the most important aspects of education for children. The international technical guidance of the United Nations Educational, Scientific, and Cultural Organization (UNESCO) on sexuality education emphasizes the need for comprehensive sexuality education (CSE) programs that aim to equip children and young people with the knowledge, skills, attitudes, and values to make responsible choices about their sexual and social relationships in the world (UNESCO, 2018). CSE programs are scientifically accurate, culturally and age-appropriate, gender-sensitive, and life skills-based. Sexuality education should not be assumed to begin in adolescence. Sexuality begins at birth, and talking about sex and sexuality with children should be a continuous process. Sexuality education if started early in childhood may help children develop a sense of themselves and their bodies while strengthening their self-confidence and helping them take charge of their lives (UNESCO, 2018). Sexuality education is critical in the development of a healthy life; it is both formal (e.g., school-based curricula and health professionals) and informal (e.g., parents /caregivers, Internet, and peers).

Parents play an important part in the sexuality education of children

Parents play a key role in educating their children about sexuality. They could offer sexuality education sequentially and provide time-sensitive information as they receive questions from their children at home (Krauss and Miller, 2012). CSE programs at school can help children and young people maintain sexuality and relationship health in physical, emotional, spiritual, and social adaptation. The impact of CSE lessons at school depends on the support of parents at home, such as clarifying concepts and helping children apply their new knowledge and skills in daily life. Moreover, one of the most important extended environments affecting the learning activities of their children in sexuality is the teaching of parents at home (Morawska et al., 2015). Children and young people often want to learn about sexuality matters from their parents (Turnbulla et al., 2008). Young children are curious about the issues related to sexuality and ask their parents questions about body differences between boys and girls, where babies come from, how babies are made, and so on (Brilleslijper-Kater and Baartman, 2000; Martin and Torres, 2014). When parents talk about sexuality issues with their children at an early age, they have the opportunity to foster safe and healthy attitudes toward sexuality (Morawska et al., 2015). Therefore, the knowledge, attitudes, and practices of parents would have very strong influences on the formation of sound sex-related values in their children.

Parental knowledge, attitudes, and practices in the sexuality education of children

Previous studies showed that a majority of parents have positive attitudes toward sexuality education at school and have general sexuality knowledge (Mckay et al., 2014; Morawska et al., 2015; Shin et al., 2019). For example, one study in Australia, with a sample of 557 parents of children between the ages of 3 and 10 years, demonstrated that parents felt knowledgeable about sexuality education (Morawska et al., 2015). Another survey of 337 primary school parents conducted in Korea revealed that more than 70% of respondents have the knowledge of the structure and function of sexual organs, pregnancy, and childbirth (Shin et al., 2019).

Research has also shown that few parents discuss and communicate about sexuality with their children. Some studies indicated that few parents could provide adequate and good-quality sexuality education for their children (Jerman and Constantine, 2010; Morawska et al., 2015; Shin et al., 2019). Morawska et al. (2015) found that more than half of the Australian parents did not start up a conversation about sexuality with their children (aged 3–10 years). A recent study in South Korea also showed that two-thirds of parents had never provided sexuality education to their elementary school children (Shin et al., 2019). Scholars and researchers have proposed several reasons for the reluctance of parents to talk about sexuality with their children. These include parents having an inability or unwillingness to discuss topics of a sensitive nature, especially on sexuality (Morawska et al., 2015; Alldred et al., 2016); parents lacking sexuality knowledge and teaching skills to provide education (Morawska et al., 2015; Shin et al., 2019); parents with low self-efficacy or feeling embarrassment (Turnbulla et al., 2008; Morawska et al., 2015); and parents with the fear of destroying the "innocence" of their children (Alldred et al., 2016; Robinson and Davies, 2017; Rudolph and Zimmer-Gembeck, 2018). Sexuality education is effective when parents and their children discuss sex-related issues together. Furthermore, parent-child communication, parental monitoring, and involvement are all beneficial to protecting children from sexual abuse (Wurtele and Kenny, 2010; Rudolph and Zimmer-Gembeck, 2018). Parent-child communication about sexuality in the family has been linked to reductions in risky sexual behaviors in adolescence (Huebner and Howell, 2003; Zhao et al., 2022).

Sexuality education of children in China

China has long recognized the significance of sexuality education for children. In March 1963, Premier Zhou Enlai stressed the need to promote sexuality education for adolescents as an important element for the healthy growth of the Chinese population on the occasion of the national conference on the hygiene science and technology program (Liu, 1994). However, for a long time, there are neither national guidelines nor a national curriculum for sexuality education in China. In 2008, the Ministry of Education issued a set of health education guidelines for primary and middle schools that contained some reference to sexuality education (Ministry of Education of People's Republic of China, 2008). Recently, child sexual abuse has become a major concern in Chinese society. A meta-analysis found that child sexual abuse prevalence rates are 8.9% for women and 9.1% for men in China (Ma, 2018). Therefore, in 2013 and 2018, the Ministry of Education issued opinions on sexual abuse education prevention for children and adolescents (Ministry of Education of People's Republic of China, 2013, 2018). In the present time, part from sexual abuse, children in China are frequently exposed to sexual messages through films, television, the media, and the Internet. Thus, the importance of quality sexuality education at an early age has been increasingly emphasized in modern Chinese society (Zhang et al., 2013; Liu and Su, 2014).

Although the education policy of China supports primary and middle schools to carry out sexuality education, very few schools officially teach sexuality education courses for children (Liu and Su, 2014). Chinese children, especially primary school students, have limited sexuality knowledge and skills. A survey with 773 primary students (aged 6–14 years) conducted in 12 schools in Zhejiang, Hunan, Shanxi, Sichuan, Ningxia, and Liaoning provinces in China found that primary school students lack sexuality knowledge (Hu et al., 2015). Some studies in China on child sexual abuse prevention education revealed that primary school children lack the knowledge of sexual abuse prevention and self-protection skills (Chen, 2012; Jin et al., 2016).

Although more than 70% of primary school students identify their parents as the main source of sexuality education in China (Hu et al., 2015), there is less research on the sexuality education of the children of primary school parents. In Fuzhou, a city in the southeast of China, one study investigated 209 parents in four primary schools. It was found that <40% of parents reported their children needed to receive sexuality education at school and that nearly one-half of parents were reluctant to answer questions about the sexuality

development of their children (Hu, 2017). Diao surveyed a sample of 179 primary school parents in Chengdu, a city in southwest China. It was reported that more than 90% of parents had positive attitudes toward school-based sexuality education, but only one-third of parents could answer questions about the sexuality development of their children (Diao, 2019).

In the last three decades, it has been found that a series of qualitative or review studies involves the concept of sexuality education, teaching modes, education lessons, resources, and practices in China (Liu and Yuan, 2017; Wu and Zeng, 2020; Zhao et al., 2020). However, there is less empirical and quantitative research on sexuality education. Previous quantitative studies in China that included primary school parents only had small sample sizes, mainly in the south of China. In addition, previous studies showed that there are some impact factors related to parental communication about sexuality with their children. The main related factors include parental characteristics, such as parental gender, educational level, experience in receiving sexuality education in childhood, sexuality knowledge, and attitudes (Mckay et al., 2014; Flores and Barroso, 2017; Robinson and Davies, 2017; Shin et al., 2019), and child characteristics, such as child gender, age, and grade (Flores and Barroso, 2017; Shin et al., 2019).

The current study

Therefore, the present study had two aims. First, this study aimed to examine knowledge, attitudes, and educative practices toward sexuality education among parents of primary school students in Beijing, Tianjin, and Hebei in China. Second, the study sought to explore whether sexuality communication of Chinese parents with their children is associated with certain "facilitators" such as the parental experience of receiving sexuality education in childhood, parental sexuality knowledge, parental attitudes toward sexuality education, parental educational level, child gender, child grade, and other demographic factors. The findings of this study are expected to be used as baseline data to develop an education program to assist parents in discussing sexuality with their children in China.

Materials and methods

Procedures and participants

A cross-sectional survey was conducted among a convenience sample of primary school parents in Beijing, Tianjin, and Hebei. Participating parents were from six primary schools located in Beijing, four schools in Tianjin, and five schools in Hebei. An online questionnaire was used to collect data from participating parents. First, a link to the questionnaire was sent to the heads of participating schools. Second, school head teachers were asked to forward the link to parents to promote participation. Third, parents accessed the survey online and were presented with an information page about the study as well as a consent page, such as the voluntary nature of their participation, the anonymity and privacy of their responses, and so on. Participants could exit the online survey at any time. The questionnaire was available online for 4 months, from September to December 2018.

Of the 28,155 enrolled primary students, 21,679 adults responded (77.0%), with only one adult permitted to respond per family. Among the 21,679 online questionnaires returned, 277 questionnaires were rejected due to the fact that the respondents missed over one-third of the questions (199) or gave fictitious or inconsistent (e.g., The answer for more than two-thirds of the items in the questionnaire was the same option, such as option A, option B, and so on; and more than one-third of the items had been given two answers, but two answers were inconsistent) answers (78). The data analyses in the current study were restricted to respondents of mothers and fathers only. The final participants were 19,745 (92.3%) parents, including 15,217 mothers (77.1%, M age = 35.96, SD = 4.42) and 4,528 fathers (22.9%, M age = 37.37, SD = 4.87). Their children were aged 6–13 years (M age = 8.77, SD = 1.78).

Measures

Parent questionnaire

The parental questionnaire was developed based on a series of published studies (Chen and Chen, 2005; Dake et al., 2014; Morawska et al., 2015; Robinson et al., 2017; Depauli and Plaute, 2018; Rudolph and Zimmer-Gembeck, 2018; UNESCO, 2018; Shin et al., 2019) and included 15 items on knowledge, attitudes, and practices regarding sexuality education of children.

The knowledge subscale included five items, including knowledge of correct terminology for genitalia, daily sexual healthcare, child sexual development, and sexuality questions, that may be encountered at different ages of development of children, and accurate information on child sexual abuse prevention education, *"e.g., that do you know the correct terminology for genitalia"*. Response options were *"yes,"* *"no,"* or *"unsure"* for each item. "Yes" responses scored 1, while "no" and unsure responses scored 0. The scores for each item were summed for a total knowledge score (*range = 0–5*). A brief attitudes subscale consists of three items that ask whether parents agree or disagree with the aspects of sexuality education for children in primary school (0–3). The practices subscale included seven items. These seven questions were asked about parental communication with their child about sexuality. Examples of questions in this section included the following: "Did you use appropriate terminology with your child in the process of sexuality education?" "Did you encourage your child to share their thoughts and feelings about sexuality?" and "Did you give brochures or other materials to your child to help them learn about sexuality?" Response options were *"yes,"* *"no,"* or *"unsure"* for each item. "Yes" responses scored 1, while "no" and unsure responses scored 0. The scores for each item were summed for a total practice score (*range = 0–7*). Internal consistency analyses of subscales of knowledge, attitudes, and practices produced alpha levels of 0.83, 0.90, and 0.80, respectively.

Demographic form

A demographic form was designed to gather background information about parents. Four items gathered demographic information about themselves, including gender (fathers/mothers), age, education qualifications (junior high school or less/senior high school/college degree/bachelor degree or high), and their childhood sexuality education history. Parents were asked about their

own experience of receiving sexuality education in childhood: "In your childhood, did you ever get the information about sexuality education from your parents or other family members?" and "In your childhood, did you ever get the information about sexuality education at school?" (response options: yes, no, or unsure). Other four items were used to gather the characteristics of their children, including child gender (boys/girls), child grade, child age, and only one child or not (yes/no).

The whole questionnaire was reviewed by two psychologists, two sexuality education professionals, and two educational researchers. These interviews and their evaluation were discussed. Then, their suggestions and proposals for improvement were taken into account in the design of the final questionnaire. The final questionnaire was piloted with ten parents of primary students, including four fathers and six mothers, to determine whether they were able to comprehend the instructions and items of the questionnaire. No changes were made to the final questionnaire following the current study.

Data analyses

All data were analyzed using the SPSS 23.0 software. First, descriptive statistics were used to report the demographic characteristics of parents and their knowledge, attitudes, and practices toward the sexuality education of children in primary schools. Second, a series of variance analyses were conducted to investigate the associations between scores of parents on sexuality knowledge, attitudes, and educative practices and their sociodemographic characteristics variables. Finally, a stepwise multivariate linear regression was conducted to find the correlated factors of parental practices toward the sexuality education of children.

Results

Demographic characteristics of parents

The present sample included 19,745 parents. Table 1 shows the frequency distribution of parental demographic variables.

TABLE 1 Characteristics of the parents involved in the study ($N = 19{,}745$).

Characteristics		*n* (%)
Living region	Beijing	5,639 (28.6%)
	Tianjin	2,681 (13.6%)
	Hebei	11,425 (57.9%)
Gender	Mothers	15,217 (77.1%)
	Fathers	4,528 (22.9%)
Mothers' educational level	Junior high school or less	4,480 (22.7%)
	Senior high school	5,526 (28.0%)
	College degree	4,710 (28.6%)
	Bachelor degree or above	5,029 (25.5%)
Fathers' educational level	Junior high school or less	4,338 (22.0%)
	Senior high school	6,041 (30.6%)
	College degree	4,609 (23.3%)
	Bachelor degree or above	4,757 (24.1%)
Only-one child	Yes	9,218 (46.7%)
	No	10,527 (53.3%)
Child gender	Girls	9,408 (47.6%)
	Boys	10,337 (52.4%)
Child grade	Grade 1	3,763 (19.1%)
	Grade 2	3,005 (15.2%)
	Grade 3	3,562 (18.0%)
	Grade 4	3,407 (17.3%)
	Grade 5	2,896 (14.7%)
	Grade 6	3,112 (15.8%)

History of sexuality education for parents

Parents were asked about their own experiences of receiving sexuality education in childhood. Less than 7% (6.6%; fathers: 5.7% and mothers: 6.8%) of respondents reported that they did receive sexuality education from their family in childhood, and ∼10% (10.3%; fathers: 10.8% and mothers: 10.1%) of respondents reported that they received sexuality education from the school in childhood. The proportion of parents who received sexuality education in childhood at school was significantly higher than that at home ($\chi^2 = 3{,}524.45$, $p < 0.001$). More mothers than fathers received family sexuality education in childhood ($\chi^2 = 7.13$, $p < 0.01$). There was no gender difference in the parental history of receiving sexuality education at school ($p > 0.05$).

Knowledge, attitudes, and practices of parents toward sexuality education of children

Correct responses of parents to sexuality knowledge questions of children are summarized in Table 2. More than 80% of the parents responded that they have the knowledge of the correct terminology for genitalia and the knowledge about daily sexual healthcare. In other respects, the sexuality knowledge of parents is lacking. Nearly half of the participating parents did not know about sexual development and behavior across childhood, while almost three-fifths did not know about sexuality questions that children may encounter at different ages and did not have any accurate information on child sexual abuse prevention education. On average, parents of primary school students had 60% of sexuality knowledge ($M = 3.02$, $SD = 1.54$).

As shown in Table 3, ∼ 90% of parents agreed that sexuality education should be offered to primary school students, and primary school teachers should provide sexuality education to their students. Moreover, the great majority of parents were willing to join school sexuality education programs. In short, parents had positive attitudes toward sexuality education in primary schools ($M = 2.61$, $SD = 0.87$).

As a whole, 87.1% of parents had provided at least one form of sexuality education at home. However, only 13.6% of the parents

TABLE 2 Parental knowledge of children sexuality education ($N = 19,745$).

Items	Answered correctly (%)		
	Mothers	Fathers	Total
1. Correct terminology for genitalia	84.9	90.0	86.1
2. Daily sexual health care	86.7	82.2	85.7
3. Sexual development and behavior across childhood	52.3	49.6	51.7
4. Questions about sexuality that may be encountered at different ages of children development	39.1	38.6	39
5. Accurate information on child sexual abuse prevention education	40.5	37.1	39.7

TABLE 3 Parental attitudes toward sexuality education of children ($N = 19,745$).

Items	Answered "agree" (%)		
	Mothers	Fathers	Total
1. Primary school students should receive sexuality education?	88	84	87.1
2. Primary school teachers should provide their students with sexuality education	87.5	85.4	87.0
3. Parents should join in school sexuality education programs?	87.9	84.6	87.1

TABLE 4 Parental practices on sexuality education of children ($N = 19,745$).

Items	Answered "yes" (%)		
	Mothers	Fathers	Total
1. Responded confidently to a question about a sexuality topic	38.1	46.1	40
2. Used appropriate terminology with my child in the process of sexuality education	27.7	37.2	29.8
3. Talked to my child about sexuality comfortably	30.2	34.6	31.2
4. Encouraged my child to share their thoughts and feelings about sexuality	54.9	53.0	54.5
5. Read books with my child about sexuality	64.0	60.8	63.3
6. Made use of the television and the internet resources to my child about sexuality appropriately	70.3	66.9	69.5
7. Gave brochures or other materials to my child to help them learn about sexuality	50.5	53.4	51.1

answered "yes" to all seven items of sexuality education practices. Approximately 70% of parents reported that they had used television and Internet resources to talk with their children about sexuality appropriately, and nearly two-thirds of parents reported that they had read books with their children about sexuality. More than half of the parents had encouraged their children to share thoughts and feelings about sexuality and had given brochures or other materials to their children to help them learn about sexuality. Using appropriate terminology with their children in the process of sexuality education and talking to their children about sexuality comfortably were noticeably less common. Table 4 shows that the great majority of parents did not respond confidently to questions from their children about sexuality topics. On average, parents of primary school students had limited practices of sexuality education of children at home ($M = 3.39$, $SD = 2.27$).

Associations between demographic factors and knowledge, attitudes, and educative practices toward sexuality education of children

Associations between demographic factors of parents and their knowledge, attitudes, and practices toward sexuality education of children are summarized in Table 5. The results showed that the gender of parents was associated with differences in the scores of sexuality knowledge, attitudes, and educative practices. The total score of knowledge of the mother was significantly higher than that of the father (mothers: 3.04 ± 1.54 vs. fathers: 2.98 ± 1.55; $F = 5.21$, $p < 0.05$). Similarly, the score of attitudes of the mother toward sexuality education was significantly higher than that of the father (mothers: 2.63 ± 0.84 vs. fathers: 2.54 ± 0.65; $F = 40.64$, $p < 0.01$). However, the score of practices of the father in the sexuality education of children was significantly higher than that of the mother (fathers: 3.52 ± 2.38 vs. mothers: 3.63 ± 2.23; $F = 17.98$, $p < 0.01$). Further analysis showed that mothers had a higher percentage than fathers in two items "read books with my child about sexuality" (mothers: 64% vs. fathers: 60.8%, $\chi^2 = 15.03$, $p < 0.001$) and "made use of the television and the Internet resources to my child about sexuality appropriately" (mothers: 70.3% vs. fathers: 66.9%, $\chi^2 = 19.22$, $p < 0.001$).

The living region of the parents was associated with knowledge, attitudes, and practices toward the sexuality education of children. Further analysis demonstrated that parents in Beijing and Tianjin had higher scores of sexuality knowledge and practices than that in Hebei ($p < 0.05$), while parents in Beijing and Tianjin had similar levels of knowledge and practices. The results also found that parents in Beijing had more positive attitudes toward the sexuality education of children than that in Tianjin and Hebei ($p < 0.05$), while parents in Tianjin and Hebei had no living region differences in scores of attitudes.

The level of education of parents was positively associated with their sexuality knowledge, attitudes, and educative practices. As shown in Table 5, with the increase in the level of education of parents, their scores on sexuality education knowledge, attitudes, and practices of children were also increasing. Parents who had a bachelor's degree or above scored highest on the knowledge, attitudes, and practice toward sexuality education of children. The experiences of parents receiving sexuality education in childhood were also analyzed. Parents who had experiences receiving sexuality education in childhood at home or school showed significantly higher knowledge scores, more positive attitudes, and more active education practices with their children on sexuality than those who had not (see Table 5).

It is also noteworthy that child gender was associated with parental knowledge and attitudes toward sexuality education. Compared to parents of boys, parents of girls scored higher on

TABLE 5 Associations between demographic factors and parental sexuality knowledge, attitudes, and educative practices ($N = 19,745$).

Variables	Categories	Sexuality knowledge (0–5)		Sexuality attitudes (0–3)		Educative practices (0–7)	
		M (SD)	*F*	*M* (SD)	*F*	*M* (SD)	*F*
Living region	Beijing	3.05 (1.54)	7.35***	2.67 (0.80)	16.46**	3.49 (2.30)	10.43***
	Tianjin	3.10 (1.57)		2.62 (0.87)		3.47 (2.32)	
	Hebei	2.99 (1.54)		2.58 (0.90)		3.33 (2.23)	
Gender	Mothers	3.04 (1.54)	5.20*	2.63 (0.84)	40.64***	3.36 (2.23)	17.98***
	Fathers	2.98 (1.54)		2.54 (0.95)		3.52 (2.38)	
Mothers' educational level	Junior high school or less	2.64 (1.63)	171.10***	2.46 (1.02)	96.26***	2.91 (2.20)	179.78***
	Senior high school	2.98 (1.54)		2.57 (0.91)		3.22 (2.21)	
	College degree	3.09 (1.48)		2.67 (0.80)		3.49 (2.25)	
	Bachelor degree or above	3.34 (1.44)		2.74 (0.69)		3.93 (2.28)	
Fathers' educational level	Junior high school or less	2.63 (1.63)	162.13***	2.50 (0.99)	64.85***	2.93 (2.19)	169.09***
	Senior high school	3.00 (1.54)		2.56 (0.93)		3.22 (2.24)	
	College degree	3.11 (1.48)		2.67 (0.79)		3.52 (2.25)	
	Bachelor degree or above	3.33 (1.54)		2.72 (0.72)		3.92 (2.27)	
Only-one child	Yes	3.11 (1.51)	53.82***	2.66 (0.81)	52.43***	3.56 (2.27)	94.25***
	No	2.95 (1.56)		2.57 (0.92)		3.25 (2.25)	
Child gender	Girls	3.11 (1.53)	64.81***	2.65 (0.82)	34.35***	3.42 (2.24)	3.03
	Boys	2.94 (1.55)		2.58 (0.91)		3.37 (2.29)	
Child grade	Grade 1	2.86 (1.48)	19.08***	2.58 (0.92)	1.32	3.32 (2.26)	3.29**
	Grade 2	3.01 (1.54)		2.62 (0.88)		3.45 (2.25)	
	Grade 3	2.95 (1.55)		2.61 (0.87)		3.32 (2.24)	
	Grade 4	3.05 (1.56)		2.62 (0.85)		3.37 (2.27)	
	Grade 5	3.15 (1.54)		2.62 (0.84)		3.46 (2.28)	
	Grade 6	3.16 (1.56)		2.61 (0.87)		3.48 (2.30)	
Received sexuality education as a child at home	Yes	4.21 (1.27)	859.80***	2.84 (0.55)	100.02***	5.11 (2.05)	833.45***
	No	2.94 (1.52)		2.60 (0.88)		3.27 (2.23)	
Received sexuality education as a child at school	Yes	3.87 (1.39)	711.36***	2.79 (0.63)	100.40***	4.59 (2.20)	656.54***
	No	2.92 (1.53)		2.59 (0.89)		3.26 (2.23)	

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

sexuality knowledge and attitudes. Regarding the educative practices of parents, there was no significant difference between boys and girls. Moreover, the findings showed that parents who had only one child scored significantly higher scores on knowledge, attitudes, and practices toward sexuality education than those who had not. Child grade was related to the scores of parental sexuality knowledge and practices. Further analysis showed that parents whose children were in grades 5 and 6 had significantly higher sexuality knowledge scores and had more active practices than those whose children were in other grades (see Table 5). Regarding the attitudes of parents toward sexuality education, there was no significant difference by child grade.

Regression analyses

The stepwise multivariate linear regression was used to explore the associations between the scores of the father (or mother) on sexuality education practices and nine independent variables, including parental knowledge, parental attitudes, parental history of receiving sexuality education at home in childhood, parental history of receiving sexuality education at school in childhood, parental educational level, parental living region, child grade, and only one child.

The multivariate linear regression showed that, among all these variables, the knowledge of the father ($B = 0.50$, $SE\ B = 0.02$, $p < 0.00$), the attitude of the father ($B = 0.63$, $SE\ B = 0.03$, $p < 0.001$), history of the father receiving sexuality education at home in childhood ($B = 0.96$, $SE\ B = 0.15$, $p < 0.001$), history of the father receiving sexuality education at school in childhood ($B = 0.43$, $SE\ B = 0.11$, $p < 0.001$), and educational level of the father ($B = 0.16$, $SE\ B = 0.03$, $p < 0.01$) were the significant factors for education practices of the father. The five variables together accounted for 24.4% of the variance in scores on practices of the father toward sexuality education of children ($F = 183.48$, $p < 0.001$, $R^2 = 0.24$).

There are also five significant factors for the educative practices of the mother. The multivariate linear regression showed that these significant factors included knowledge of the mother ($B = 0.46$, $SE\ B = 0.01$, $p < 0.001$), the attitude of the mother ($B = 0.63$, $SE\ B = 0.02$, $p < 0.001$), history of the mother receiving sexuality education at home in childhood ($B = 0.89$, $SE\ B = 0.07$, $p < 0.001$), history of the mother receiving sexuality education at school in childhood ($B = 0.50$, $SE\ B = 0.06$, $p < 0.001$), and educational level of the mother ($B = 0.20$, $SE\ B = 0.02$, $p < 0.001$). The five variables together accounted for 24.9% of the variance in scores on practices of the mother toward sexuality education of children ($F = 630.38$, $p < 0.001$, $R^2 = 0.25$).

Discussion

Knowledge and attitudes of parents toward sexuality education of children

In this study, parents of primary students had gaps in their sexuality knowledge. Although the average sexuality knowledge score was 3.02, the correct rate for some items was very low. Only 39% of parents reported that they had knowledge of the sexuality questions that children may encounter at different ages. Although children commonly ask their parents some sexuality questions (Krauss and Miller, 2012; Martin and Torres, 2014; Hu et al., 2015), parents who lack sexuality knowledge feel embarrassed (Xie et al., 2015; Shin et al., 2019) and may be unable to answer questions from their children in time. Similar to the previous studies done in China (Chen and Chen, 2005; Chen et al., 2007; Xie et al., 2015; Jin et al., 2019), more than 60% of the parents in this study reported that they lacked knowledge about child sexual abuse prevention education. Thus, children may be unable to be protected well and taught accurate information about sexual abuse by their parents (Wurtele and Kenny, 2010).

Most parents (87%) agreed about the importance of sexuality education lessons in primary schools. This finding is consistent with observations in previous studies conducted on US parents of primary school children (∼90% in Fisher et al., 2015; 80% in Dake et al., 2014), on Canadian parents (87% in Mckay et al., 2014), and on Australian parents (71% in Robinson et al., 2017) but much higher than the study in Shenzhen province in China 15 years ago (∼60% in Wu, 2005). It is suggested that Chinese parents have more positive attitudes toward sexuality education than before. Scholars and researchers advocate that better communication between parents and school teachers could enhance the effect of sexuality education (Robinson et al., 2017). Approximately 90% of parents of primary school students expressed their willingness to join in school-based sexuality education in the current study. This finding suggests that there is substantial support from the majority of parents for implementing sexuality education in primary schools. In future, it is supposed to be a collaborative approach between families and schools on sexuality education in China.

Practices of parents on sexuality education of children at home

With the help of media (e.g., television and the Internet), parents actively carry out sexuality education at home in China. Almost 70% of parents reported using television and Internet resources to provide sexuality education to their children. The percentage is higher than the previous studies in Australia (Morawska et al., 2015), the United States (Dake et al., 2014), and Korea (Shin et al., 2019). In addition, more than 60% of the parents reported reading books with their children about sexuality, which is a substantial rise from the Australian study which found that <50% of parents had read books with their children about sexuality (Morawska et al., 2015). At present, the media has become one of the most important sources of sexuality health information in China. Access to media resources could increase motivation and enhance the quality of sexuality education (Lou et al., 2006). Therefore, it is helpful and convenient for parents to discuss sexuality with their children by using the Internet and television.

Chinese parents rarely used correct terminology for genitalia (30%), which is lower than the previous studies with parents of primary school students in Australia (∼80% in Morawska et al., 2015) and the United States (∼40% in Dake et al., 2014) but much higher than the recent Muslim research in Pakistan (∼6% in Nadeem et al., 2021) and the Korean research (∼6% in Shin et al., 2019). Parents commonly feel embarrassed or uncomfortable talking to their children about sexuality (Turnbulla et al., 2008). Our study found that less than one-third of the parents had talked to their children comfortably about sexuality, and only two-fifths responded confidently to a question about a sexuality topic. It is much lower than the previous studies in Australia (∼75% in Morawska et al., 2015) and Korea (∼70% in Shin et al., 2019). The Chinese tradition of sexual conservatism may make it difficult for parents to discuss sexuality topics with their children openly and comfortably (Xie et al., 2015).

Influencing factors for practices of parents on sexuality education of children

Our study provided a factual basis that parental knowledge and attitudes are influencing factors for their practices on the sexuality education of children. With the increase in parental scores on knowledge and attitudes, their scores on educative practices about sexuality were also increasing. Hence, sexuality education needs to target not just children but also their parents (Robinson et al., 2017). In view of this, scholars and researchers should develop parent-focused sexuality education programs that include more accurate and specific sexuality information to help Chinese parents improve their family communication about sexuality.

Consistent with previous studies (Lee and Kweon, 2013; Flores and Barroso, 2017), the results of our study showed that mother respondents had more knowledge and positive attitudes toward sexuality education of children. However, unlike the previous studies in the United States (Flores and Barroso, 2017) and Korea (Lee and Kweon, 2013), which found that mothers were predominant providers of sexuality education at home, this study showed that fathers were more likely to provide educative practices to their children in China. Fathers also play an important role in sexuality education at home, like mothers. Compared to mothers, fathers may discuss male issues more effectively with their boys (Shin et al., 2019; Zhang et al., 2019). The results of this study suggest that both mothers and fathers of young children should be the target population for sexuality education training programs in China in future.

Despite the vast majority of parents (90%) in the sample having not had received any experience of sexuality education either from their own families or in their school settings, this study still demonstrated that the experience of parents of sexuality education in childhood was associated with better communication about sex-related issues with their child. Consistent with the previous studies (Wight et al., 2006; Jerman and Constantine, 2010; Zhang et al., 2013; Dake et al., 2014), this study also found that parents with higher educational levels were more likely to talk with their children about sexuality. Therefore, attention should be paid to parents with low academic qualifications in future training programs.

Study limitations

This study had several limitations. The first limitation relates to the purpose-built questionnaire. The scale of knowledge, attitudes, and practices in sexuality education for children was designed to be simple and relatively superficial. While the scales appeared to demonstrate good internal consistency, the results need to be interpreted with caution. To obtain a deeper understanding of the awareness of parents about sexuality education, a more detailed assessment, focus groups, and qualitative interviews need to be conducted in future research. Second, this study used an Internet-based survey that relied on self-reporting. Therefore, the reliability of the data may depend on the sincerity of the answers of respondents. Third, although this study had a sufficient sample size, it was limited to self-reports from a sample of parents only in Beijing, Tianjin, and Hebei in China. Thus, the findings cannot be generalized to the whole of China. Finally, the information collected was cross-sectional; thus, causation between associated factors and parental educative practices in sexuality education cannot be inferred from this study.

Conclusion

This study concluded that the majority of parents of primary school students had positive attitudes toward sexuality education in China. However, they had limited sexuality knowledge. Less than 40% of the parents knew that there were sexuality questions that children may encounter at different ages and had accurate information on child sexual abuse prevention education. One major benefit of this study lies in the novel investigation that most fathers and mothers had communication specifically with their children about sexuality, with the help of the Internet, television, and books. Moreover, this study documented that parental practices are positively associated with their knowledge and attitudes toward sexuality education of children. Based on these findings, it is important to develop culturally relevant training programs for parents in Chinese society in future. Sexuality education training programs are supposed to help parents learn more accurate knowledge and improve their communication with their young children at home.

Data availability statement

The datasets presented in this article are not readily available because the data have not been made available on a permanent third-party archive because Beijing academy of educational sciences ruled that we could not post the data. Requests to access the datasets should be directed to the corresponding author (yuanbnu@163.com).

Ethics statement

The study involving human participants was reviewed and approved by Beijing Academy of Educational Sciences. The participants provided their written informed consent to participate in this study.

Author contributions

WZ: acquisition of data, conception and design of study, conducting a research and investigation process, and drafting the manuscript. YY: data curation, revising the manuscript critically for important intellectual content, and development or design of methodology. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Families with young children during the COVID-19 pandemic—The importance of family type, perceived partnership roles, parental stress, and social support for changes in the home learning environment during lockdown

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Beginning in March 2020, the lockdown precipitated by the COVID-19 pandemic resulted in many challenges, especially for families with young children. Many children had little or no access to institutional education. Therefore, they were even more dependent on their parents providing them with home learning activities (HLA) to support their development. We examined the adaptability of families with regard to changes in parents' provision of HLA in traditional two-parent families, single parent families, and large families compared to before the lockdown. We focused on family resources, such as a supportive distribution of roles within the partnership, or social support, as predicting factors of adaptability in *N*=8,513 families with children aged 18–69months. In addition, we considered parental stress as a further influencing factor. The cross-sectional data depicts families from a nationwide online survey, which we conducted during spring 2020 in Germany. We found that (a) all three family types offered their children more learning activities at home, albeit with slight differences between the families. However, (b) we identified differences in the factors influencing families' adaptability: Across all family types, we found slight to medium negative relations between adaptability and parental stress. The relations were most evident in large families. Furthermore, social support exhibits somewhat positive relations to the adaptability of large families. For adaptability in single-parent families, gender differences were initially evident. Among single fathers, the change in parental HLA was stronger than among single mothers. However, this relation disappeared when we took parental stress and social support into account. For traditional two-parent families and single parents, our analyses revealed (c) barely significant relations between the investigated predictors and changes in HLA during lockdown. Overall, our study confirms that high stress limits the adaptability of providing HLA in families and that social support mitigates negative relations between stress and the provision of HLA, especially in large families. In order to develop effective and needs-based family support programs, it is therefore important to help parents cope with stress and provide them with low-threshold social support. The extent to which these services need to be adapted to different family types must be surveyed in more depth.

KEYWORDS

COVID-19, home learning environment, family adaptability, family type, perceived partnership roles, parental stress, social support

1. Introduction

In the spring of 2020, the COVID-19 pandemic reached Germany, causing severe disruptions for families and their everyday lives. Parents with children under the age of six were particularly exposed to challenges compared to other parents and reported a substantial reduction in their satisfaction with family life (Huebener et al., 2020). One reason for this was the nationwide closure of daycare centers. As a result, many families were denied centralized care and education services. Moreover, contact restrictions also made other care options, such as grandparents, impossible. COVID-19 policies also influenced the working lives of parents (Cohen et al., 2020). Parents who were worried about diminished employment income due to, for example, reduced hours at work or even the loss of their job, had to deal with further challenges and financial concerns. Even those parents who were able to work from home still had to compensate for the missing hours of childcare within the family. Hence, parents had to deal with the difficulties posed by lack of childcare and the new demands of reconciling family and work. Families needed to adapt in the shortest possible time, reorganize working and childcare hours, and redistribute childcare at home. International research on the severe disruptions for families during the COVID-19 pandemic has increased considerably in just a few years. Still few studies focus specifically on families with young children (Huebener et al., 2020; Linnavalli and Kalland, 2021). Some international studies about families with young children examine the impact of the COVID-19 policies on parental and child well-being. The studies often focus on family strains, changes in parenting practices, child development (e.g., socio-emotional development) and family resilience (Gassman-Pines et al., 2020; Prime et al., 2020; Romero et al., 2020). In Germany, studies indicate that children and families may have been particularly vulnerable during the COVID-19. This findings show that family strains and coping to parental stress posed major challenges to parenting during the COVID-19 pandemic (Huebener et al., 2020; Essler et al., 2021; Oppermann et al., 2021; Calvano et al., 2022).

In view of the increasing complexity of the living environment and new societal demands on families, such as those resulting from the COVID-19 pandemic, it is becoming increasingly important to understand those factors that can influence the adaptability of families. In the present study, we consider family adaptability in terms of parents' ability to ensure that children continue to receive sufficient educationally stimulating activities, even if the educational remit of early childhood education institutions cannot be carried out and other stressors impair the functionality of the family system. Another aim of the study is also to investigate family adaptability among traditional two-parent families, single parents, and large families during the first COVID-19 lockdown. This enables statements about adaptability to be linked to the ratio of children to adults within a family setting. In addition to the family type, we also take the relevance of a supportive role distribution within the partnership, social support, and parental stress into account. This family type characteristic approach should help us to learn more about the impact of COVID-19 restrictions on families with young children. Furthermore, we intend to identify protective and risk factors and formulate family type-specific conditions for adaptability.

2. Adaptability of the home learning environment

Referring to Bronfenbrenner (1986) eco-systemic model of human development, the family is a learning environment with its own specific characteristics. In order to describe the processes within a family, and the effects they have on child development, the framework of the home learning environment (HLE), shown in Figure 1, summarizes structural, processual, and orientation dimensions (Kluczniok et al., 2013). These three dimensions – partly indirectly and partly directly – influence child development, and represent a way of categorizing resources in the learning environment of a family. The structural dimension summarizes characteristics such as household income or parents' educational level, and interrelates with characteristics of the orientation dimension, which describes parents' attitudes to education and child-rearing. The family type (e.g., single parent, two-parent family, large family), which is made up of different personal resources (number of adults and children within a household), is also understood as a characteristic of the structural dimension. Both structural and orientation characteristics are related to the availability of educational resources, such as parent–child activities. We describe these as home learning activities (HLA). The processual dimension includes global family processes such as day-to-day activities or the fostering of a familial atmosphere, but also domain-specific family processes, which focus on educationally relevant activities (Kluczniok et al., 2013). Process quality is determined *via* the frequency and quality of stimulating activities in the home, specifically educationally relevant activities (e.g., reading aloud or looking at picture books together). Studies show a clear, but moderate, relation between structural characteristics and family process quality. Thus, lower socio-economic background characteristics (e.g., low levels of parental education) in a family are associated with a lower quality of processes in families (Sylva et al., 2004; Melhuish et al., 2008).

Family life is subject to certain dynamics. Interactions and relationships between family members respond to changing internal and external circumstances (Bradshaw et al., 2006). If the living conditions of families change (e.g., due to challenging life situations), this can have an impact on the HLE. For many years, family research looked at the special dynamics of families in challenging life situations with the help of the model of family adaptation (McCubbin and Patterson, 1983), shown in Figure 2. From the perspective of child development, appropriate family adaptability must consist of ensuring the educationally supportive character of the HLE, even in challenging life situations or when it is not possible for the child to attend the relevant educational institutions. Thus, in order to understand the needs and adaptability of families, it seems reasonable to assume a link between the HLE and factors which influence family adaptability. The model of family adaptation presents four components of families' adaptability (A, B, C, and X) to a critical event and addresses the interaction between family resources and family perceptions. From this point of view, we can conclude that it is not only the stressor (critical event) that leads to a family crisis. Rather, it depends on whether and in what way a family is able to react appropriately to the stressor and adapt to the concomitant changed life circumstances: The family might equally develop adequate adaptation strategies to deal with the stressful life event and thereby maintain functionality as a family unit (Xu, 2007). The process of family adaptation to stressful life events consists of an interplay between the four different components A, B, C, and X. Stressor A, e.g., the impact of the interventions taken during the COVID-19 pandemic—such as changes in employment or the nationwide closure of daycare centers—disturbs the family's previous patterns of interaction. The internally and externally available resources (e.g., supportive role distribution in the partnership or social support; B) enable families can respond to the stressor. The appraisal of the stressor (e.g., threat or challenge; C) also influences the coping strategies a family uses to respond to the stressor (BC). The outcome

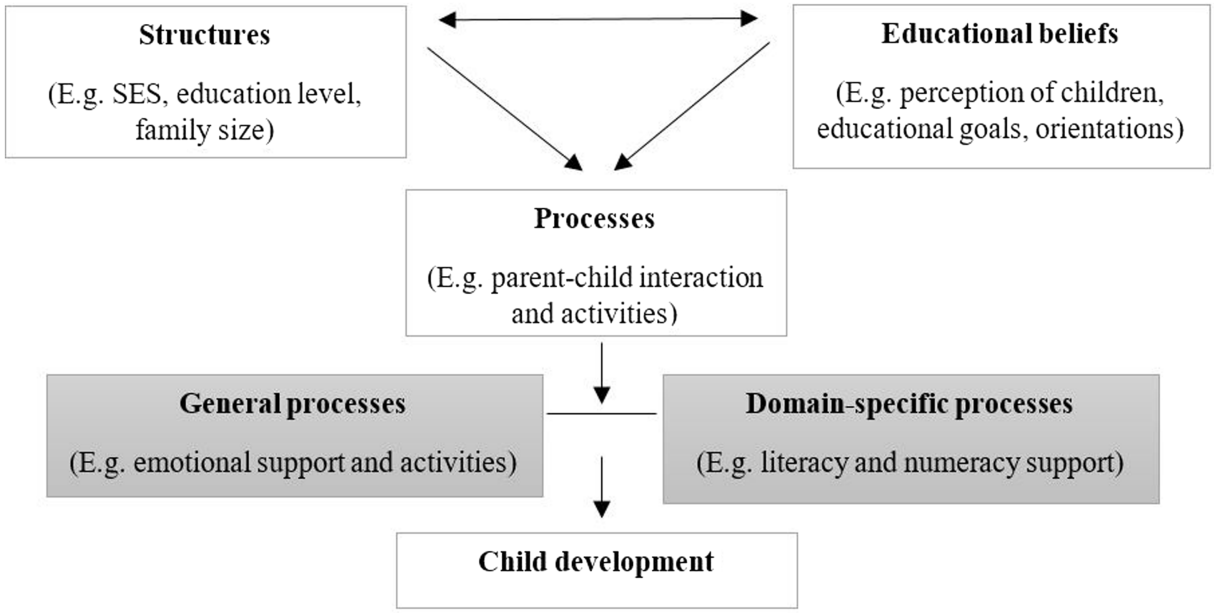

FIGURE 1
Framework of the HLE (Kluczniok et al., 2013).

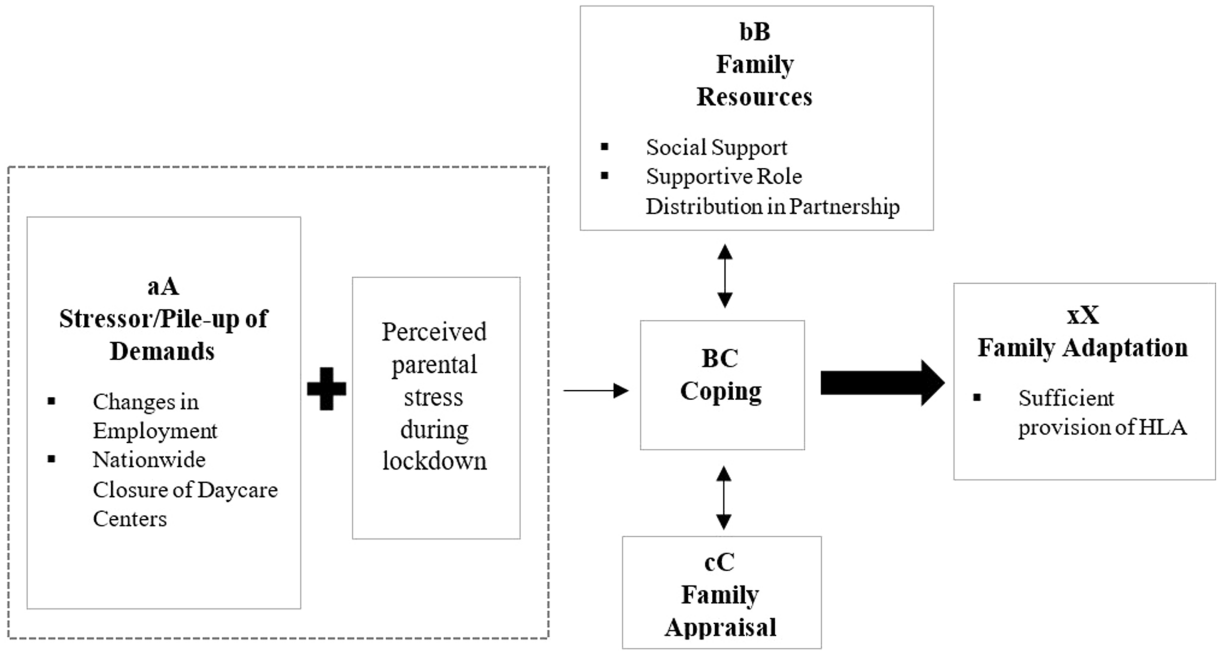

FIGURE 2
Own depiction according to the double ABC-X-Model of family adaptation (McCubbin and Patterson, 1983).

of the interactions between these identified variables corresponds to the family's adaptability (here, the appropriate provision of HLA, xX). The model focuses on the evolving nature of the family unit, including general stressors of everyday family life. It takes into account additional stressors that may exacerbate the stress that families already face in their daily live (aA). The same applies to expanded resources (bB) and changes in the meaning attributed to a challenging situation (cC) (McCubbin and Patterson, 1983). The Double ABC-X Model of family adaptation shows conceptual similarities to the Family Stress Model (Masarik and Conger, 2017). Both models focus on similar aspects, but differ primarily in the arrangement of variables. The Family Stress Model focuses on stress processes of families, whereas the Double ABC-X Model describes the process of everyday adaptation as well as adaptation during times of crisis. We include the influence of stress on parenting behavior in the Double ABC-X Model and consider this aspect as a variable influencing family adaptability.

During the first lockdown, children had little or no access to institutional education for several months. During this time, they were more dependent than usual on their parents' provision of HLA to stimulate their development. We therefore consider successful adaptability in families during the first lockdown of the COVID-19 pandemic as being represented by parents provided sufficient HLA for their children, even when the attendance of the child's educational institutions was not possible and the functionality of the family system is impaired by other stresses.

2.1. Family adaptability: Protection and risk factors

The challenges of everyday life, as well as changing demands within society, require families to adapt permanently. The concept of family adaptability is also applied when it comes to specifying the change processes which take place in families in response to challenging life situations or crises (Moen and Wethington, 1992) and therefore also for the challenges of family life during the COVID-19 pandemic. Fundamental to understanding family adaptability is the identification of protective factors such as internal family resources (e.g., supportive role distribution within the partnership), financial resources, and social support (Patterson, 2002). These factors all affect a family's involvement in children's development, as well as influencing their broader educational decisions (Kluczniok et al., 2013).

Parental stress experiences, as well as adaptation strategies, influence how intensively parents offer their children HLA (Wierda-Boer et al., 2008; Holthus and Bertram, 2018). It is not only the frequency of educationally stimulating parent–child interactions that matters, but also the parents' responsive and sensitive interaction behavior (Anders et al., 2012; Kluczniok et al., 2013). More and more studies investigating the factors influencing parenthood include measures of parents' perceived stress levels (Crnic and Ross, 2017). According to Deater-Deckard (2004), parental stress describes processes that lead to aversive reactions. The origin of these reactions is the attempt to adapt to the demands of parenthood. The perception of parental stress and the effects of it reflect systemic processes within the family (Crnic and Ross, 2017). Many studies suggest that parental stress predicts inadequate parenting behavior (Crnic and Greenberg, 1990; Crnic et al., 2005). For example, research on the influence of economic stress shows that parents are irritable, frustrated, and less patient when emotional resources cannot be accessed during times of financial stress. The consequences are more punitive parenting as well as the withdrawal and social alienation of the stressed parent (McLoyd, 1990; Magnuson and Duncan, 2002). An earlier study by Oppermann et al. (2021) on the same sample as this article investigated the correlation between parental stress and changes in HLA during the first COVID-19 lockdown in Germany. They found a negative, exponential relation, indicating a threshold of parental stress: The relation between perceived parental stress and changes in HLA appeared above a certain tipping point. Past this parental stress level, HLA exponentially decreased with increasing stress.

The identification of family resources (e.g., supportive role distribution within the partnership) plays an important role in adaptability (Patterson, 2002). In times of crisis, responsibilities for employment, household, and child-rearing have to be (re-)distributed. This can have a great influence on parental well-being (Fankhauser et al., 2018). Consequently, the supportive role distribution within the partnership as a predictor of parental well-being plays an important role in the functioning of families and the development of children in their home environment. We therefore want to investigate to what extent the supportive role distribution functions as an intra-family protective factor for the adaptability of families (maintaining or increasing HLA provision) in times of crisis. It is just as important that parents feel supported by their social environment and know where to ask for help. Studies have identified social support outside the family as an underlying mechanism for successful adaptability. It contributes significantly to how strongly a family feels the emotional burden of a crisis (Dunn et al., 2001; Wierda-Boer et al., 2008; Manning et al., 2011). Most recently, Oppermann et al. (2021) showed in their family survey that, during the first lockdown, social support was associated with lower parental stress. Furthermore, social support reduced the negative effects of stress on HLA, highlighting the importance of social support for family adaptability.

2.2. Why family types matter

A look at family research shows that most studies deal with the family as a generic unit and rarely classify different family types. Studies often focus on heterosexual married or cohabiting couples and their children (two-parent families; Wierda-Boer et al., 2008; Manning et al., 2011; McStay et al., 2014; Liu et al., 2019). Childhood and family also take place in non-heterosexual relationships. In addition, families form through surrogacy, permanent foster care, or adoption. Moreover, family structures can change over the course of life, regardless of how they are founded (Riggs and Due, 2018). Studies that look at the importance of different family types for child development increasingly examine whether certain family types are more affected by disadvantages than others. According to Bradshaw et al. (2006), children from large families are affected by a greater risk of poverty than children from other family types – poverty can expose families to financial crisis. It is known from current research that in large families, for example, due to the high number of children, that the likelihood of only one parent being employed is higher, while the other parent is more likely to be responsible for care and nursing activities (Bradshaw et al., 2006). Research on single parents, on the other hand, shows that single parents are more likely to have lower parental SES, because SES often reduces after separation or divorce due to the lack of a second income (OECD, 2018). When it comes to coping with everyday demands, studies showed that single parents in particular face special challenges, due to their single-parent status and the reduced time and social resources in their family structure that often go hand in hand with this (Wright, 1989; Bowen et al., 1993). Some studies also argue that if single parents have few opportunities for social support, then these families are more vulnerable to family stress (McQuillan and Bates, 2017). As early as the 1990s, Bowen et al. (1993) studied the adaptability of single parents and found that the lack of social support was the greatest risk factor among single parents in this context. Studies that are more recent also follow these findings (Maldonado and Nieuwenhuis, 2015; Jackson and Kiehl, 2017; Martin-West, 2019). Educational research has not yet sufficiently mapped out the extent to which the factors influencing adaptability differ in other family types. This raises the question of whether it is not precisely families with special needs that face particular challenges in times of crisis, or whether, based on the family type, different resources must be drawn on to cope with challenging life situations. However, in view of the increasing complexity of the living environment and new societal

demands on families, it is becoming more and more important to understand those factors that can influence the adaptability of families.

2.3. Purpose of the study and research questions

In Germany, the COVID-19 lockdown confronted families with challenging situations. Families with young children in particular faced major challenges during this time because children in this age group need more intense care. In addition, they are highly dependent on stimulating HLA offered by their parents, as there is still no influence from the school system. The closure of daycare centers in particular resulted in new demands on the reconciliation of family and work. Some parents also had to cope with changes in their employment (Cohen et al., 2020; Huebener et al., 2020). Those parents who were less affected by changes in employment still had to make up for the missing hours of childcare outside the home. The challenge of continuing to cope with everyday family life also was noticeable in parents' perception of stress (Oppermann et al., 2021).

The number of studies investigating the challenges of family life during the COVID-19 pandemic has increased significantly in recent times. However, since many of the studies deal with the family as a general unit, we would like to focus on different types of families. The negative relation between parental stress and the HLE in general and especially during the first COVID-19 lockdown has already been scientifically proven (Crnic and Greenberg, 1990; Crnic et al., 2005; Oppermann et al., 2021). However, we also want to investigate whether these findings apply equally to all family types. In addition, we are interested in whether negative relations between parental stress and changes in HLA occur in the different family types from the same stress level (low, medium, high levels of stress) onwards. In order to identify, among the surveyed families, those types with special needs in times of crisis, we investigate whether social support is equally considered a protective factor for family adaptation in all families. Finally, we want to look at supportive role distribution in couple households under a family type-specific focus and explore whether the importance of a supportive role distribution within the partnership for adaptability (Patterson, 2002) differs between traditional two-parent families and large families.

Based on current data, we examine differential links between family adaptive capacities (changes in HLA); taking into account different family types (two-parent families, large families, and single parents). Due to different family types, our aim is to examine the relations of changes in parents' HLA with their children during the first COVID-19 lockdown. We define positive adaptability as maintaining or increasing the parental level of HLA with preschool children. This approach aims to better capture the protective factors of families, in addition to the impact of the COVID-19 lockdown, on families with young children, and thus formulate family type-specific needs in crises. We define the following research questions (RQ):

1. What is the impact of the first COVID-19 lockdown on adaptability of parents' HLA in different family types?
   a. We expect families to draw on different resources based on their family type and therefore we will find differences in adaptability of parents' HLA (H1a).
   b. We assume that the change in employment as well as in external childcare is related to the adaptability of families (H1b).
2. What is the importance of perceived roles in the partnership, parental stress, and social support for changes in the home learning environment?
   a. We assume positive relations between (1) the supportive distribution of roles within the partnership and (2) social support and family adaptability (H2a1 and H2a2).
   b. We assume that parental stress influences the adaptability differently in the family types (H2b).
   c. We assume that the relations of perceived stress and adaptability are strongest in single-parent families because of the lower personal resources (only one adult within a household) (H2c).
   d. We assume that the relations of perceived stress and adaptability will be lowest in large families due to the distribution of employment and care work for mostly several young children (H2d).

3. Methods

3.1. Design and sample

Data stems from the study 'Families and Childcare centers in times of COVID-19', a nation-wide cross-sectional online survey, which examined the effects of the abrupt closure of daycare centers during the first COVID-19 lockdown on German families with young children (Cohen et al., 2020). However, since the restrictions differed greatly in Germany's various federal states, we cannot assume that the sample is representative of the whole of Germany. To our knowledge, this was one of the first studies to examine the situation of families with young children during the first wave of the COVID-19 pandemic in Germany. In April and May 2020, 9,343 parents whose children attended daycare before the lockdown participated in the survey. We recruited a convenience sample through personal contacts, online blogs, social media, and the mailing lists of large non-profit organizations, foundations, and daycare centers. The recruited parents came from all 16 German states, with clustering in some federal states like Bavaria, Baden-Württemberg and North Rhine-Westphalia (Cohen et al., 2020). We excluded all cases without children in the household ($n = 289$). We did the same with those who had a relationship with the child other than mother/stepmother or father/stepfather ($n = 181$). Finally, we excluded single-parent families who lived with other family members or with roommates/friends from the sample ($n = 360$). Thus, the sample does not represent all family types living in Germany. To answer the research question $N = 8{,}513$ families with children aged 18–69 months ($M = 37.0$, $SD = 4.5$) from the main sample fit these criteria. Of these, 89% of respondents were mothers ($n = 7{,}551$). The average age of respondents was 37 years ($SD = 4.5$; age range 18–69 years). We determined the parental educational level *via* three levels: *low*, which corresponds to ISCED levels 0–2 (lower secondary school education and below), *medium*, which corresponds to ISCED levels 3–5 (upper secondary school education to short-cycle tertiary education) and *high*, which corresponds to ISCED levels 6 and 7 (Bachelor's degree or above; UNESCO, 2011). With regard to the level of education, we classify the families as privileged: In all three family types, the ISCED is close to the medium range (Single parents: $M = 2.7$, $SD = 0.6$; traditional two-parent families: $M = 2.9$, $SD = 0.4$, large families: $M = 2.8$, $SD = 0.5$). Moreover, 85% of parents in the sample had a high educational level, 13% had a medium educational level and 0.9% had a low educational level. At the

time of the survey, 74% of parents were employed (21% fulltime, 45% parttime, and 8% on reduced hours). Before the COVID-19 pandemic, 79% of parents were employed (27% fulltime, 52% parttime, and 0.3% on reduced hours). The proportion of those who were on leave or looking for work also increased from 1% to 5% compared to before the lockdown and the proportion of those who regularly work from home increased from 28% to 38% compared to the situation before COVID-19. The employment situation of the respondents' partners has also changed significantly, with from 96% in employment (82% fulltime, 12% parttime and 0.3% on reduced hours) before the lockdown, and 93% in employment during (68% fulltime, 13% parttime and 11% on reduced hours). In addition, 30% of respondents and 22% of partners worked in systemically relevant occupations, which gave them special entitlement to daycare during the lockdown. However, it should be emphasized that the classification of system-relevant occupations was quite heterogeneous between the federal states and at the time of the first daycare closure. At this point, the average time children spent in care outside the home dropped from 7 h/day ($SD = 2.4$) to 1.5 h/day ($SD = 3.0$). The surveyed families also hardly felt any stress due to the employment situation (their own or their partner's; $M = 3.0$, $SD = 1.3$) or partnership conflicts ($M = 2.6$, $SD = 1.1$). Descriptive analyses of family cohabitation revealed that 93% of the families surveyed live together as a traditional two-parent family ($n = 7{,}911$). Five percent of the families are single parents ($n = 429$). In contrast, 2% of respondents live together in a large family ($n = 173$). Regarding parental education, all three family types show values on the medium ISCED level. The highest parental educational background was found in two-parent families ($M = 2.9$, $SD = 0.4$). Large families were close behind ($M = 2.8$, $SD = 0.5$). Among single parents, we found the lowest levels parental educational, albeit with only a slight difference ($M = 2.7$, $SD = 0.6$). On average, the families largely describe their financial situation before COVID-19 as unproblematic.

3.2. Measures

3.2.1. Family type

In order to identify different family types, we established family type criteria. Due to the data situation, we are not able to depict all family types living in Germany. We defined the following family types: The "two-parent family" describes cases in which two parents lived together as a couple with one to three children as a family unit in a common household. "Large families" are cases in which two parents lived together as a couple with four or more children as a family unit in a common household (Toth et al., 2019). "Single parents" were defined in the study *via* cases where the respondent stated that he or she lives alone with his or her child(ren) in a common household. For our approach, the number of children living in the single-parent household was not relevant. We statistically excluded a crossing of the categories.

3.2.2. Family adaptability

In order to be able to make statements about the current adaptability in families, we generated a change variable of the HLA-quantity compared to the time before the lockdown, which formed the dependent variable within our model specification. Using a 7-point response scale (1 = considerably less frequent; 4 = the same; 7 = considerably more frequent) we asked parents about the frequencies of educational activities (e.g., reading aloud or handicrafts) that they or another family member engaged in with the target child, compared to the time before the lockdown ($\alpha = 0.85$). The focus of the survey was kindergarten children. Thus, the parents indicated how many children between 0 and 6 years of age live in their household. If there were several children belonging to this age group in a family, the parents were asked to self-report reading aloud or doing handicrafts with the oldest child within this age group.

3.2.3. Predictors of changes in HLA

We measure *changes in employment at the household level* (−1 = less, 0 = no change, 1 = more) and *changes in hours of childcare outside the home* (−2 = significantly less, −1 = less, 0 = no change, 1 = more 2 = significantly more) compared to the time before the lockdown as reported by the families as predictors. Parental stress comprised four items, which indicated the level of perceived stress (e.g., "I often feel unable to cope with the new tasks and demands, e.g., home schooling, keeping the child occupied") by using the scale mean from 1 to 4 with higher values indicating a higher parental stress level, ($\alpha = 0.85$). To investigate the relation between parental stress and adaptability in detail, we followed the threshold concept of Oppermann et al. (2021) and additionally measured parental stress as dummy variables to include these in multiple group regressions: With the help of a quartile split, medium-stress and high-stress limits were determined. Parents between a value of 2.33 (2 = tend to disagree) and 3.0 (3 = tend to agree) on the linear stress scale are labelled with 1 in the dummy variable *medium stress* (1 = medium stress, 0 = low or high stress). Parents whose stress perception on the linear stress scale is at least 3.25 are labelled with 1 in the dummy variable *high stress* (1 = high stress, 0 = medium or low stress). We define *low stress* from a scale value of 2.25 or lower and use this variable as a reference group in later analyses. Four items assessed *social support*, which described how strongly the respondent felt supported by his or her social environment during the lockdown (e.g., "Is there someone who can give you good advice when you have problems?"). On a 5-point response scale, respondents could indicate the perceived availability of social support (1 = never, 5 = always). The reliability test resulted in a Cronbach's alpha of.89. *Supportive role distribution within the partnership* consisted of four items, e.g., if the respondent felt sufficiently supported by his or her partner in childcare or in the household. A 4-point response scale was used to measure agreement with these statements (1 = strongly disagree, 4 = strongly agree). Single parents could not answer this scale because of their single status. The scale proved to be reliable ($\alpha = 0.86$).

3.2.4. Control variables

As control variables, we implement parental education (ISCED level: *low* = 0–2, *medium* = 3–5, *high* = 6–7), the perceived financial problems before COVID-19 (1 = we had no financial problems, 5 = we had great financial worries), the gender of the respondent (0 = female, 1 = male), as well as the child's age (in months) at the time of the interview and the gender of the target child (0 = female, 1 = male).

3.3. Statistical analyses

To investigate the impact of the first COVID-19 lockdown on the adaptability of parental HLA in different family types (RQ1), we compute descriptive statistics and use analyses of variance with *post hoc* analyses. Thus, we test the extent to which the mean values of parents' HLA, the change in employment as well as in external childcare differ significantly among the three family types. To test, whether the changes in employment and in external childcare are related to the

adaptability of families, we conduct multiple group regressions in Mplus, with the family type being the grouping variable (Version 8.3; Muthén and Muthén, 1998–2012). Multiple group analysis allows us to test if pre-defined data groups (family type) have significant differences in their group-specific parameter estimates (e.g., standardized regression coefficients, standard errors and significance for family resources, perception of parental stress and social support). To answer the research question regarding the importance of perceived roles in the partnership, parental stress, and social support for changes in the home learning environment (RQ2), we initially compute descriptive statistics and analyses of variance. In addition, we investigate relations between the supportive distribution of roles within the partnership and changes in parents' HLA using further multiple group regressions combined with post hoc analysis of the regression coefficients (Wald-Test). We survey relations between social support and changes in parental HLA in a similar way. To test the importance of parental stress for changes in the home learning environment we additionally use further multiple group regressions combined with post hoc analysis of the regression coefficients.

To verify whether the data of the relevant variables were systematically missing, we conducted a missing data analysis in all cases. We used Little's (1988) test for completely missing values at random (MCAR). The results of the MCAR test showed that data were not missing at random (MNAR) in the continuous variables relevant to us (e.g., perceived financial problems, changes in employment, or in hours of childcare outside the home: $\chi^2 = 141.71$, $df = 54$, $p = 0.000$). However, Shin et al. (2009) argue that even under MNAR, the full information maximum likelihood (FIML) approach yields the least biased parameter estimates and the lowest parameter estimation error. To make full use of the data, we used FIML in all our analyses to answer our research question. The model fit was assessed with reference to the Yuan-Bentler scaled χ^2 (YB χ^2, mean-adjusted test-statistic robust to non-normality), the root mean square of approximation (RMSEA), the comparative fit index (CFI), the Tucker and Lewis index (TLI), and the standardized root mean residual (SRMR) values according to the criteria recommended by Hu and Bentler (1999). CFI and TLI values >0.95, RMSEA values lower than 0.06, and SRMR lower than 0.08 were accepted as indicators of a good model fit (Hu and Bentler, 1999).

4. Results

4.1. Descriptive findings

In all three family types, there were hardly any changes in employment during the first lockdown. This does not mean that families were not burdened by changes. Even though the amount of employment did not change noticeably, the percentage of respondents working from home increased from 28% to 38% during the first lockdown. In all families, there was a noticeable decrease in hours of care outside the home during the lockdown. Single parents ($M = -1.4$, $SD = 0.9$) were slightly less affected by these changes than two-parent families ($M = -1.7$, $SD = 0.7$). We can explain this in part by the fact that single parents had a special entitlement to emergency daycare. Also, large families ($M = -1.5$, $SD = 0.9$) were slightly less affected by these changes than two-parent families ($M = -1.7$, $SD = 0.7$). All families, regardless of family type, were equally affected by parental stress. We observe the same for the perception of social support: All families reported an intermediate level of social support. Two-parent families and large families alike reported living in a partnership with a tendency toward a supportive distribution of roles. In all three family types, parents provided HLA somewhat more frequently on average, which corresponds to the value 5 on the response scale, during the first lockdown (see Table 1). Here, however, in comparison, large families offered the least ($M = 4.6$, $SD = 1.0$), less than single parents ($M = 4.9$, $SD = 0.8$) and two-parent families ($M = 5.0$, $SD = 0.8$).

4.2. Predicting changes in parents' HLA in different family types

First, we consider the relations of the interventions taken during the COVID-19 pandemic (aA component: pile-up of demands): The changes in employment and in hours of childcare outside the home are additional stressors that add to the stress that families already face in their daily lives. Taking into account control variables, we examine the relations changes in employment and in hours of childcare outside the home exhibit with HLA (Model 1). The interventions taken during the COVID-19 pandemic may increase parents' perception of stress (aA component: pile-up of demands). Model 2 tests relations between parental stress and HLA, focusing on particularly stressed families. To understand more about the relevance of available external resources (bB), we analyze relations between social support and HLA in Model 3. This allows us to explore the extent to which the availability of social support mitigates stress relations. In order to gain more knowledge about the importance of available internal resources (bB), we examine the relation between supportive role distribution and HLA in Model 4. The question as to the extent to which supportive role distribution functions as a family-internal protective factor during times of crisis can thus be investigated. Using this model specification, we explain relations between the relevant variables and the adaptability of families (maintaining or increasing HLA provision) in times of crisis. We must point out that we do not have assessable data for the component cC "familial appraisal."

4.2.1. RQ1: The impact of the first COVID-19 lockdown on adaptability of parents' HLA in different family types

To analyze differences in adaptability of parents' HLA based on the family type (H1a), we computed analyses of variance, which revealed differences in changes in parents' HLA with their children (F (2, 7,549) = 12.93, $p < 0.010$, $\eta^2 = 0.00$,). Changes were significantly higher in two-parent families than in large families ($p = 0.000$). During the lockdown, parents from two-parent families offered HLA significantly more often to their children than parents from large families. Also, single-parent families offered HLA significantly more often than parents from large families ($p = 0.010$). We found no significant differences between two-parent families and single parents ($p = 0.335$). This confirms the established assumption.

To test hypothesis H1b, we investigated potential relations between changes in employment as well as in hours of childcare outside the home and the adaptability of families. Taking the control variables into account, the analysis of variance revealed significant differences between the groups with regard to changes in employment (F (2, 8,443) = 8.57, $p < 0.010$, $\eta^2 = 0.00$). In two-parent families, changes (reduction in hours worked) were significantly greater than in single-parent families ($p = 0.000$). In large families, changes (reduction in hours worked) were significantly greater than in single-parent families ($p = 0.000$), too. We found no differences between two-parent families

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TABLE 1 Descriptive statistics for family types.

	Single parents (n=429)		Two-parent families (n=7,911)		Large families (n=173)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Age of child (in months)	37.0	5.4	37.0	4.5	39.0	4.2
Perceived financial problems before COVID-19 (1 = no financial problems; 5 = major financial problems)	2.0	1.0	1.4	0.7	1.7	0.9
ISCED	2.7	0.6	2.9	0.4	2.8	0.5
Change in employment (household level; 1 = more, 0 = unchanged, −1 = less)	−0.2	0.4	−0.3	0.5	−0.3	0.5
Change in hours of childcare outside the home (2 = considerably more, 0 = unchanged, −2 = considerably less)	−1.4	0.9	−1.7	0.7	−1.5	0.9
Parental stress (1 = totally disagree, 4 = totally agree)	2.7	0.8	2.7	0.7	2.7	0.7
Low stress (0 = medium or high stress, 1 = low stress)	0.3	0.5	0.3	0.5	0.3	0.5
Medium Stress (0 = low or high stress, 1 = medium stress)	0.4	0.5	0.4	0.5	0.4	0.5
High stress (0 = medium or low stress, 1 = high stress)	0.3	0.5	0.3	0.5	0.3	0.5
Social support (1 = never, 3 = sometimes, 5 = always)	3.3	1.0	3.3	1.0	3.2	1.1
Supportive role distribution partnership (1 = totally disagree at all, 4 = totally agree)	–	–	3.1	0.7	3.1	0.8
Changes in parents' HLA with their children (1 = considerably less frequent, 4 = Same, 7 = considerably more frequent)	4.9	0.8	5.0	0.8	4.6	1.0

and large families ($p = 0.734$). The ANOVA further shows differences in changes in hours of childcare outside the home between the family types (F (2, 5,556) = 25.98, $p < 0.010$, $\eta^2 = 0.01$). In two-parent families changes were significantly greater than in single-parent families ($p = 0.000$). We found neither differences between two-parent families and large families ($p = 0.192$) nor between single parents and large families ($p = 0.322$). Table 2 shows the results of the multiple group regression analyses. Including the control variables, changes in employment and in hours of childcare outside the home model 1 does not support our hypothesis H1b that changes in employment as well as in hours of childcare outside the home are related to the adaptability of families. In two-parent families, we found significant relations between all variables and changes in parents' HLA. However, the relations are too small to interpret. Moreover, the large sample of 7,884 two-parent families is the reason for the significance of the findings. At 2%, the model explains little variance. In large families, we found no predictions of changes in parents' HLA during lockdown by the control variables, changes in employment, or in hours of childcare outside the home. For large families, the model explains 5% of variance. For single parents, the model showed small relations between the gender of the parent and changes in HLA: Single fathers ($n = 19$) reported greater increases in HLA during the first lockdown than single mothers did. The model explains 5% of the variance. With the exception of the CFI/TLI values, the model fit was acceptable ($\chi^2 = 203.32$, $df = 30$, RMSEA = 0.05, CFI = 0.00, TLI = 0.00, SRMR = 0.03). This does not confirm the assumption made.

4.2.2. RQ2: The importance of perceived roles in the partnership, parental stress, and social support for changes in the home learning environment

The surveyed families were slightly affected (2 = not at all stressful; 3 = somewhat stressful) by general stressors caused by the COVID-19 interventions, such as worries about children's development ($M = 2.8$, $SD = 1.3$) or family health ($M = 2.6$, $SD = 1.2$). We used analysis of variance to examine differences in parental perception of stress between the family types: It revealed no significant differences between the families for linear parental stress ($p = 0.727$), low parental stress ($p = 0.877$), medium parental stress ($p = 0.516$), or high parental stress ($p = 0.637$). Then we included parental stress in our multiple group regression (see Table 2, model 2). In order to include particularly stressed parents among the families, we computed two dummy variables: one indicating intermediate levels of stress and one indicating high levels of stress. The analyses show no statistically significant relations for intermediate stress and changes in HLA among the families. Still, in large families there is a tendency toward a significant, but slightly negative relation between medium stress and changes in HLA ($p = 0.082$). Regarding high stress, the analysis reveals that the more stressed single parents were, the less they were able to offer their children the same level of HLA as before the lockdown. The gender differences among single parents disappear when we considered stress. The Mann–Whitney-U Test shows differences in the mean values for medium and high stress of single mothers and single fathers. Fathers ($M = 0.6$, $SD = 0.5$) are more affected by medium stress than mothers ($M = 0.4$,

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TABLE 2 Multi-group regression: changes in parents' HLA in different family types.

	Model 1	Model 2	Model 3	Model 4
	ß (SE)	ß (SE)	ß (SE)	ß (SE)
Single parents ($n = 428$)				
Gender respondent (0 = female, 1 = male)	**0.11 (0.05)**	0.09 (0.05)	0.09 (0.05)	
Age child (in months)	−0.11 (0.06)	−0.09 (0.06)	−0.10 (0.06)	
Gender child (0 = female, 1 = male)	−0.09 (0.05)	−0.09 (0.05)	−0.09 (0.05)	
Perceived financial problems COVID-19	−0.04 (0.06)	−0.02 (0.06)	−0.02 (0.06)	
ISCED	0.07 (0.07)	0.06 (0.07)	0.06 (0.07)	
Change in employment at household level	−0.05 (0.05)	−0.04 (0.05)	−0.03 (0.05)	
Change in hours of childcare outside the home	−0.09 (0.08)	−0.10 (0.08)	−0.10 (0.08)	
Medium stress (0 = Low or high stress, 1 = Medium stress)		−0.04 (0.05)	0.04 (0.05)	
High stress (0 = Medium or low stress, 1 = High stress)		**−0.18 (0.06)**	**−0.19 (0.06)**	
Social support			−0.03 (0.06)	
R^2	0.05	0.08	0.08	
Two-parent families ($n = 7.884$)				
Gender respondent (0 = female, 1 = male)	**0.03 (0.01)**	**0.03 (0.01)**	**0.03 (0.01)**	**0.03 (0.01)**
Age child (in months)	**−0.06 (0.01)**	**−0.06 (0.01)**	**−0.05 (0.01)**	**−0.05 (0.01)**
Gender child (0 = female, 1 = male)	**−0.04 (0.01)**	**−0.04 (0.01)**	**−0.04 (0.01)**	**−0.04 (0.01)**
Perceived financial problems COVID-19	**−0.06 (0.01)**	**−0.05 (0.01)**	**−0.05 (0.01)**	**−0.05 (0.01)**
ISCED	**0.03 (0.01)**	**0.04 (0.01)**	**0.04 (0.01)**	**0.04 (0.01)**
Change in employment at household level	**−0.04 (0.01)**	**−0.04 (0.01)**	**−0.04 (0.01)**	**−0.04 (0.01)**
Change in hours of childcare outside the home	**−0.07 (0.02)**	**−0.08 (0.02)**	**−0.09 (0.02)**	**−0.09 (0.02)**
Medium stress (0 = Low or high stress, 1 = Medium stress)		**−0.03 (0.01)**	−0.02 (0.01)	0.01 (0.01)
High stress (0 = Medium or low stress, 1 = High stress)		**−0.14 (0.01)**	**−0.11 (0.01)**	**−0.11 (0.01)**
Social support			**0.08 (0.01)**	**0.08 (0.01)**
Supportive role distribution				0.02 (0.01)
R^2	0.02	0.04	0.04	0.04
Large families ($n = 172$)				
Gender respondent (0 = female, 1 = male)	0.03 (0.05)	0.04 (0.04)	0.04 (0.05)	0.03 (0.05)
Age child (in months)	0.04 (0.09)	0.04 (0.08)	0.02 (0.08)	0.02 (0.08)
Gender child (0 = female, 1 = male)	−0.03 (0.08)	−0.02 (0.08)	−0.01 (0.08)	−0.01 (0.08)
Perceived financial problems COVID-19	0.06 (0.09)	0.09 (0.09)	0.11 (0.09)	0.11 (0.09)
ISCED	−0.12 (0.09)	−0.16 (0.10)	−0.17 (0.09)	−0.17 (0.09)
Change in employment at household level	−0.10 (0.07)	−0.04 (0.07)	−0.04 (0.07)	−0.04 (0.07)
Change in hours of childcare outside the home	−0.13 (0.14)	−0.07 (0.13)	−0.13 (0.15)	−0.14 (0.14)
Medium stress (0 = Low or high stress, 1 = Medium stress)		−0.14 (0.08)	0.10 (0.08)	0.10 (0.08)
High stress (0 = Medium or low stress, 1 = High stress)		**−0.38 (0.07)**	**−0.27(0.09)**	**−0.27 (0.09)**
Social support			**0.25 (0.09)**	**0.25 (0.10)**
Supportive role distribution				0.01 (0.07)
R^2	0.05	0.19	0.23	0.24

Displayed are standardized regression coefficients, standard errors in brackets, significance and explained variance. The bold values represent the significant results. The dataset contains 29 cases with missing on x-variables. These cases were not included in the analysis.

$SD = 0.5$). There was a tendentially statistically significant difference between the groups ($U = 2{,}529$, $Z = -1.80$, $p < 0.10$). Mothers ($M = 0.3$, $SD = 0.5$) are more affected by high stress than fathers ($M = 0.1$, $SD = 0.2$), There was a statistically significant difference in high stress between them ($U = 2{,}468$, $Z = -2.11$, $p < 0.05$). The model explains slightly more variance (8%) for this family type. For traditional two-parent families, due to the sample size, again almost all relations were statistically significant, but with very little to no relations. Only for relations between high parental stress and changes in HLA did the regression show that the more stressed traditional two-parent families were, the less the

frequency of HLA changed. The model still explains little variance (4%). In large families compared to the other family types, the level of parental stress was of greater importance for an adequate adaptability of the HLA during the first lockdown. We found an intermediate negative relation between high stress and changes in parents' HLA. This model explains significantly more variance (19%) than Model 1. The model fit was acceptable ($\chi^2 = 259.47$, $df = 27$, RMSEA = 0.15, CFI = 0.00, TLI = 0.00, SRMR = 0.07). *Post hoc* analysis of the regression coefficients of high parental stress between the groups shows no differences between traditional two-parent families and single parents ($\chi^2(1) = 0.865$, $p = 0.352$, $d = 0.021$). We also find no differences between single parents and large families ($\chi^2(1) = 2.929$, $p = 0.087$, $d = 0.038$). Only between two-parent families and large families do the regression coefficients of high stress experience differ ($\chi^2(1) = 6.247$, $p = 0.012$, $d = 0.056$). In general, the results confirm hypothesis H2b, according to which parental stress influences the adaptability differently in the family types. However, hypothesis H2c assumed that the negative relations of perceived stress and adaptability are strongest in single-parent families because of their lower personal resources. Our results refute this. When we considering the regression coefficients, it becomes clear that negative relations between parental stress and changes in HLA are significantly greater in large families than in traditional two-parent families. Accordingly, we must reject the assumption that the negative relation between perceived stress and adaptability are lowest in large families (H2d).

To test hypothesis H2a2, we investigated relations between social support and family adaptability. In general, we found no statistically significant differences between the groups for social support ($p = 0.479$). When we included social support to the multiple group regression, we found no significant relations between social support and changes in parents' HLA compared to the time before the lockdown for single parents (see Table 2, model 3). The variance reached its maximum at 8%. Although in traditional two-parent families the regression coefficient for social support is relatively small, the relations between high levels of stress and changes in HLA decrease when we consider social support. The variance remains at 4%. In large families, the availability of social support was more important for changes in HLA during the first lockdown compared to the other family types. For social support, the negative relations between high levels of stress and changes in HLA decrease (see Table 2, model 3). This model explains 23% of the variance. The model fit was acceptable ($\chi^2 = 296.30$, $df = 30$, RMSEA = 0.14, CFI = 0.00, TLI = 0.00, SRMR = 0.07). Comparative post hoc analyses of the regression coefficients between the groups show no differences in the perception of social support between two-parent families and single parents ($\chi^2(1) = 1.803$, $p = 0.179$, $d = 0.031$). However, perceptions of social support differs statistically between two-parent families and large families ($\chi^2(1) = 4.612$, $p = 0.032$, $d = 0.049$), as well as between single parents and large families ($\chi^2(1) = 6.558$, $p = 0.010$, $d = 0.058$). For traditional two-parent families and large families, the results confirm hypothesis H2a2, according to which positive relations exist between social support and the adaptability of families.

Hypothesis H2a1 assumes positive relations between the supportive distribution of roles within the partnership and family adaptability. Analysis of variance revealed no statistically significant differences between the groups in the distribution of the supporting role ($p = 0.691$). In our regression Model 4 (see Table 2), we added the perception of a supportive role distribution within the partnership. Due to the relationship status, we only conducted these analyses for traditional two-parent families and large families. Neither in traditional two-parent families nor in large families was the perceived supportive role distribution within the partnership significantly related to parents' changes in HLA during the first lockdown. For two-parent families the variance remained the same (4%). For large families, Model 4 explains minimally more variance despite significant correlations (24%). Aligned with the SRMR value the model fit was acceptable ($\chi^2 = 280.06$, $df = 22$, RMSEA = 0.15, CFI = 0.00, TLI = 0.00, SRMR = 0.07). The post hoc analysis of the regression coefficients of the perceived supportive role distribution within the partnership between the two family types shows no statistically significant differences ($\chi^2(1) = 0.084$, $p = 0.772$, $d = 0.007$). These results cannot confirm hypothesis H2a1.

5. Discussion

In Germany, restrictions to contain the COVID-19 pandemic les to severe disruptions for parents with children under the age of six. These families were denied centralized care and education services, so they needed to reorganize working and childcare hours, and redistribute childcare at home. Our aim was to examine the adaptability of families with young children in times of crisis, with a special focus on adaptability among traditional two-parent families, single parents, and large families. As an indicator of family adaptability, we examined changes in the frequency of parents' HLA with their children during the first lockdown compared to the preceding time period. Results show, with minor differences, that parents from all three family types offered HLA slightly more often during the first lockdown than before. Since a large proportion of the children spent more time at home due to the closed daycare, this does not, initially, seem surprising. Our results do show that the employment of the surveyed parents hardly changed: Nevertheless, we must note that, whether working from home or not, many families had to organize their employment around childcare and sometimes work early in the morning or late in the evening. To what extent there was enough time for relaxation or family time is questionable. Nevertheless, all parents offered their children HLA more often during the lockdown. It is possible that families tried to compensate for the loss of the influence of early childhood education institutions by providing more HLA. Still, the results revealed significant differences among the groups: Despite fewer personal resources, the single parents in our study, just like families with two parents, managed to offer their children HLA more often compared to before the first lockdown. Adaptability during the first lockdown was comparatively lowest in large families, which identifies this family type as a special risk group in our study.

5.1. Adaptability of families in times of crisis: Risk and protective factors

Toward a deeper understanding of family type-specific conditions for adaptability, the identification of factors that influence the adaptability of families is crucial. How parental stress predicts inadequate parenting behavior is well established (Crnic and Greenberg, 1990; Crnic et al., 2005). Overall, studies showed that parental stress is negatively associated with changes in the provision of HLA, in general and especially during the first lockdown in Germany (Barnett, 2008; Oppermann et al., 2021). We were able to confirm this and even show that in large families the tipping point for negative relations between stress and parents' provision of HLA, as documented by Oppermann et al. (2021), occurs earlier and is stronger overall. Single parents and

two-parent families are still relatively adaptable when exposed to the medium stress level. The adaptability of large families, on the other hand, already seems to be vulnerable at a medium stress level. Since these findings just fail the level of significance, follow-up studies are required. Our study initially confirms that high stress restricts the ability to provide HLA in all three family types. There is hardly any variance in our data for child age. We can therefore conclude that the surveyed families were affected by comparable stress when it comes to providing care activities toward their children. We see intermediate negative correlations especially in large families. In the other two family types, the relations are smaller. In large families, the level of parental stress was the best predictor of lower adaptability. Thus, the adaptability of the HLA is significantly more susceptible to stress in large families. This raises the question of whether large families, considered as a special risk group in times of crisis, need special support to compensate for parental stress and thus ensure supportive parenting behavior. In order to make more precise statements about changes in HLA and the associated adaptability of families, it is be necessary to have further information on the general extent of HLA before the lockdown. In general, we were able to show that the relation between stress and the provision of HLA is smallest in two-parent families. It seems that this type of family in particular is the – comparatively – most stress-resistant. This is possibly due to a more balanced distribution of parents and children within this family setting. Compared to the adaptation performance in single-parent families, the availability of parental resources was not a decisive factor for stress management during the lockdown. Of more importance perhaps was how families organized their everyday life, or whether new routines developed during this time. Last but not least, it would also be interesting to analyze the extent to which our results on the stress level of families would be applicable if the target children were older or younger.

As already outlined, social support is crucial to successful adaptability because the extent to which a family feels supported by its social environment contributes to how strongly the emotional burden of a crisis feels (Dunn et al., 2001; Wierda-Boer et al., 2008; Manning et al., 2011). Our study found that the strongest relations between social support and parents' provision of HLA occur in large families. In line with Oppermann et al. (2021), we thus demonstrate the importance of social support for the adaptability of families and show once again that this predictor seems to be particularly important for an adequate adaptability in large families. If those families receive the level of social support they need for adequate adaptability, this may help to maintain the educational opportunities of children from large families during times of crisis. Moreover, even if the relation between social support and changes in HLA is low in traditional two-parent families, we still see that relations between stress and changes in HLA decrease here. The study by Oppermann et al. (2021) also revealed that social support has a mitigating effect on negative relations between stress and parents' provision of HLA. Although all three family types perceived similar availability of social support, among single parents, we could not demonstrate relations between social support and changes in HLA. Previous findings considered the lack of social support as the greatest risk factor in single parent adaptability (Jackson and Kiehl, 2017; Martin-West, 2019). It is conceivable that the single parents in our study were already making extensive use of social support before the lockdown and therefore we could find no relations. At the same time, our results show that the employment of single parents scarcely changed and changes in hours of childcare outside the home were been less drastic. Due to their single-parent status, many single parents were entitled to emergency childcare from daycare centers. Problems reconciling work commitments and childcare may have been mitigated in this way, making the importance of social support less relevant during the first lockdown.

As the identification of family resources plays an important role in adaptability (Patterson, 2002), we expected the supportive role distribution within the partnership to be an important predictor of the adaptability of the surveyed families. For changes in HLA during the lockdown, this internal family resource does not seem to have been of importance. The reason for this could be the operationalization of the scale: We surveyed role distribution within the partnership based on self-assessment by the parents. The perception of role distribution alone does not allow any conclusions about the actual distribution of household and care activities. Perhaps it is not the satisfaction with the role distribution that is decisive, but how much parents find fulfilment in their own role.

5.2. Further influencing factors

One relation we did not expect concerns gender differences in single-parent families: Single fathers reported a greater increase in HLA than single mothers. The COVID-19 pandemic has certainly led to single mothers and single fathers spending more time with their children. Concerning the time spent on childcare, single fathers often spend less time on childcare than single mothers (Hook and Chalasani, 2008). The single fathers in our study seem to have caught up in terms of time spent with their children during the lockdown. However, when we consider high stress, the gender differences among single parents disappear. Thus, it is a spurious relation between gender and the change in HLA in single-parent families. Rather, the relation is mediated by the level of parental stress. Compared to other family types, there is hardly any well-founded knowledge about the characteristics of single-father families with young children. Mostly, it is older children who live with single fathers. Our findings provide interesting insights into the group of single fathers in early childhood. The fact that single fathers of young children are represented in the sample at all can be seen as a particularly valuable aspect of the study. On the other hand, the results once again make it clear that single mothers in particular are burdened by parental stress. Studying differences between single mothers and fathers is an important area of research to explore child development in different contexts. However, further research on differences between single mothers and fathers needs to examine other aspects of the family environment. The number and age of other children living in the household must also be taken into account in such comparative studies, or whether both family types employ different strategies in obtaining support from their friends and family.

5.3. Limitations

The data for the present study come from a Germany-wide cross-sectional survey conducted online, resulting in a convenience sample. Accordingly, parents with a low level of education and single parents are underrepresented, within the sample compared to the German average (Statistisches Bundesamt, 2021). Furthermore, it is not possible to map the extent to which job-seeking participants devote time resources to their job search. Therefore, we cannot assume that those respondents have more time to provide HLA for their children. We also

note that some background characteristics of the family situation of the target children (e.g., possible number of younger siblings) cannot be represented. Furthermore, we could not survey changes in HLA directly due to the cross-sectional survey. We asked only for changes in HLA compared to the time before the first lockdown. Consequently, statements can only be made about the changes in HLA as a result of the first COVID-19 lockdown. This also means that no information is available on the initial frequency of HLA. The present findings can therefore be interpreted in terms of how perceived roles in partnership, parental stress, and social support affected changes in HLA, but cannot be generalized to absolute frequencies of HLA. Nor can we make any statements about the quality of the home learning stimulation, such as the atmosphere in a family. The study cannot answer how this changed during the lockdown. The information on changes in HLA is also based on parents' self-reports, which may be biased by social desirability. Further limitations concern the cross-sectional data as well as the sizes of the regression coefficients. On the one hand, cross-sectional data based on a one-time survey do not allow for causal conclusions. On the other hand, most of the results presented have both low effect sizes and small regression coefficients. This does not make them any less interesting, but we must interpret them with caution. Lastly, we want to point out that the situation of families during the first lockdown was different from the later stages of the COVID-19 pandemic. During the early phase of the COVID-19 pandemic, many families experienced the social shutdown as an opportunity to unwind, and optimism about overcoming the crisis was certainly higher than after many months of lockdown. Families were able to use this time to develop a more mindful family life, establish new rituals, and strengthen their own relationships (Weissbourd et al., 2020). This raises the question of whether our findings are also tenable over a longer period.

6. Conclusions and implications

This article contributes to linking the dynamics of HLE more closely to adaptation processes in families. We were thereby able to explain relations between perceived partnership roles, parental stress or social support and the adaptability of families in times of crisis. The present results illustrate that different resources of different types of family were indeed relevant for their adaptability during the COVID-19 lockdown in Germany. This becomes particularly apparent when it comes to the adaptability of families in times of crisis. We were able to show that the adaptation of HLA during the lockdown differed slightly based on family type, and that depending on family type distinct predictors are important for successful adaptability. For two-parent families and single parents, our analyses explained little variance. How these families can be better supported in their adaptability, and which predictors are important here, must be investigated in further studies in depth. Furthermore, follow-up studies should consider statements about the family appraisal component. This would allow links between the importance of parental self-efficacy for HLE and adaptability in times of crisis. Still, particularly noteworthy here are the results for large families. The study makes clear that special attention should be paid to these families in times of crisis and raises the question of whether the special needs of large families have received enough attention within social and political debates during the first lockdown in Germany. In times of crisis, it is important to ensure that all families receive the support they need to care for their children in the best possible way. To do this, we need further research to give a clear picture of where requirements remain unfulfilled, and what the special needs of individual families are. The characteristics of specific types of family should not be neglected in these considerations; they can further our understanding of the dynamics in different family types, which is essential for the development of effective and needs-oriented family support programs and policies.

Data availability statement

The datasets presented in this article are not readily available because the data are currently reserved for scientific qualifications (Ph.D. and masters' theses). Requests to access the datasets should be directed to EO, elisa.oppermann@uni-bamberg.de.

Author contributions

LP: conceptualization, methodology, formal analysis, writing–original draft, and visualization. FC: conceptualization, methodology, data collection, and writing–review and edit. EO: conceptualization, methodology, data collection, writing–review and editing. YA: conceptualization, methodology, writing–review and editing, supervision, and resources. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Appendix

Pearson correlations								
	Age of child	Perceived financial problems before COVID-19	ISCED	Change in employment (household level)	Change in hours of childcare outside the home	Parental stress	Social support	Supportive role distribution partnership
Perceived financial problems before COVID-19	−0.104**							
ISCED	0.156**	−0.172**						
Change in employment (household level)	0.032**	−0.045**	0.050**					
Change in hours of childcare outside the home	−0.056**	0.054**	−0.150**	0.087**				
Parental Stress	0.029*	0.084**	0.035**	0.040**	−0.095**			
Social support	−0.065**	−0.084**	0.008	0.005	0.079**	−0.374**		
Supportive role distribution partnership	0.007	−0.119**	0.052**	0.019	−0.018	−0.161**	0.199**	
Changes in parents' HLA with their children	−0.048**	−0.060**	0.038**	−0.046**	−0.082**	−0.134**	0.105**	0.056**

**The correlation is significant at the 0.01 level (2-sided).

*The correlation is significant at the 0.05 level (2-sided).

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Parental burnout and adolescents' academic burnout: Roles of parental harsh discipline, psychological distress, and gender

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Parental burnout is an emerging hot issue in discussions about children's mental health and development. However, little is known about the underlying psychological mechanisms of parental burnout on children's academic burnout. To fill in this gap, we aim to examine the relationship between parental burnout and adolescents' academic burnout, as well as the mediating effects of harsh discipline, adolescents' psychological distress, and the moderating effect of gender. A sample of 871 junior high school students (477 boys and 394 girls) and their primary caregivers from Eastern China participated in this study. The results showed a direct relationship between parental burnout and academic burnout as well as an indirect relationship through the mediating role of psychological distress and the chain-mediating roles of parental harsh discipline and psychological distress. Furthermore, we discovered that fathers' parental burnout had a stronger effect on children's psychological distress than mothers. These findings contribute to our understanding of how parental burnout relates to children's academic burnout and underline the significance of fathers' parental burnout.

KEYWORDS

parenting emotion, academic performance, social learning theory, junior high school student, multiple mediation model

1. Introduction

With the aggravation of the contraction between high expectations and limited energy in parenting, parental burnout gradually rises to a serious social issue in the current era. Parental burnout is defined as a series of negative symptoms brought on by parental role and long-term parenting stress (Mikolajczak et al., 2018b). It not only damages their mental health and behavior, but its negative spillover effect also spread to their spouses and children (Mikolajczak et al., 2018a). Prior research regarding the influence of parental burnout on children tended to focus on parenting practices (such as neglect and violence) and children's mental health (Mikolajczak et al., 2018a; Mikolajczak et al., 2019; Yang et al., 2021). The influence of parental burnout on academic burnout has received little attention. However, driven by the result-oriented educational background, adolescents' primary task is to study, and academic burnout is a common issue. Academic burnout plays an important role in adolescents' growth and social development (Lay-Khim and Bit-Lian, 2019; Ogbueghu et al., 2019). Severe academic burnout leads to a series of maladaptive and negative developmental outcomes, such as poor academic performance, truancy, school dropouts, as well as psychological disorders (Rudolph et al., 2001;

Bilige and Gan, 2020). Therefore, understanding the influence of parental burnout on children's academic performance is crucial to fully understanding its influence on children. It is equally essential to pay attention to parental burnout to reduce adolescents' academic burnout. The present study aims to examine the relationship between parental burnout and adolescents' academic burnout, as well as the mediating effects of harsh discipline, adolescents' psychological distress, and the moderating effect of gender.

1.1. Parental burnout and academic burnout

As the demand-resource model of burnout indicates, burnout occurs when an individual's resources cannot satisfy the demand (Demerouti et al., 2001). In the process of parenting, parental burnout occurs when a parent's resources are insufficient to meet the demands of parenting (Mikolajczak and Roskam, 2018). Recently, due to the rising prevalence of parental burnout among parents worldwide, researchers have been more interested in this subject. According to a survey conducted in 42 countries throughout the world, the incidence of parental burnout ranged from 0 to 8% (Roskam et al., 2021). Parental burnout has a profound effect on adolescents due to their deficiencies in emotion regulation abilities. Therefore, parental burnout and its effect require exceptional attention. According to social learning theory (Bandura, 1977), children learn and imitate their parents' behavior patterns and attitudes. This theory has also been confirmed in many research topics, such as addictive behavior and psychological status (Kendler and Gardner, 2017; Xie et al., 2019). Academic burnout refers to a certain type of reaction caused by students' failure to cope with academic stress (Maslach and Jackson, 1981). Prior researches have also shown that parental burnout has an impact on children's academic achievement (An et al., 2022) and academic burnout (Wu et al., 2022), but its underlying psychological process was unclear. Therefore, we aim to first examine the relationship between parental burnout and adolescents' academic burnout, and then analyze its influential mechanism.

1.2. The role of parental harsh discipline

According to the theoretical framework of parental burnout, the influence of parental burnout on children's developmental outcomes may have to be mediated by other factors such as parenting style or parenting behavior (Mikolajczak et al., 2018a). In this way, harsh discipline seems to be an important mediating variable. From the biological point of view, stress elicits and fuels anger (Moons et al., 2010), while emotional and physical exhaustion might limit the executive resources available to suppress negative behaviors (Krabbe et al., 2017). Parental burnout resulted not only in neglect and evasion but also in the violent treatment of children and the appearance of rough parenting behavior (Hansotte et al., 2021). As a type of rough parenting behavior, parental harsh discipline is a common parenting style globally, especially in Chinese families (Wang and Liu, 2014). It refers to the compulsory behavior or negative emotional expression committed by parents against children's improper behavior (Erath et al., 2009). Burned-out parents are frequently trapped in parenting stress, which might impair their ability to control the occurrence of negative parenting behaviors (Roskam et al., 2017). Thus, burned-out parents are more inclined to adopt harsh discipline to deal with issues that arise during the child-rearing process.

Previous researches on the association between parental harsh discipline and children's academic performance have reached conflicting conclusions. Parental harsh discipline is frequently interpreted as responsibility and care for children in traditional Chinese culture (Chao, 1994). Furthermore, the examples of "Tiger Mom" and "Wolf Dad" indeed provide evidence for the promotion effect of parental harsh discipline on children's academic achievement (Chu and Xie, 2023). However, ample studies in recent years have criticized that parental harsh discipline impeded children's cognitive and emotional development, and increased the degree of social maladjustment (Gershoff et al., 2010; Bai L. et al., 2020). Another study directly linked negative parenting behavior (e.g., punishment) to the risk of academic burnout in children (Luo et al., 2016). As parental acceptance-rejection indicated, neglect and aggression increase children's risk for problematic behaviors and academic burnout (Rohner, 2004). Accordingly, this study attempt to examine the mediating role of parental harsh discipline between parental burnout and adolescents' academic burnout.

1.3. The role of psychological distress

Academic burnout is influenced not only by family factors but also by individual factors (Ling et al., 2014). According to the intergenerational integration model of depression (Goodman and Gotlib, 1999), caregivers who are depressed as a result of parental burnout might create stressful living environments through their negative cognition, emotions, and behaviors, which cause children to internalizing problematic behavior. The empirical studies have also shown that parental burnout harmed children's mental health (Yang et al., 2021). However, different from mental health, psychological distress is characterized as an unpleasant emotional state that individuals experience when they respond to the demands that cause psychological disorders (Ridner, 2004). Although existing evidence has supported the link between parental burnout and mental health, it was indefinite whether similar relations existed between parental burnout and psychological distress. Clarifying their connections is beneficial to enrich the knowledge about the influence of parental burnout on children's psychological situations.

Prior studies have investigated the association between psychological distress and academic burnout but reached the opposite conclusion. Smith and Emerson (2021) have indicated that academic burnout and its dimensions had effects on psychological distress, whereas other scholars thought that negative emotions worsened academic burnout (Salmela-Aro et al., 2009; Zhang et al., 2022). Existing research, however, has primarily focused on college students, and this relationship among junior high school students was not well explored. The theory of resource conservation holds that individual resources are limited (Ford, 2007). If an individual must spend resources on psychological adjustment, the resources available for learning will be limited, contributing to higher academic burnout. We tend to regard psychological distress as an antecedent of academic burnout. According to the theory of the mediation effect proposed by Baron and Kenny (1986), psychological distress is likely to play mediating role in the relationship between parental burnout and

academic burnout. Therefore, examining the mediating role of psychological distress is also our aim.

1.4. The relations between parental harsh discipline and psychological distress

Since both parental harsh discipline and psychological distress might mediate the relationship between parental burnout and academic burnout, is there any link between these two mediators? Although no direct evidence existed to support the association between parental harsh discipline and the psychological distress of children, it has been confirmed in related concepts. As the emotional security proposition argues, parental harsh discipline might weaken individual emotional security, leading to anxiety, anger, and other feelings in children (Cummings and Davies, 1996). A prior study has shown that parental harsh discipline drastically increased the risk of internalizing problematic problems (e.g., depression and anxiety; Wang et al., 2016). Therefore, we speculate that parental harsh discipline is positively related to children's psychological distress, and that the two variables play chain-mediating effects in the relations between parental burnout and academic burnout.

1.5. Gender differences in the mediating mechanism

Previous studies have found that parental harsh discipline and children's internalizing and externalizing problematic behavior may vary based on gender (Chang et al., 2003; Liu et al., 2022). According to the social role theory, society has distinct expectations on different genders, which are what make up gender roles (Eagly et al., 2000). The expectations and cognitions of parents' gender roles could affect children's perception and interpretation of their behaviors. Therefore, the same behavior may have a very degree of effect on children due to gender differences. Father's harsh discipline has a stronger effect on boys' aggressive behavior than it does on girls, whereas a mother's harsh discipline does not affect both boys and girls (Chang et al., 2003). Relevant research also showed gender consistency in the relationship between parental harsh discipline and children's anxiety (Deater-Deckard and Dodge, 1997). Based on these evidences, this study aims to investigate whether there are gender differences in this sequential mediation model of parental burnout and adolescents' academic burnout. The research results are helpful to increase the knowledge of gender differences in the relationship between parental burnout and children's development.

1.6. The present study

To make up for the deficiency in the literature, the present study aims to examine the relationship between parental burnout and adolescents' academic burnout, as well as the mediating roles of harsh discipline, adolescents' psychological distress, and the moderating role of gender. To solve this problem, we conducted a questionnaire survey on adolescents and their parents and provided evidence for this study from a multi-subject perspective. Based on relevant theories and previous empirical studies, we proposed the following hypotheses. (1) Parental burnout is positively related to children's academic burnout. (2) Parental harsh discipline mediates the relations between parental burnout and academic burnout. (3) Children's psychological distress also plays a mediating role in the association between parental burnout and academic burnout. (4) Parental harsh discipline and psychological distress play chain-mediating roles between parental burnout and academic burnout. (5) The mediating mechanism has gender differences and the mediation effect is more significant in mothers than in fathers. The detailed theoretical model was shown in Figure 1.

2. Method

2.1. Participants and procedures

We conducted this study in the Shandong Province of China during the first week of May 2022. Since offline questionnaires were unavailable during the COVID-19 pandemic, and web surveys had a similar effect to offline surveys (Huang, 2006), we carried out this investigation through a web survey tool named Wenjuanxing. Considering the difference in lockdown time, we just recruited students of Grade 7 and Grade 8 to participate in this survey. Those students and their primary caregivers (only father or mother) who voluntarily participated, were included in this study. Yet, students and their parents who suffered or were suffering psychological, neurological, or major physiological diseases were excluded. This study was approved by the ethics committee of the first author's institution. Informed content was obtained from all persons, only those who clicked on the agree option could answer the latter questionnaires. All persons were free to withdraw from this survey at any time and without any reward or punishment.

The survey was divided into two parts: a questionnaire for parents and a questionnaire for students. The parent questionnaire was mainly used to collect demographic characteristics of parents and family-related information, parental burnout, and parental harsh discipline. The student questionnaire contained more detailed information, including demographic characteristics of students, academic burnout, and psychological distress. A total of 1,015 students and 1,030 parents completed the questionnaire. After matching the questionnaires of students and their parents using the students' ID numbers, 871 students and parents whose responses were valid and finally included in this study. The boys and girls were 477 (53.8%) and 394 (45.2%),

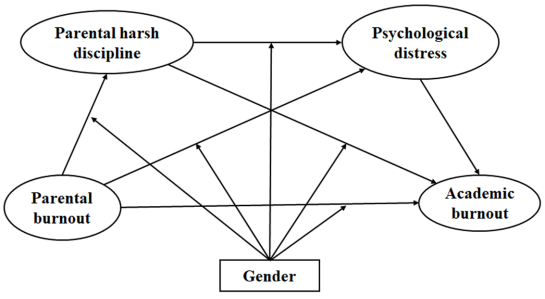

FIGURE 1
The theoretical model.

respectively. Their ages ranged from 11 to 16 years with a mean age of 13.75 (0.74) years old. More than half of the students came from Grade 8, which accounted for 61.2%. Among the valid parents' questionnaires, the proportion of mothers and fathers was 73.8% (643/871) and 26.2% (228/871). The average age of parents was 39.14 (3.08) years old. All the persons were Han Chinese and native Chinese speakers. Of 595 families (68.3%) had two children.

2.2. Measurements

2.2.1. Parental burnout

Parental Burnout Assessment (PBA), developed by Roskam et al. (2018) and translated by Cheng et al. (2020), was used to measure parental burnout. It contains 23 items and consists of four subscales: exhaustion in parental role, contrast in parental self, feelings of being fed up and emotional distancing. Items were responded on a 7-point Likert scale ranging from 1 (i.e., never) to 7 (i.e., everyday). A higher score indicates stronger feelings of parental burnout parents perceived. In the current study, the scale was completed by parents. The Cronbach alpha of the total scale was 0.96.

2.2.2. Parental harsh discipline

Parental harsh discipline was measured using the Parent–child Conflict Tactics Scales (CTSPC), which was compiled by Straus et al. (1998). This scale was widely used to measure parental corporal punishment among adolescents and demonstrated to have high validity and reliability (Wang and Liu, 2018). In the current study, we only used the subscales of psychological aggression and corporal punishment to measure the frequency of harsh discipline by parents in the past half-year. The scale uses a 7-point scoring standard that ranges from 0 to 6, indicating the frequency of harsh discipline. According to the instruction of CTSPC Straus and colleagues provided, we calculated frequency based on the median number of times parents scored on each item (Straus et al., 1998). The higher they scored, the more psychological aggression or corporal punishment their parents imposed on their children. The Cronbach alpha of this scale in the present study was 0.89.

2.2.3. Psychological distress

Kessler 10 was used to estimate the psychological distress of students in junior high school. This scale was developed by Kessler et al. (2002) and translated into Chinese by Huang et al. (2009). It is one of the most widely used self-rated measuring tools. It contains 10 items and the response was rated on a 5-point Likert scale. Persons were asked to rate their psychological condition in past 4 weeks. The total score ranged from 10 to 50, and a higher score indicated more frequent psychological distress. The Cronbach alpha of the scale in this study was 0.95.

2.2.4. Academic burnout

Academic burnout was assessed by the Academic Burnout Scale constructed by Wu et al. (2007) based on Maslach Burnout Inventory. It was a self-rated scale used to measure the academic burnout of adolescents. This scale contains 16 items with three subscales, namely, physical and psychological exhaustion, academic alienation and low sense of accomplishment. Six items were reversely scored and needed to be transformed. The responses were rated on a 5-point scale, with 1 and 5. A higher score represents severer academic burnout. In the current study, the Cronbach alpha of the scale in this study was 0.88.

2.3. Data analysis

The data for this study was collected online, and persons were not allowed to skip any questions when answering. Therefore, no data was missing. SPSS 23.0 and AMOS 23.0 software were employed to perform all analyzes. After checking for normality, we log-transformed parental burnout and parental harsh discipline. We still used the original data to clearly present the initial scores of variables but used the transformed data in the other analyzes. The correlations between every two variables were primarily described using correlation analysis. We used the Structural Equation Model (SEM) to further analyze the link between parental burnout, parental harsh discipline, psychological distress and academic burnout. According to the suggestion of Rogers and Schmitt (2004), we adopted item parceling strategies for the unidimensional variable (psychological distress) to control the inflated measurement error. In this process, we first conducted a factor analysis to rank the items according to the value of loadings. After that, arrange items in turn from high to low and vice versa. This method balanced the loading and variance of each package to the greatest extent. The average scores of each package were used as observational variables of psychological distress. Multiple group structural equation model was also used to compare the mediation model in different genders of primary caregivers. The model fit could be considered good if $\chi^2/df < 3$, RMSEA < 0.05, SRMR < 0.05, GFI > 0.90, CFI > 0.90, and NFI > 0.90. We performed the bias-corrected bootstrap to examine the mediating effect based on 5,000 samples. A p value lower than 0.05, confidence intervals did not include zero, or critical ratios for differences between parameters higher than 1.96 were considered significant.

3. Results

3.1. Preliminary analyzes

We first conducted correlation analysis to get a preliminary understanding of the relationship between variables. As expected, all variables were positively correlated, detailed information could be found in Table 1.

TABLE 1 Bivariate correlations (N=871).

Variables	M	SD	PB	PHD	PD	AB
Parental burnout (PB)	45.70	24.73	1			
Parental harsh discipline (PHD)	19.87	30.18	0.55**	1		
Psychological distress (PD)	18.55	7.89	0.35**	0.29**	1	
Academic burnout (AB)	38.21	9.48	0.39**	0.33**	0.59**	1

M, mean; SD, standard deviation; **$p < 0.01$.

3.2. Mediation models

To examine the first four research hypotheses, namely the direct and indirect relationship between parental burnout and children's academic burnout, we have established several structural equation models. When examining the direct relationship between parental burnout and academic burnout, the model fit showed acceptable (χ^2/df = 2.724, RMSEA = 0.045, SRMR = 0.020, GFI = 0.991, CFI = 0.996, NFI = 0.993). Then we constructed a multiple mediation model to deeply analyze the indirect relationships. The results showed that all indicators of model fit were good (χ^2/df = 2.663, RMSEA = 0.044, SRMR = 0.020, GFI = 0.978, CFI = 0.991, NFI = 0.985). Parental burnout was found to be a significant independent variable in academic burnout ($\beta = 0.16$, $p < 0.001$). It also had a positive effect on parental harsh discipline ($\beta = 0.61$, $p < 0.001$) and psychological distress ($\beta = 0.26$, $p < 0.001$), both of which were mediators in the current model. Psychological distress was positively related to academic burnout ($\beta = 0.58$, $p < 0.001$). However, the other mediator, parental harsh discipline, was not significantly associated with academic burnout ($\beta = 0.07$, $p = 0.15$). Additionally, parental harsh discipline was linked to a higher risk of psychological distress ($\beta = 0.19$, $p < 0.001$).

As shown in Figure 2, three indirect paths were found in the model: (1) parental burnout → parental harsh discipline → academic burnout; (2) parental burnout → psychological distress → academic burnout; (3) parental burnout → parental harsh discipline → psychological distress → academic burnout. Relevant results are displayed in Table 2. For the first path, the indirect effect of parental burnout on academic burnout through parental harsh discipline was not significant ($p = 0.171$). For the second path, parental burnout was positively related to academic burnout through the mediating role of psychological distress ($p < 0.001$), and this path coefficient was higher than the other two indirect paths. The last chain-mediating path was also significant ($p = 0.001$), parental burnout had a positive effect on parental harsh discipline and psychological distress, which in turn contributed to academic burnout. In conclusion, parental burnout has a significant indirect effect on academic burnout. Under the given situation, its direct effect also had significance. Parental harsh discipline and psychological distress partially mediated the effect of parental burnout on academic burnout, accounting for 61.2% of the total effect.

3.3. Multiple group path analysis

We constructed a multiple group structural equation model to examine the fifth hypothesis, namely comparing multiple mediation models in different genders of primary caregivers. Table 3 presents the standardized path coefficients in different groups, as well as critical ratios for parameter differences. The critical ratio for parameter differences between mother and father on the path from parental burnout to adolescents' psychological distress was 2.29, which was higher than 1.96. Thus, these path coefficients varied significantly between different genders of primary caregivers. Specifically, the path coefficient from parental burnout to psychological distress in mother-cared students ($\beta = 0.19$, $p < 0.001$) was lower than father-cared students ($\beta = 0.47$, $p < 0.001$).

4. Discussion

Family-related factors have a significant impact on adolescents' academic burnout. However, little is known about the influential mechanism of parental burnout on children's academic burnout. To fill in this gap, we constructed structural equation model and first examined these relationships. We found that parental burnout had a direct relationship with academic burnout as well as an indirect relationship through the mediating role of psychological distress, and the chain-mediating roles of parental harsh discipline and psychological distress. Furthermore, fathers' parental burnout had a stronger effect on children's psychological distress than mothers.

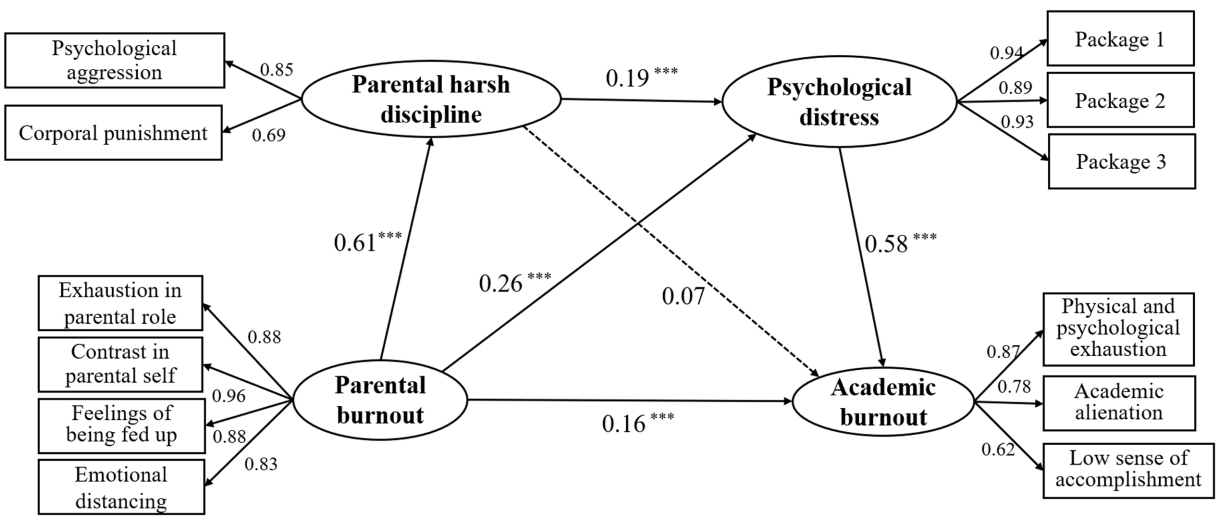

FIGURE 2
The multiple mediation model. All path coefficients were standardized. *p<0.05, **p<0.01, ***p<0.001.

TABLE 2 Indirect effects of parental burnout on academic burnout.

Indirect path	Effect value	*P*	Boot LLCI	Boot ULCI
Path 1: PB → PHD → AB	0.040	0.171	−0.017	0.099
Path 2: PB → PD → AB	0.150	<0.001	0.094	0.210
Path 3: PB → PHD → PD → AB	0.067	0.001	0.029	0.107
Total indirect effect	0.257	<0.001	0.188	0.328

PB = Parental burnout; PHD = Parental harsh discipline; PD = Psychological distress; AB = Academic burnout; LLCI = Lower limit confidence interval; ULCI = Upper limit confidence interval.

TABLE 3 Standardized path coefficients in different gender of primary caregivers.

Path	Primary caregiver (mother/father)		
	β	C.R.	C.R. for Differences between Parameters
PB to PHD	0.58/0.70	11.10***/8.29***	0.66
PB to AB	0.24/0.03	4.15***/0.29	−1.58
PB to PD	0.19/0.47	3.72***/4.67***	2.29
PHD to AB	0.09/−0.07	1.81/−0.66	−1.32
PHD to PD	0.59/0.56	11.82***/6.66***	0.25
PD to AB	0.15/0.26	3.25**/2.55*	1.03

C.R. = Critical Ratios; PB = Parental burnout; PHD = Parental harsh discipline; PD = Psychological distress; AB = Academic burnout; *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

4.1. Relations between parental burnout and academic burnout

This study found a positive relationship between parental burnout and academic burnout, which indicated that parenting emotion is a factor in adolescents' academic burnout. This finding was consistent with a prior study that regarded parental burnout as a mediator and found that parental burnout mediated the relationship between parents' education anxiety and children's academic burnout (Wu et al., 2022). Other relevant research also revealed that a favorable upbringing was conducive to obtaining emotional warmth and support from their parents, and that as a result, they were capable of coping with academic stress and showed less academic burnout (He et al., 2017). The results enriched the social learning theory (Bandura, 1977), and extended it to the field of burnout. Therefore, improving parents' feelings about parenting and letting parents play an exemplary role are crucial to intervene in children's academic burnout, especially during the COVID-19 lockdown.

4.2. The mediating role of parental harsh discipline

Contrary to the hypothesis, although parental burnout was linked to harsh discipline, parental harsh discipline failed to be associated with academic burnout. That is to say, the mediating path did not reach a significant level in the latter half. This result differed from previous studies which have found either positive or negative relations between parental harsh discipline and academic burnout (Gershoff et al., 2010; Chu and Xie, 2023). Several reasons can be used to explain this finding. First, parental harsh discipline may have an indirect effect on academic burnout. Previous studies have found that individual factors had a great influence on academic burnout (Yang and Cheng, 2005; Ling et al., 2014), and harsh discipline affected children's academic burnout through psychological capital and self-control (He et al., 2017). Second, the inconsistency of the findings resulted from cultural differences. Previous study in the eastern country has found that parental harsh discipline was beneficial for adolescents' academic achievements (Chu and Xie, 2023). Although the influence of parental harsh discipline on adolescents' academic burnout is not significant in this study, we still found that mothers' and fathers' harsh discipline had opposite effects on academic burnout. Specifically, the father's harsh discipline is beneficial for children's academics, while the mother's harsh discipline is the opposite. It can explain this result to some extent. Third, this study was carried out during the COVID-19 lockdown, the influence of harsh discipline on children's academic burnout may be offset by other environmental factors or their psychological distress. However, it is worth mentioning that deep and detailed research into their relationship should be carried out.

4.3. The mediating role of psychological distress

Aligned with the hypothesis, the mediating model demonstrated that parental burnout had an effect on academic burnout through psychological distress. On the one hand, parental burnout increased children's psychological distress, which confirmed finding in previous research (Yang et al., 2021). Firstly, burned-out parents provided less social support, and their children were prone to psychological distress (Yang et al., 2021). Burned-out parents were more likely to lose their patience with their children, try to avoid their parenting responsibilities, and gradually ignore their children's physiological and emotional requirements (Roskam et al., 2017). Secondly, this finding supported the intergenerational integration model of depression (Goodman and Gotlib, 1999). Parental burnout worsened parents'

mental health, generating depressive symptoms and hence psychological distress in their children. On the other hand, as an antecedent variable, psychological distress had an effect on academic burnout, which supported the loss spiral effect of the resource conservation model (Ford, 2007). Psychological distress represents the loss of psychological resources, which puts individuals in a state of stress. This situation resulted in the deficiency of resources and a "chain reaction" of resource loss, which further led to academic burnout. The previous study has also indicated that positive emotions promoted academic engagement and ultimately led to academic success (Durlak et al., 2011). In other words, psychological stress impeded academic engagement and eventually led to academic burnout. The results increased knowledge for understanding the relationship between parental burnout and academic burnout from the perspective of individual psychological distress.

4.4. The multiple mediating roles of parental harsh discipline and psychological distress

The present study also discovered that harsh discipline and psychological distress played chain-mediating roles between parental harsh discipline and academic burnout, which was in line with hypothesis four. Parental burnout was associated with harsh discipline and children's psychological distress, and then linked to academic burnout. The result suggested that although parental harsh discipline cannot mediate the relationship between parental burnout and academic burnout, it can increase psychological distress, and then leads to academic burnout. The effect of parental harsh discipline on children's psychological distress supported the emotional security hypothesis (Cummings and Davies, 1996). This result can also be explained by the parental acceptance-rejection theory (Rohner, 2004), which suggests that children might misinterpret their parents' harsh discipline as rejection and thus resulting in psychological distress. This finding was in line with a prior study that showed positive correlations between harsh discipline and psychological distress (Wang et al., 2016). The findings provided a new perspective for the explanation and intervention of academic burnout from the perspective of parental harsh discipline and adolescents' psychological distress.

4.5. Primary caregiver gender differences in the mediating mechanism

Although this study found that the influence of parental burnout on children's psychological distress differed by caregiver gender, the specific finding is inconsistent with the hypothesis. In comparison to mothers, fathers' parental burnout had a stronger effect on children's psychological distress. This result was close to that of a study conducted in French-and English-speaking countries. They discovered that gender moderated the relationship between parental burnout, avoidance of ideas, neglect, and violent behavior toward children (Roskam and Mikolajczak, 2020). The results may be attributed to parenting styles parents adopted after encountering parental burnout. Fathers adopted a more neglectful parenting style, while mothers used severe harsh discipline (Roskam and Mikolajczak, 2020). Parents who employ a neglectful parenting style are constantly disregarding basic demands in children's development, resulting in their basic psychological demands not being satisfied (Kantor et al., 2004), which brought psychological distress to adolescents (Arslan, 2017). In other words, neglect has a stronger negative effect on children's mental health than harsh discipline, and this phenomenon is more obvious in Chinese culture. Thus, we should attach importance to the neglectful parenting style toward children. Along with increased father involvement in parenting, we are concerned not only about the effect of mothers' parental burnout on children, but also the influence of fathers' parental burnout.

4.6. Implications

This study has both theoretical and practical implications. Theoretically, this study focused on the negative impact of the emerging hot topic of parental burnout and determined the relationship between parental burnout and adolescents' academic burnout. This study integrated social learning theory, intergenerational integration model of depression and resource conservation model, and constructed a model of "parenting emotion–parenting behavior–psychology–academic burnout" to explain how parental burnout increased adolescents' academic burnout. This provided a new theoretical basis for promoting adolescents' growth and development. In addition, it also showed that the influence of gender should not be ignored when explaining the influence of parental burnout. Practically, this study provided a new perspective for preventing and intervening in academic burnout in adolescents, and had important practical significance. We should be fully aware of the important role of parental burnout in reducing adolescents' academic burnout and its negative impact on themselves and their children. In addition, adolescents trying to reduce psychological distress can also effectively prevent the negative impact of parental burnout on adolescents' academic burnout.

4.7. Limitations and future directions

Several limitations should be mentioned in this study. First, the present study was carried out just during the COVID-19 lockdown. As a result, it's impossible to say "whether the intensity of this relationship after COVID-19 differed from that during the COVID-19 lockdown." Second, this study was a cross-sectional study, which cannot directly infer causality. According to family system theory, not only parental burnout affects adolescents' academic burnout, but children's academic burnout influences parental burnout. Thus, to clarify the causality, longitudinal research is needed in the future. Third, concerning gender differences in the effect of parental burnout, we just analyzed the effect of the father or mother's parental burnout on children. Nevertheless, collecting mothers' and fathers' parental burnout, respectively, could provide more persuasive results on gender differences.

5. Conclusion

In conclusion, parental burnout had a direct relationship with academic burnout as well as an indirect relationship through the

mediating role of psychological distress, and the chain-mediating roles of parental harsh discipline and psychological distress. Furthermore, fathers' parental burnout had a stronger effect on children's psychological distress than mothers. These results add to our understanding of how parental burnout relates to children's academic burnout and underline the importance of fathers' parental burnout. Parental burnout is an emerging hot topic worldwide, and this kind of work will help us have a more comprehensive understanding on the influence of parental burnout.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by the ethics committee of Linyi University. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Author contributions

HZ conceived of the study, participated in its design, performed the statistical analysis and drafted the manuscript. SL participated in its design and interpretation of the data and helped to revise the manuscript. RW participated in the interpretation of the data and coordination and collected the data. QH conceived of the study, participated in the design and coordination and collected the data. All authors read and approved the final manuscript.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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The influence of parental awareness of the "Chinese double reduction" policy on junior high school students' extracurricular physical exercise

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Objective: In this study, we aimed to explore the relationship between parental cognitive awareness (criticality, disruption and novelty cognition) of DBR, educational anxiety, and attitudes toward students' physical exercise and students' extracurricular physical exercise so as to construct and verify a conditional process model.

Methods: We adopted a stratified random cluster sampling approach and conducted a nationwide questionnaire survey with 2,700 junior high school students and their parents across 9 provinces, municipalities and autonomous regions.

Results: Parents generally had a certain degree of cognitive awareness of DBR. Criticality cognition and disruption cognition had a significant positive impact on junior high school students' extracurricular physical exercise (β=0.24, p<0.01; β=0.04, p<0.05), but the effect of novelty cognition was not significant (β=−0.04, p=0.06). Parents' educational anxiety played a significant mediating role in parents' cognition of DBR and students' extracurricular physical exercise (criticality cognition: β=0.10, 95% CI: 0.03–0.06; disruption cognition: β=0.37, 95% CI: 0.31–0.42). Parents' attitude toward students' exercise also played a significant positive moderating effect in the mediation model (criticality cognition: β=0.014, 95% CI: 0.002–0.031; disruption cognition: β=0.010, 95% CI: 0.007–0.013).

Conclusion: Parents' novelty, disruption, and criticality cognition of DBR have different effects on parents' education anxiety and students' extracurricular physical exercise, in which parental educational anxiety mediates the influence of DBR cognition on students' extracurricular physical exercise, while attitudes toward students' extracurricular physical exercise positively moderates the mediating effect.

KEYWORDS

double reduction, educational anxiety, exercise attitude, physical exercise, parent

1. Introduction

On July 24, 2021, the Chinese government issued a statement on "the opinions on further reducing academic burden of students in compulsory education and the burden of off-campus training," hereinafter referred to as DBR, which aims to promote the all-round development and healthy growth of students (Ma and Zheng, 2022). DBR is intended to

provide more time and energy for students to participate in extracurricular physical exercise. Researchers in the field of sports have concluded that students' extracurricular physical activities will provide new opportunities for rapid development (Chai et al., 2022). Historically, the problems of students' academic burden have been long-standing and a series of "burden reduction" policies have been introduced in the history of education in New China (Li and Zhao, 2022). However, despite the promulgation and implementation of these policies, the academic burden of primary and secondary school students persists. Moreover, the problem of low level of extracurricular physical activities has become increasingly serious. It is therefore important to evaluate the concrete effects of DBR in the first year of its inception. The purpose of this study was to analyze the effects of DBR on the extracurricular physical exercise of junior high school students after it was enacted, and to explore the role of parents' educational anxiety and their attitudes toward their children's participation in extracurricular physical exercise.

2. Literature review and research hypothesis

2.1. Evaluations of parental cognition of DBR and junior high school students' extracurricular physical exercise based on policy performance

Performance evaluation of government public policies is currently a much-discussed topic in the area of administrative research, and is vital for improving the effectiveness of public policies (He et al., 2021). The impact of such policies is often evaluated based on expected targets and empirical data (Zhao et al., 2021), and is carried out both prior to and following the end of policy implementation activities. It further focuses on the assessment and improvement of possible effects from the perspective of policy objectives. Due to complex dynamics of society, government public policies often empirically demonstrate the response effects of policy implementation from a systemic point view of. If the implementation of DBR is considered as an event in the social system, then the event system theory can be used to test a series of impacts of the policy (Morgeson et al., 2015). Event system theory claims that the attributes of time, space, and intensity of events require special attention to explain the effect of events on individuals (Zhang and Yan, 2018).

Since this study concerned the practical impact of DBR on middle school students over the past year, variables such as time (policy timing, policy duration) and space (policy origin, diffusion range, diffusion distance) are relatively steady in the cross-sectional survey of individual event responses, and so can be reflected separately by the intensity of the event (Cheng and Yin, 2021). The intensity of the event comprises the three dimensions of novelty, disruption, and criticality to measure the effect of the policy (Morgeson and Derue, 2006). *Novelty* reflects the degree to which the policy differs from current or past policies, and represents a new and unexpected phenomenon or event. *Disruption* reflects the extent to which policy changes organizations or individuals. *Criticality* reflects the significance of a policy to an organization or individual and the priority level of response. In summary, this study mainly measures the intensity of events from individual cognitions of the novelty, disruption, and criticality of DBR in order to explore the impact of the policy on junior high school students' extracurricular physical exercise.

Extracurricular physical activities have been shown to enrich students' out-of-class life, strengthen physique, enhance personality, and promote mental health (Lou and Yan, 2020; Yan et al., 2020; Li and Kwok, 2021), it is an important content to reflect the effect of DBR (Pei et al., 2022). Moreover, DBR is directed at the compulsory education stage, where students are relatively young and parents' perceptions are crucial to the effectiveness of the policy (Zhao and Fan, 2022). Therefore, this study focuses on parental cognition of the policy as the primary independent variable of the model. As mentioned above, DBR provides a new opportunity to improve the extracurricular physical activity for junior high school students. Combining with the event system theory, this study proposes the following hypotheses:

> *H1a*: Parental scores on novelty cognition of DBR have a significant positive effect on students' participation in extracurricular physical exercise.
>
> *H1b*: Parental scores on disruption cognition of DBR have a significant positive effect on students' participation in extracurricular physical exercise.
>
> *H1c*: Parental scores on criticality cognition of DBR have a significant positive effect on students' participation in extracurricular physical exercise.

2.2. The mediating role of parents' educational anxiety

DBR aims to both ease the burden on students and promote healthy development, as well as reduce the burden and pressure on parents. According to a survey conducted by the Central Committee of the Communist Youth League, the educational anxiety of students' parents in compulsory education has been alleviated after the implementation of DBR (CNTV, 2021). Moreover, event system theory suggests that when events occur, individuals will have cognitive and emotional reactions to them. Parents' educational anxiety is not only a widespread negative emotion among members of society, but also has a profound influence on adolescents' learning, life, and health, marking it as an important phenomenon for Chinese parents (Jin, 2015). Relevant studies have also shown that parents' educational anxiety is detrimental to their children's extracurricular physical exercise (Wei, 2021). Based on this, we further propose the following hypotheses:

> *H2a*: Parental scores on novelty cognition of DBR have a significant negative influence on parents' educational anxiety.
>
> *H2b*: Parental scores on disruption cognition of DBR have a significant negative influence on parents' educational anxiety.
>
> *H2c*: Parental scores on criticality cognition of DBR have a significant negative influence on parents' educational anxiety.

> *H2d*: Parental scores on educational anxiety have significant negative influence on students' extracurricular physical exercise.

In addition, parental scores on cognition of the event intensity of DBR (novelty cognition, disruption cognition and criticality cognition) affect junior high school students' extracurricular physical activity, which may be achieved through the intermediary of parents' educational anxiety. Thus, we predict that parental awareness of the event intensity of DBR possibly reduces parents' educational anxiety. Subsequently, the reduction of parents' educational anxiety may increase the extracurricular physical activity level of junior high school students. We further propose that:

> *H3a*: Parents' educational anxiety plays a mediating role between parents' novelty cognition of DBR and junior high school students' extracurricular physical exercise.
>
> *H3b*: Parents' educational anxiety plays a mediating role between parents' disruption cognition of DBR and junior high school students' extracurricular physical exercise.
>
> *H3c*: Parents' educational anxiety plays a mediating role between parents' criticality cognition of DBR and junior high school students' extracurricular physical exercise.

2.3. The moderating role of parents' attitudes toward their children's participation in physical exercise

Teenagers in their formative years find that their behaviors are easily influenced by others. As the most important influencers of junior high school students, parents exert a subtle effect on their extracurricular physical activities (Milliken, 2021; Niu and Wang, 2021). There is a positive correlation among parents' attitudes toward their children's sports participation and sports behaviors (Anderson et al., 2009; Chen et al., 2021). Parents' positive attitudes toward their children's participation in extracurricular physical activity has the ability to amplify the impact of reduced parents' educational anxiety on middle-school students' extracurricular physical activity. In contrast, if the level of parents' attitudes is low, the relief of parents' educational anxiety may not bring students a higher level of extracurricular physical exercise. Consequently, we hypothesize that:

> *H4a*: Parents' attitudes toward their children's participation in extracurricular physical exercise can significantly and positively affect junior high school students' extracurricular physical exercise.
>
> *H4b*: Parents' attitudes toward their children's participation in extracurricular physical exercise play a moderating role between parents' educational anxiety and junior high school students' extracurricular physical exercise.

A full hypothetical model depicting these predictions is shown in Figure 1.

Based on the above schematic, we explore the effects and pathways of parents' policy cognition scores on junior high school students' extracurricular physical exercise in the context of DBR. In addition, we investigate the role of parents' educational anxiety in parents' cognition intensity of DBR (novelty cognition, disruption cognition, and criticality cognition) and the effect of this anxiety on middle school students' extracurricular physical activity, in addition to the moderating role of parents' attitudes toward their children's participation in extracurricular physical exercise.

3. Research methods

3.1. Research objects

We adopted the method of stratified random cluster sampling to comprehensively consider the three major economic belts in the east, middle, and west of China. We selected three low-grade cities: in the east: Nantong, Jiangsu Province, Lishui, Zhejiang Province, and Fuxin, Liaoning Province; in the middle: Taiyuan, Shanxi Province, Puyang, Henan Province, and Xiangxi Tujia and Miao Autonomous Prefecture, Hunan Province; in the west: Chongqing, Yibin, Sichuan Province, and Yili, Xinjiang Uygur Autonomous Region. From March to April 2022, local teachers were instructed to distribute 100 paper questionnaires in each grade of 9 junior middle schools, 2,700 of which were distributed and 2,679 were recovered, including 2,420 valid questionnaires (recovery rate = 89.6%). The valid data included 1,190 male students and 1,230 female students with a basically balanced sex ratio. Of these, 826 students were in Grade 7, 913 students were in Grade 8, and 681 students were in Grade 9 (grade distribution: $X^2 = 3.74$, $p = 0.15$).

3.2. Measuring tools

3.2.1. Parents' cognition of DBR

We administered the Chinese version of the Event Intensity Cognition Scale revised in combination with DBR (Liu and Liu, 2017). There are 11 items in total, including 4 reverse scoring items, using the Likert 7-point scoring method, in which 1 represents "completely disagree" and 7 represents "completely agree." Higher scores indicate higher parental cognition of DBR. Four of the items reflect novelty cognition, three items reflect criticality cognition, and the final four items reflect disruption cognition of DBR. The dimensions show high reliability (McDonald $\omega = 0.911$, 0.911, and 0.912, respectively). Confirmatory factor analysis ($X^2/df = 4.924 < 5$, RMSEA = 0.041 < 0.08, NFI = 0.982 > 0.9, IFI = 0.985 > 0.9, TLI = 0.980 > 0.9, CFI = 0.985 > 0.9) further confirm high structural validity.

3.2.2. Parents' educational anxiety

We used the Parents' Education Anxiety Questionnaire (Han, 2018) containing 21 items in total on a Likert 5-point scale. Higher scores indicate higher parental anxiety about their children's education, and the scale includes dimensions of anxiety about children's learning attitudes, school choice, future development, academic achievements, and anxiety about parent–child learning interaction. The dimensions show high reliability (Cronbach's $\alpha = 0.785$, 0.782, 0.809, 0.811 and 0.849 respectively), and confirmatory factor analyses ($X^2/df = 4.410 < 5$, RMSEA = 0.038 < 0.08,

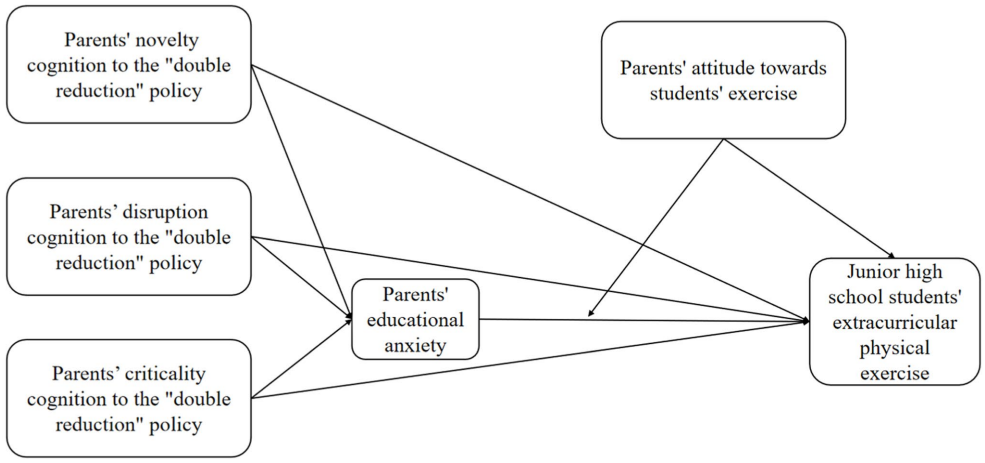

FIGURE 1
Hypothetical model of parents' cognition of DBR impact on junior high school students' extracurricular physical exercise.

NFI = 0.974 > 0.9, IFI = 0.980 > 0.9, TLI = 0.975 > 0.9, CFI = 0.980 > 0.9) indicate good structural validity.

3.2.3. Parents' attitude toward their children's participation in extracurricular physical exercises

We used the Parental Sports Attitude Scale revised in combination with the factor of extracurricular physical exercise (Bao and Teng, 2001). The Likert scale includes 9 total items, and higher scores indicate more positive parental attitudes toward students' extracurricular physical exercise. The dimensions show high reliability (Cronbach's $\alpha = 0.921$), and good structural validity ($X^2/df = 4.097 < 5$, RMSEA = 0.036 < 0.08, NFI = 0.992 > 0.9, IFI = 0.994 > 0.9, TLI = 0.992 > 0.9, CFI = 0.994 > 0.9).

3.2.4. Extracurricular physical exercise for junior high school students

We final used the Physical Activity Rating Scale revised in combination with the dimension of "extracurricular physical exercise" (Liang, 1994). The scale includes 3 total items combining frequency of weekly extracurricular exercise, duration of each extracurricular exercise, and the intensity of ordinary extracurricular exercise; the total score of was the product of the three. The answer to each item is divided into five grades, with a scoring range of frequency and intensity of 1–5, a scoring range of time of 0–4, and the total score range of 0–100. Exercise intensity dimension: "1" representing "Slight intensity," "5" representing "Continuous high intensity." Exercise frequency dimension: "1" representing "Once a month," "5" representing "Once a day." Each duration dimension: "0" representing "Less than 10 min," "4" representing "More than 60 min." Higher scores indicate higher levels of students' extracurricular physical exercise. The internal consistency coefficient of the scale was Cronbach's $\alpha = 0.907$.

TABLE 1 Basic information of extracurricular physical exercise of junior high school students.

PARS	*N*	%
Frequency		
Once a month	120	5
2–3 times a month	934	39
1–2 times a week	753	31
3–5 times a week	517	21
Once a day	96	4
Intensity		
Slight intensity	321	13
Minimum intensity	414	17
Medium intensity	939	39
High intensity	480	20
Continuous high intensity	266	11
Duration		
Less than 10 min	527	22
11–20 min	706	29
21–30 min	768	32
31–59 min	266	11
More than 60 min	153	6

3.3. Common method biases test

Data were collected using the self-report method. In order to detect the possibility of common method bias, we used the Harman single factor test prior to data analysis in which all variables were analyzed using non-rotated principal component analysis. The results showed that the variance explained by the first factor was 22.86%, less than the critical value of 40%. Therefore, there is no significant evidence for common method bias in the data.

3.4. Data analysis

SPSS25.0 was used for descriptive statistics and correlation analysis of variables (see Tables 1, 2), and linear regression analysis

was used for main effect test (see Table 3). Process 4.0 plug-in is used to analyze the mediation effect and regulatory effect. Model 4 was used to test the mediating effect of parents' educational anxiety (see Table 4), and model 59 was used to test the moderating effect of parents' attitudes (see Table 5). The bootstrap method based on 2,000 resample was used to examine the significance of the direct and indirect effects.

4. Results

4.1. Descriptive statistics and correlation analysis

The descriptive statistics (Table 1) show that most junior high school students have participated in extracurricular physical exercise. Parents' cognition of DBR scores are shown in Table 2.

The correlations between PARS and the various cognition variables are shown in Table 2.

4.2. Main effects test

We found that novelty cognition scores had no significant impact on students' extracurricular physical exercise ($\beta = -0.04$, $SE = 0.02$, $p = 0.06$), in contrast to *H1a*. We also did not find evidence for the effect of novelty cognition on parents' educational anxiety ($\beta = 0.01$, $SE = 0.05$, $p = 0.36$). However, disruption cognition did have a significant positive effect on students' extracurricular physical exercise ($\beta = 0.24$, $SE = 0.03$, $p < 0.01$), consistent with our prediction *H1b*. We also found evidence in favor of the remaining hypotheses: criticality cognition had a significant positive effect on students' extracurricular physical exercise ($\beta = 0.04$, $SE = 0.03$, $p < 0.05$); disruption cognition had a significant negative effect on parents' educational anxiety ($\beta = -0.30$, $SE = 0.05$, $p < 0.01$), and criticality cognition had a significant negative impact on parents' educational anxiety ($\beta = -0.18$, $SE = 0.06$, $p < 0.01$). Furthermore, parents' educational anxiety showed a significant negative effect on students' extracurricular physical exercise ($\beta = -0.07$, $SE = 0.01$, $p < 0.05$). Parents' attitudes toward their children's participation in physical exercise had a positive but nonsignificant impact on junior high school students' extracurricular physical exercise ($\beta = 0.03$, $SE = 0.01$, $p = 0.14$; Table 3).

4.3. Mediating and moderating effects testing

The mediating effects of the test results are shown in Table 4. When novelty cognition is entered as the independent variable, there is a negative total effect on students' extracurricular physical exercise ($\beta = -0.12$, 95%CI = [−0.17, −0.06]) in which the negative direct effect is significant ($\beta = -0.10$, 95%CI = [−0.16, −0.04]), but not the indirect effect ($\beta = -0.02$, 95%CI = [−0.03, 0.01]), thus not supporting our *H3a* prediction. When considering disruption cognition as the independent variable, the total effect on students'

TABLE 2 Descriptive statistics and correlation analysis results of cognition variables.

	Variables	M	SD	1	2	3	4	5	6	7	8
1	Gender	-	-	1							
2	Stage	-	-	−0.003	1						
3	Novelty cognition	2.870	1.167	−0.020	−0.011	1					
4	Criticality cognition	3.136	1.248	0.037	−0.018	−0.084**	1				
5	Disruption cognition	3.262	1.236	−0.025	−0.065*	−0.150**	0.295**	1			
6	Educational anxiety	2.910	0.721	−0.011	0.054**	0.077**	−0.265**	−0.356**	1		
7	Parents' attitude	2.886	0.960	0.021	−0.011	−0.127**	0.066**	0.232**	−0.063**	1	
8	PARS	8.670	6.859	0.010	0.040	−0.080**	0.53**	0.265**	−0.150**	0.092**	1

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

TABLE 3 Main effects hypothesis test.

Variables	Parents' educational anxiety			PARS		
	β	*SE*	*p*	*β*	*SE*	*p*
Novelty cognition	0.01	0.05	0.36	−0.04	0.02	0.06
Disruption cognition	−0.30**	0.05	0.00	0.24**	0.03	0.00
Criticality cognition	−0.18**	0.06	0.00	0.04*	0.03	0.04
Educational anxiety				−0.07**	0.01	0.01
Parents' attitude				0.03	0.01	0.14
R^2	0.16					
F	147.80					

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

extracurricular physical exercise is significant ($\beta = 0.37$, 95%CI = [0.31, 0.42]), and both the direct ($\beta = 0.33$, 95%CI = [0.28, 0.39]) and indirect effects ($\beta = 0.03$, 95%CI = [0.01, 0.06]) are significant, suggesting that parental educational anxiety plays a partial mediation role. Finally, using criticality cognition as the independent variable results in a total significant effect on students' extracurricular physical exercise ($\beta = 0.10$, 95%CI = [0.03, 0.06]), while the direct effect is not significant ($\beta = 0.02$, 95%CI = [−0.05, 0.10]), but the indirect effect is ($\beta = 0.07$, 95%CI = [0.05, 0.09]). These results suggest that parental educational anxiety plays a full mediating role, supporting prediction *H3c*.

The interaction between parents' educational anxiety and attitudes toward their children's participation in extracurricular physical exercise shows a significant positive effect on junior high school students' participation in extracurricular physical exercise ($\beta = 0.007$, $SE = 0.001$, $p < 0.01$). Figure 2 shows the results of a simple slops test depicting the differences between "high" and "low" groupings (designated as one standard deviation above and below the mean, respectively). The results show that the effect of parental educational anxiety on students' extracurricular physical exercise is stronger under the condition of high parental exercise attitude and weaker in conditions of low parental exercise attitudes.

We further tested the mediating and moderating role of parents' attitude toward their children's participation in extracurricular physical exercise (Table 5). The results show that parental educational anxiety is a significant mediated moderating variable in all aspects of cognition.

TABLE 4 Bootstrap test results of mediation effects.

Effect type	β	SE	LLCI	ULCI
Independent variables: Novelty cognition				
Total effect	−0.12	0.03	−0.17	−0.06
Direct effects	−0.10	0.03	−0.16	−0.04
Indirect effects	−0.02	0.01	−0.03	0.01
Independent variables: Disruptive cognition				
Total effect	0.37	0.03	0.31	0.42
Direct effects	0.33	0.03	0.28	0.39
Indirect effects	0.03	0.01	0.01	0.06
Independent variables: Critical cognition				
Total effect	0.10	0.04	0.02	0.17
Direct effects	0.03	0.04	−0.05	0.10
Indirect effects	0.07	0.01	0.05	0.09

5. Discussion

5.1. Parents' policy cognition, educational anxiety, and junior high school students' extracurricular physical exercise in the context of DBR

Our results show that parents of junior high school students are generally aware of the promulgation and the impact of DBR (cognitive intensity mean range: 2.870–3.262). However, the frequency of extracurricular physical activity among junior high school students has remained steady, as shown by the low percentage of those who never participate in extracurricular physical activity and the high percentage of those who participate three times a week or more, differing slightly different from the results of studies prior to the outbreak of COVID-19 (Yan et al., 2020). The reason for this may be that the enactment of DBR has had a greater impact on society, schools, families, and individuals, and that teachers, parents, and junior high school students are all increasingly aware of the importance of healthy development and need for extracurricular physical activity. This is consistent with social-ecological theory models (Lee and Park, 2021), in which the policy layer at the top of the model can influence extracurricular physical activity of society, schools, interpersonal, and individual junior high school students at the macro level. Given the effectiveness of encouraging and promoting youth physical activity through policy adjustments, the investigation of DBR in this study becomes especially relevant and crucial.

The educational anxiety levels of parents in different dimensions vary in scale with respect to each other. For example, parental anxiety about parent–child interactions is seemingly less significant than anxiety about adolescents' academic performance, which is in turn less important than anxiety about adolescents' learning attitudes, future development, and adolescents' choice of school for higher education. This is consistent with findings obtained prior to DBR (Han, 2018), in which parent–child interaction anxiety was lowest, but is not consistent with Han's findings about anxiety about children's learning attitudes. This may be because under DBR, parents are increasingly aware of the importance of the healthy growth of adolescents in junior high school and their anxiety about their children's studies has been alleviated. However, at the present stage in China, entry into high school is selected and classified according to the results of the secondary school entrance examination; therefore, anxiety about school selection remains a critical component of parental educational anxiety. Our findings show that the enactment of DBR may have had an impact on alleviating parental anxiety and promoting extracurricular physical activity in adolescents.

TABLE 5 Mediated moderating effects of parents' educational anxiety.

Paths	β	SE	LLCI	ULCI
Moderator variables: Parents' attitudes toward their children's exercise				
Novelty cognition → parental educational anxiety → extracurricular physical exercise	0.006	0.001	−0.004	0.009
Disruption cognition → parental educational anxiety → extracurricular physical exercise	0.010	0.001	0.007	0.013
Criticality cognitive → parental educational anxiety → extracurricular physical exercise	0.014	0.008	0.002	0.031

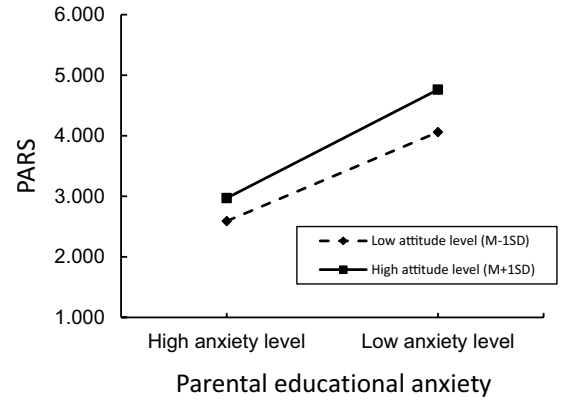

FIGURE 2
The moderating effect of parents on children's exercise attitudes.

5.2. Effects of parents' cognition of DBR on junior high school students' extracurricular physical activity

First, we explored the effects of the three dimensions of parents' cognition of DBR (novelty cognition, disruption cognition, and criticality cognition) on junior high school students' extracurricular physical activity. The results showed that parents' novelty cognition of DBR did not have a significant effect on junior high school students' extracurricular physical activity, while disruption and critical cognition had a significant positive effect on extracurricular physical activity. Since junior high school students are mainly only children or two-child families, parents may not have comparative experience with the implementation of the previous reduction policy, leading to decreased relevance and awareness of the novelty cognition aspect of DBR. Moreover, the novelty aspect may not directly affect students' physical activity outside of class. It is also possible that novelty may create a degree of uncertainty for parents who may be hesitant to allow students to participate in extracurricular physical activity because the consequences may be unclear.

The significance of criticality cognition may be due to the fact that parents' awareness of reducing the burden on students and promoting the healthy development of their children is currently a priority in the education field and may consequently facilitate the reduction of extracurricular classes and homework time and increase the amount of healthy extracurricular physical activity. Furthermore, if parents recognize that DBR is critical to their children's future success, they may also be less likely to promote more extracurricular physical activity by reducing the need for quick fixes. Finally, the disruption cognition results may be a result of parents believing that the implementation of DBR will disrupt the current status quo in family education and require changes to previously established educational practices to promote behaviors (e.g., extracurricular physical activity) that are beneficial to their children's physical and mental health. Although there is little empirical research to support the idea that students' extracurricular physical activity will increase after DBR, some studies (Wang et al., 2022; Zhang et al., 2022) argue that DBR should bring opportunities to increase students' extracurricular physical activity, which is consistent with the findings we obtained here.

5.3. Mediating and moderating effects of parents' educational anxiety and attitudes toward their Children's exercise

Parents' novelty cognition of DBR had a positive effect on parents' educational anxiety but did not reach statistical significance, suggesting that the relationship between novelty cognition and anxiety may be more complex than initially thought. We hypothesized that parents' perception of the novelty of DBR would reduce parents' educational anxiety, but the results did not support this hypothesis. This may be because if parents perceive the policy as a novelty, they may develop new anxieties due to their lack of understanding of the new policy, thereby presenting a more complex situation. Studies on parents' educational anxiety in China also suggest that parents' uncertainty in the educational process and educational outcomes can induce educational anxiety, which can manifest itself in complex emotional states such as tension, anxiety, apprehension, and annoyance (Chen and Xiao, 2014). In contrast, parents' disruption and criticality cognition scores negatively influenced educational anxiety. Therefore, if parents are aware of the importance of DBR in the current educational system, they may experience lower educational anxiety, which comes with a fuller comprehension of the policy.

We further found that parents' educational anxiety negatively affects students' extracurricular physical activity, consistent with prior research (Song and Feng, 2021). Chinese parents' educational anxiety is obvious and even called "severe anxiety disorder." Parents always want their children to be better than other children, so the phenomenon of over-education is serious, and children's learning burden is becoming heavier and heavier, without following the laws of education and the physical and mental development characteristics of adolescent. Only by reducing this anxiety can they untie their children and let them participate in activities that are beneficial to their healthy growth and development.

Parents' educational anxiety plays a partially mediating role in the process of parents' disruption cognition of DBR on students' extracurricular physical exercise, and plays a completely mediating role in the impact of criticality cognition on students' extracurricular physical exercise. This can further explain the mechanism and characteristics of the effect of DBR on the extracurricular physical activity of junior high school students. The implementation of DBR may have alleviated parents' educational anxiety and relieved students from the burden of subject tutoring or homework, which in turn facilitated more extracurricular physical activity.

Parents' attitudes toward their children's participation in extracurricular physical activity under DBR did not significantly affect junior high school students' extracurricular physical activity, perhaps due to the fact that parents received information about DBR that required additional cognitive processing. If parents only know that DBR has been implemented but do not recognize the criticality and disruptive nature of its content, this would not effectively reduce their anxiety nor promote extracurricular physical activity among their children. The moderating effects obtained in this study further reinforces the view that parents' attitudes toward their children's participation in extracurricular physical activity can positively moderate the effect of educational anxiety on students' extracurricular physical activity. In other words, students' extracurricular physical activity is more likely to occur under the dual effect of reduced parents' educational anxiety and positive parental attitudes toward their participation in extracurricular physical activity. Moreover, the role of parental educational anxiety alleviation in

promoting junior high school students' extracurricular physical activity was strongest under conditions of high levels of parental attitudes and weaker under conditions of low levels of attitudes.

6. Conclusion

We demonstrated that parents' cognitive awareness of the novelty, disruption and criticality dimensions of DBR have differing effects on their education anxiety and their children's participation in extracurricular physical exercise. Moreover, we found that parents' educational anxiety mediates the influence of these DBR cognition aspects on students' extracurricular physical exercise, while parental attitudes toward students' extracurricular physical exercise positively regulates the mediating effect. In the future, it is expected to further promote the extracurricular physical exercise of Chinese junior high school students by reducing parents' educational anxiety and cultivating parents' attitudes towards their children's exercise.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Ethics Committee of Nantong University. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Author contributions

PL and HL: study concept and design and critical revision of the manuscript for important intellectual content. JC and YS: analysis and interpretation of data and statistical analysis. PL, JC, YS, and HL: drafting of the manuscript and study supervision. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Developing and validating a multidimensional Chinese Parental Psychological Control Scale

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Introduction: This study validated a Chinese Parental Psychological Control Scale (CPPCS) among secondary school students in mainland China.

Methods: The item pool consisting of 65 items was constructed based on consultation with existing measures and focus group interviews of 19 Chinese adolescents. After content validation conducted by 14 experts, a total of 40 items were retained and subject to further factorial validation based on a sample of 963 Chinese adolescents (mean age = 13.39 ± 0.72; 52.23% females).

Results: Using the two random-split half samples, exploratory and confirmatory factor analyses retained 30 items that loaded on three factors, including "relational induction" (twelve items), "harsh psychological control" (twelve items), and "social comparison shame" (six items). The three-factor structure was invariant across gender (male versus female) and grades (grade 7 versus grade 8) among the whole sample. Cronbach's αs of the three dimensions in maternal and paternal subscales ranged between 0.89 and 0.92, suggesting adequate internal consistency. The three dimensions were significantly correlated with each other, supporting the scale's convergent validity. The concurrent validity of the CPPCS was supported by the positive correlations between subscales and parental rejection, and the negative correlations between subscales and parental warmth. In addition, while the "harsh psychological control" and "social comparison shame" negatively predicted adolescents' well-being, "relational induction" positively predicted adolescents' well-being.

Discussion: The findings suggest that the CPPCS is a promising instrument for measuring multidimensional psychological control among Chinese parents and for investigating and comparing individual dimensions' effect on adolescents' development.

KEYWORDS

psychological control, Chinese contexts, scale validation, multidimensions, invariance test

1. Introduction

Unfavorable adolescent developmental outcomes, including poor well-being (e.g., low life satisfaction) and growing ill-being (e.g., depression), particularly exacerbated by COVID-19, have become a worrying social issue in Chinese and other societies. Understanding what factors may contribute to or act against this trend and in what ways is of great concern to parents, scholars, youth workers, and policymakers. As parents are the primary socialization agents, parenting remains one of the focuses of inquiry.

Among different parenting strategies, parental psychological control has been the subject of heated discussion. In contrast to parental behavioral control which exerts due parental authority and regulations over children's activities and behaviors and is often associated with favorable child developmental outcomes, psychological control refers to a type of dysfunctional parental control that represents parental undue authority over children's thoughts and feelings through multiple intrusive and manipulative tactics (Barber and Harmon, 2002; Barber et al., 2005). These tactics include "invalidating children's feelings" (discounting children's feelings and thoughts), "constraining verbal expression" (preventing or interrupting children's expression), "personal attack" (attacking children's self-worth and identity), shaming and guilty induction (evoking children's feelings of guilty or ashamed), and love withdrawal (threatening the loss or actual loss of parental love or attention) (Barber and Harmon, 2002; Barber et al., 2005). Characterized by these tactics, psychological control has been conceptualized as manipulation and coercion, intrusion into the personal domain, and disrespect of individuality (Barber et al., 2012).

Parental psychological control negatively affects children's development because it violates their psychological world and sense of self; it also makes children feel pressured, inferior, and alienated, thwarting their basic psychological needs (Soenens and Vansteenkiste, 2010). In Western samples, parental psychological control is generally associated with the child's unfavorable developmental outcomes indicated by low well-being and high ill-being (see Scharf and Goldner, 2018 for a review). Yet, the findings in Chinese settings are equivocal despite that parental psychological control, especially in shame and guilt induction forms, is commonly practiced by Chinese parents. While some studies reported similar negative impacts of parental psychological control (Shek, 2006; Yao et al., 2022), some others failed to do so (Shek and Zhu, 2019; Zhu and Shek, 2020). In some cross-cultural studies, psychological control hindered children's healthy functioning across cultures including in China (Barber et al., 2005; Wang et al., 2007). Other cross-cultural studies identified negative impacts of parental psychological control only in Western contexts, but not in Asian ones (Olsen et al., 2002; Rudy and Halgunseth, 2005). A recent meta-analysis claimed that culture (Western vs. Eastern) did not moderate the effects of psychological control on child problem behaviors (Yan et al., 2020), but this is based on only two Chinese studies.

One possible explanation for the above-mentioned mixed findings is that some forms of parental psychological control may be universally harmful, while others may function differently in Chinese contexts. While Western cultures value independence, autonomy, and individuality as essential building blocks of self-construal and healthy child development, Chinese culture generally prioritizes harmonious inter-relationships and interdependence in the family. It is noted that Chinese parents tend to feel obligated to manage their children's lives, such as ensuring their academic excellence, social, emotional, and behavioral adjustment, and helping them "fit in" and be a part of society (Cheung and Pomerantz, 2011). As such, some forms (e.g., guilt induction) may be practiced to realize prevailing socialization priorities in Chinese contexts, which have been argued to be well-intended rather than out of rejection and hostility, and thus less detrimental (Scharf and Goldner, 2018; Ng and Wang, 2019). For example, the feeling of guilt is regarded as one important element in morality and an indicator of filial piety in Chinese cultures, which helps achieve interpersonal obligations (Chen et al., 2016). However, most existing Chinese studies failed to capture the various dimensions of parental psychological control and explore their distinctive effects.

First, the investigations of parental psychological control in most Chinese studies were based on Western frameworks, with many (e.g., Barber et al., 2005; Shek, 2006; Yu et al., 2021) assessing psychological control through a translated or updated "Psychological Control Scale" (PCS; Barber, 1996), which included eight items on *constraining verbal expression*, *invalidation*, *love withdrawal*, and *personal attack*. Such investigations may be appropriate in Western contexts, but they exclude shaming and guilt induction, which are commonly used by Chinese parents. Hence, parental psychological control has not been defined and measured to its conceptual fullness. Second, despite an initial emphasis on its multifaceted nature, parental psychological control has often been empirically reduced to a unidimensional structure because of the narrow scope and the limited number of items of global measures. Although some studies assessed psychological control multidimensionally (Wang et al., 2007; Yao et al., 2022), they selected only three to four relevant forms while excluding others and treated each form as an individual dimension without exploring the co-grouping of different forms. For example, the frequently used scale developed by Wang et al. (2007) tapped three dimensions: guilt induction, love withdrawal, and authority assertion. Furthermore, the selected dimensions were usually used to construct a global parental psychological control index, assuming similar functions for all dimensions. This may be problematic, as different dimensions may have distinct effects. For example, guilt induction was contrasted with love withdrawal regarding its implications among Chinese adolescents (Yu et al., 2019).

Based on the above, a well-grounded and validated multidimensional construction of parental psychological control is essential for resolving the current controversy and identifying its detrimental and more permissible dimensions in Chinese contexts. Fung and Lau (2012) differentiated "harsh psychological control" from "relational induction" in Chinese contexts. The former (e.g., constraining verbal expression, invalidation, and personal attack) denotes parental hostility and rejection toward children and is likely to be universally detrimental. The latter (e.g., guilt induction, shaming, and love withdrawal) may be less harmful in Chinese settings since it reflects parental attempts to ensure that children meet societal norms by enhancing their understanding of what others think of them. In line with this theoretical expectation, harsh psychological control was more strongly linked to parental rejection than relational induction among Chinese parents (Fung and Lau, 2012).

Fung and Lau's (2012) framework provided a conceptual basis for understanding the unique dimensionality of parental psychological control in Chinese contexts. However, the authors did not empirically explore how different forms of psychological control are grouped into the two dimensions. Instead, they preassigned selected items to each dimension, which is threefold problematic. First, it may not have captured the conceptual fullness of the dimensions, resulting in unexpectedly insignificant effects of harsh psychological control. Specifically, harsh psychological control was defined mainly based on the "Psychological Control Scale" mentioned earlier but excluded other hostile forms, such as disregarding or depreciating children's

thoughts (e.g., "the child's thoughts are naive"), which Chinese adolescents perceived as dismissive (Sze, 2016).

Second, love withdrawal was grouped with shaming and guilt induction under "relational induction," since they might facilitate children's reflection on and correction of misbehavior (Fung and Lau, 2012). This pre-assignment is open to question. Shaming and guilt induction are thought to be socialization strategies employed by Chinese parents to instill social sensitivity and responsibility in children (Fung, 1999). Love withdrawal is theoretically more aversive and harmful because it centers on the threat of the loss of parental love, which reflects conditional parental acceptance and potential rejection (Yu et al., 2015). Empirically, while guilt and shame induction did not show negative impacts (Fang et al., 2022) and even exerted positive influences (Yu et al., 2019), love withdrawal consistently showed negative effects on Chinese adolescents' development (Cheah et al., 2019; Yu et al., 2019). Thus, love withdrawal is arguably different from relational induction (Fang et al., 2022).

Third, there is a need to distinguish between "shared shame" and "social comparison shame." While the former (e.g., "the child's behavior makes parents lose face") focuses on the influence of children's misdeeds on parental or familial reputation, the latter (e.g., "the child is not as good as another kid") reflects parental disappointment by comparing the child unfavorably to others. Shared shame may be more benign in Chinese contexts as it is used to foster children's identification with salient moral and social norms, such as reciprocity and interdependent familial relations (Yu et al., 2019). In contrast, social comparison shame, which compares children's shortcomings to those of others, may imply parental disrespect and rejection (Smetana et al., 2021). It is likely to convey essentially the same core message as harsh psychological control (i.e., the child is not good), thus hurting the child similarly.

Based on the above elaborations, there is a need to develop and validate an indigenous Chinese multidimensional parental psychological control scale that sufficiently covers all essential forms of parents' psychological control. Thus, this study aimed to first construct an instrument to measure parental psychological control to its conceptual fullness and then validate the scale and examine its psychometric properties among Chinese adolescents. We expected adequate reliability (e.g., internal consistency) of subscales taping different dimensions of parental psychological control, which indicates that the included items measure a homogenous construct. For validity, we first examined the factorial validity through both exploratory and confirmatory factor analyses (EFA and CFA) as well as invariances tests to confirm the grouping of items under different dimensions. In addition, we examined the new instrument's convergent validity by checking the correlations among individual dimensions and its concurrent validity as the correlations between dimensions and other parental factors (parental rejection and warmth). We also performed a preliminary investigation of differentiated prediction effects of individual dimensions of parental psychological control on adolescents' developmental outcomes. Based on the aforementioned elaborations, individual dimensions were expected to be positively correlated with each other, positively correlated with parental rejection, and negatively correlated with parental warmth. In addition, some dimensions (e.g., those in hostile forms) would show stronger negative predictions on adolescents' developmental outcomes than relatively well-intended dimensions (e.g., those related to shared shame).

2. Methods

2.1. Construction of item pool

To construct an item pool with full coverage of essential forms of parental psychological control, the research team consulted the existing measures on parental psychological control (e.g., Shek, 2006; Wang et al., 2007; Sze, 2016; Yu et al., 2019; Zhu and Shek, 2020; Fang et al., 2022) and Chinese adolescents' experiences. First, a list of 60 Chinese items pertinent to domineering control, invalidation, ignoring, personal attack, constraining verbal expression, guilt induction, shared shame, love withdrawal, and social comparison shame were derived from prior studies. Second, based on the recommendations from Mallinckrodt et al. (2016) on improving item quality in scale development, the research team conducted three focus group interviews involving 19 Chinese secondary school students (10 females, mean age = 12.05, SD = 1.35). Barber et al. (2012) remarked that "one of the most fundamental measurement limitations of the construct of psychological control to date; namely that youth – the recipients of the control – have not systematically been consulted when defining items to be used to measure it" (p. 276). As adolescents are the ones who experience and are influenced by parental psychological control, taking into account how they define and perceive parental psychological control can help get more informative and accurate items.

During the focus group interviews, the first author explained definitions of parental psychological control and its different forms and presented the list of the 60 items in Chinese to the participants, who subsequently, shared their interpretations of the items and understandings of different manifestations of parental psychological control they had experienced or observed. The participants' responses were carefully reviewed by the research team and used to enrich the item pool and modify certain wordings for easy and accurate comprehension among adolescent participants. As a result, ten items were modified for better understanding and five additional items were created for a more complete pool. Thus, the final item pool of 65 items was subject to further content validation.

Specifically, 14 researchers in Psychology or Education evaluated each item regarding their representativeness, relevance, and clarity and provided suggestions on item modification if deemed necessary. Items rated as unrepresentative, irrelevant, or unclear by any researcher were subject to further review and refinement by the research team. Consequently, five items were revised for better clarity, five items were discarded as they were not sufficiently relevant to or representative of parental psychological control, and another twenty items were also removed because their meanings were repetitive or similar to other items. The retained and revised 40 items were distributed to the researchers again and all the researchers rated that the items were clear, relevant, and representative. Thus, these 40 items formed the Chinese Parental Psychological Control Scale (CPPCS), which was subject to further factorial validation. Among the 40 items, 35 were derived from prior studies and five were newly produced in this study. All items were translated into English following standard translation and back-translation procedures (Brislin, 1980).

2.2. Participants and procedures

To further validate the 40-item CPPCS and investigate its psychometric properties, 963 adolescents in grades 7 and 8 (junior

secondary one and two) were recruited from four secondary schools in four cities, respectively, in Mainland China. The four participating junior secondary schools were invited using a convenience sampling strategy. Then, the responsible teacher in each school further invited a few classes in grades 7 and 8 to participate in the study (grades 9 students were not invited because they were busy engaged in preparing for high school entrance examination). The mean age of the participants was 13.39 (SD = 0.72). Among the participants, 460 (47.77%) were male adolescents and the other 503 (52.23%) were female adolescents. The participants were invited to complete a questionnaire in their classrooms, including CPPCS and other measures in a paper-and-pencil format. The schools, parents, and adolescents provided written consent for adolescents' participation. Ethical approval (HSEARS20220427002) was obtained from Institutional Review Board in the first author's university.

2.3. Measures

The questionnaire included multiple measures, covering CPPCS and additional measures. For the additional measures, parental warmth and rejection were measured to investigate the concurrent validity of the CPPCS. Three indicators of child developmental outcomes (self-esteem, life satisfaction, and depression) were also measured to primarily test potential differentiated predictions of individual dimensions in the CPPCS.

Chinese Parental Psychological Control Scale (CPPCS) employed a five-point Likert Scale ("1 = never"; "5 = always") for the 40 items to assess parents' psychological control perceived by adolescents. The participants rated maternal and paternal psychological control separately.

Parental Warmth and *Parental Rejection* were measured by the Chinese short form of the Egna Minnen Beträffande Uppfostran (s-EMBU), which has been validated and widely used among Chinese children and adolescents (Guo et al., 2021). Subscales of warmth (6 items, e.g., "My parents praised me") and rejection (7 items, e.g., "My parents were sour or angry with me without letting me know the cause") were utilized in this study. Paternal and maternal warmth as well as paternal and maternal rejection were assessed separately. A five-point rating scale (1 = "strongly disagree" to 5 = "strongly agree") was used. CFA showed that the two-factor structure of parental warmth and rejection fitted the data adequately in the current study (maternal: $\chi^2_{(64)} = 163.629$, CFI = 0.98, TLI = 0.97, RMSEA = 0.04, SRMR = 0.04; paternal: $\chi^2_{(64)} = 164.52$, CFI = 0.97, TLI = 0.97, RMSEA = 0.04, SRMR = 0.04). The internal consistency of the warmth subscales ($\alpha_{\text{father}} = 0.85/\omega_{\text{father}} = 0.86$; $\alpha_{\text{mother}} = 0.86/\omega_{\text{mother}} = 0.86$) and rejection subscales ($\alpha_{\text{father}} = 0.83/\omega_{\text{father}} = 0.83$; $\alpha_{\text{mother/}} = 0.82/\omega_{\text{mother}} = 0.83$) was adequate in this study.

Self-esteem was measured by the Chinese version of the Rosenberg Self-Esteem Scale (RSES). The original RSES consisted of 10 items with five reverse keyed. Previous studies among Chinese samples suggested the adoption of the five positively worded items (e.g., "I am able to do things as well as most other kids" and "I feel that I'm as good as other kids") for better reliability (e.g., Sze, 2016). Following the recommendation, the present study used the five positively worded items. The participants indicated the extent to which they agreed with each statement on a four-point scale (1 = "strongly disagree" to 4 = "strongly agree"). A higher mean score across the items indicated greater global self-esteem. In the present study, the one-factor structure of the five items fitted the data adequately: $\chi^2_{(5)} = 7.86$, CFI = 0.99, TLI = 0.99, RMSEA = 0.03, SRMR = 0.01. The Cronbach's alpha and McDonald's omega values for the self-esteem scale were both 0.88 in the present study.

Life Satisfaction was measured by the 5-item Chinese "Satisfaction with Life Scale" in terms of participants' subjective appraisal of their overall quality of life (e.g., "The conditions of my life are excellent" and "I am satisfied with my life"). The scale has been widely adopted in prior studies involving Chinese adolescents (e.g., Zhu and Shek, 2020; Zhou et al., 2021). A 6-point rating scale was used (1 = "strongly disagree" to 6 = "strongly agree"). In the present study, the one-factor structure of the scale fitted the data adequately: $\chi^2_{(5)} = 16.30$, CFI = 0.99, TLI = 0.98, RMSEA = 0.06, SRMR = 0.02. The Cronbach's alpha and McDonald's omega values of the scale in this study were both 0.80.

Depression was assessed by the Chinese version of the 10-item "Center for Epidemiological Studies-Depression" scale (CESD-10), a simplified form of the original 20-item CES-D. The CESD-10 has shown adequate reliability and validity for Chinese adolescents (e.g., Wang et al., 2021). The respondents indicated the frequency they displayed for each symptom described in the 10 items, including two reverse-keyed items, during the past week on a four-point scale (0 = "rarely or less than 1 day" to 3 = "most or all of the time or 5–7 days"). A higher total score across the items indicated a higher level of depression. In the present study, the CESD-10 showed a one-factor structure that fitted data adequately: $\chi^2_{(35)} = 165.31$, CFI = 0.95, TLI = 0.94, RMSEA = 0.07, SRMR = 0.03. The scale also demonstrated adequate internal consistency (α and $\omega = 0.83$).

2.4. Data analysis

As we used a five-point reporting scale for CPPCS, the assumption of continuity for using maximum likelihood (ML) estimation can be met (Flora and Curran, 2004; Lubke and Muthén, 2004). Before examining the factorial validity of the CPPCS, we checked the skewness and kurtosis of participants' responses on all 40 items. The absolute values of skewness (0.19–1.94) and kurtosis (0.01–4.24) met the requirements of normality (i.e., below 2 and 7, respectively). As a result, ML estimation can be correctly used in EFA and CFA (Finney and DiStefano, 2006). While EFA was performed using SPSS Version 26.0 (IBM Corp., Somers, NY, USA), CFA was performed using Mplus 8.5. As only 16–28 (1.66–2.91%) of the participants had variable-level missing values in CPPCS, the missing data were handled by mean imputation in EFA and "full information maximum likelihood estimation" incorporated in Mplus which enables the full usage of all available data in analyses (Cham et al., 2017).

First, EFA was performed based on the first random-split half sample (i.e., subsample A, $n = 481$) to explore factor structure and remove problematic items having serious double loadings or having factor loadings below 0.40 (Costello and Osborne, 2005). As different dimensions of psychological control are expected to be correlated with each other, we utilized Principal Axis Factoring with Promax Rotation.

Second, CFA was performed based on the second half sample (i.e., subsample B, $n = 482$) to further test the factor structure resultant from EFA in comparison to a unidimensional model where all retained items were loaded on a single factor. Following previous practices in

scale validation research (Shek and Ma, 2010; Zhu et al., 2021), the difference in "Bayesian information criterion" (BIC) was used for deciding which model fitted the data better with 10 points smaller in BIC indicating 150:1 likelihood ($p < 0.05$) of preference (Schermelleh-Engel et al., 2003). Indices and criteria reflecting adequate model fit adopted in the present study included "Comparative Fit Index (CFI)," "Tucker-Lewis Index (TLI)," "Root Mean Square Error of Approximation (RMSEA)," and "Standardized Root Mean Square Residual (SRMR)" (CFI and TLI ≥ 0.90; RMSEA and SRMR ≤ 0.08).

Third, using the full sample ($N = 963$), invariance across gender and grade, respectively, for the confirmed factor structure was tested sequentially, including configural (free estimation), metric (equality constraints on factor loadings), and scalar (additional equality constraints on item intercepts) invariances (Svetina et al., 2020). As recommended by literature (Cheung and Rensvold, 2002; Meade et al., 2008), differences in CFI and RMSEA between two nested models and the related criteria (i.e., $\Delta CFI < 0.01$ and $\Delta RMSEA < 0.015$) were used to determine factorial invariance. Inter-correlations among the factors were investigated to examine the scale's convergent validity. A good convergent validity was also indicated by "average variance extracted" (AVE) ≥ 0.50, which means that at least 50% of the variance in the observed items is explained by the latent factors rather than residuals (Fornell and Larcker, 1981). Concurrent validity was also examined by checking correlations between the latent psychological control dimensions and the other two parental factors. Indicators of scale reliability included "composite reliability" (CR ≥ 0.70, Fornell and Larcker, 1981), Cronbach's α, McDonald's ω, and mean inter-item correlations. Finally, structural equation modeling was used to separately test the predictions of maternal and paternal psychological control dimensions on the three indicators of adolescents' developmental outcomes.

3. Results

3.1. EFA

The KMO values (0.959 and 0.963 for maternal and paternal subscales, respectively) and Bartlett's Test of Sphericity ($ps < 0.001$) suggested that the scale was highly factorable. The results of EFA and scree plot for the paternal subscale supported the extraction of three factors with initial eigenvalues above 1.0. For both subscales, the same ten items meeting the exclusion criteria mentioned earlier (seriously double-loaded or factor loadings <0.40) were removed, resulting in 30 items in the refined scale. Results after rotation are shown in Table 1.

The three factors explained a total of 51.92 and 53.93% of the variance in maternal and paternal subscales, respectively. Based on the item content, the three factors were labeled as "relational induction" which consisted of 12 items on guilt induction and shared shame, "harsh psychological control" which included 12 items on invalidation, constraining verbal expression, personal attack, love withdrawal, and domineering control, and "social comparison shame" which included six items on negative comparisons to others. Although most of the items originally on domineering control and love withdrawal loaded on the factor of "harsh psychological control," there were two exceptions. Specifically, one item (i.e., My parents tell me that what they want me to do is the best for me so I need to follow their demands) originally assigned to domineering control, and another item (i.e., My parents say that they will love me more if I perform better) originally assigned to love withdrawal loaded on the factor of "relational induction." The findings suggest that these two items also imply the interrelationship between parents and children.

3.2. CFA and invariance tests

As shown in Table 2, the three-dimensional structure resultant from EFA fit the data adequately (CFI = 0.91, TLI = 0.91, RMSEA = 0.06, SRMR = 0.04, for both maternal and paternal subscales). In comparison, the unidimensional model for both subscales showed inadequate model fitness with CFI and TLI values ranging between 0.82 and 0.84. Furthermore, the BIC values of the three-factor structure were much lower than that of the unidimensional model (maternal: $\Delta BIC = 519.30$; paternal: $\Delta BIC = 620.98$). In addition, the average factor loadings for "relational induction" (maternal = 0.73; paternal = 0.74), "harsh psychological control" (maternal = 0.75; paternal = 0.77), and "social comparison shame" (maternal = 0.81; paternal = 0.82) were above 0.70. As a result, the three-factor structure was retained and used for further invariance tests.

According to the results of invariance tests shown in Table 3, the three-factor structure demonstrated adequate fitness to data among male and female adolescents for both maternal and paternal subscales. In invariance tests across gender groups, differences in CFI and RMSEA between all pairs of nested models in sequential invariance tests were below 0.01 and 0.015 respectively, implying scalar (or strong) invariance (i.e., equal factor loadings and item intercepts) across gender groups regarding the three-factor structure of maternal and paternal CPPCS. The scalar invariance model showed acceptable fitness indices (maternal: $\chi^2_{(854)} = 2217.48$, CFI = 0.90, TLI = 0.90, RMSEA = 0.06, SRMR = 0.05; paternal: $\chi^2_{(854)} = 2136.90$, CFI = 0.91, TLI = 0.91, RMSEA = 0.06, SRMR = 0.05). Similar findings were observed for invariance tests across grade in both maternal and paternal subscales (see Table 3). Thus, the invariance across gender and grade was established.

3.3. Validity, reliability, and predictions

Table 4 summarizes the psychometric properties of each dimension in the CPPCS, correlations among them in maternal and paternal subscales, and the correlations between subscales and other parental factors. The results suggested that all dimensions possessed good internal consistency characterized by moderate mean inter-item correlation (0.41–0.65) and high Cronbach's α, composite reliability (CR), and McDonald's ω values (0.89–0.92). In addition, the AVEs of three dimensions were above 0.50 and the three dimensions were highly correlated with each other ($rs = 0.70$–0.73, $ps < 0.001$), supporting the scale's convergent validity.

As shown in Table 4, maternal/paternal psychological control dimensions were positively correlated with maternal/paternal rejection. For both subscales, the harsh psychological dimension showed the highest correlation (maternal: $r = 0.86$, $p < 0.001$; paternal: $r = 0.85$, $p < 0.001$) with rejection than the other two dimensions. Meanwhile, the three dimensions of both maternal and paternal subscales were negatively correlated with maternal

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TABLE 1 Factor loadings for retained items in the CPPCS after Promax Rotation (subsample A; n=481).

Items	Maternal				Paternal			
	RI	HPC	SCS	Com.	RI	HPC	SCS	Com.
1. When I do not do things their way, my parents say that I make them unhappy	**0.74**	0.09	−0.09	0.56	**0.72**	0.13	−0.09	0.56
2. My parents expect me to be grateful and that I should not disappoint them	**0.73**	−0.05	0.06	0.55	**0.75**	−0.05	0.09	0.60
3. When I do not meet my parents' expectations, they say that their sacrifice does not worthy	**0.72**	−0.03	0.02	0.51	**0.69**	0.04	−0.04	0.52
4. My parents say that if I really care for them, I would not do things that cause them to worry	**0.70**	−0.11	−0.08	0.35	**0.66**	−0.07	−0.06	0.36
5. My parents tell me all the things they have done for me	**0.66**	−0.11	0.17	0.62	**0.56**	−0.09	0.25	0.61
6. My parents tell me that they sacrifice much for me	**0.64**	−0.07	0.12	0.61	**0.56**	−0.03	0.19	0.59
7. My parents tell me that they get embarrassed in front of others when I do not meet their expectations	**0.56**	0.16	−0.02	0.52	**0.55**	0.18	0.00	0.49
8. My parents say that they will love me more if I perform better	**0.54**	0.05	0.00	0.40	**0.69**	−0.03	−0.05	0.42
9. My parents tell me I have to do well to honor the family	**0.52**	0.01	0.15	0.46	**0.57**	−0.03	0.18	0.53
10. My parents tell me that what they want me to do is the best for me, so I need to follow their demands	**0.42**	0.01	0.19	0.40	**0.44**	−0.08	0.27	0.39
11. My parents tell me that if I misbehave, people will think they are not good parents	**0.41**	0.01	0.05	0.36	**0.50**	−0.03	0.02	0.38
12. My parents tell me that my poor performance would damage the family's honor	**0.41**	0.17	0.06	0.42	**0.40**	0.30	0.00	0.50
13. If I make them unhappy, my parents stop talking to me until I please them again	0.05	**0.68**	−0.16	0.41	0.02	**0.67**	−0.08	0.43
14. My parents often interrupt me	−0.26	**0.67**	0.20	0.44	−0.11	**0.55**	0.24	0.44
15.My parents change the subject whenever I have something to say	0.08	**0.60**	−0.09	0.43	0.23	**0.46**	−0.10	0.41
16. My parents scold me when they are not satisfied with me	−0.13	**0.59**	0.29	0.51	−0.04	**0.55**	0.26	0.54
17. My parents are less friendly with me if I do not see things their way	0.17	**0.59**	−0.02	0.55	0.18	**0.66**	−0.08	0.59
18. I feel like my parents interfere in everything I do	−0.06	**0.59**	0.18	0.52	0.12	**0.47**	0.18	0.56
19. No matter what I think or do, my parents always give me negative comments	0.04	**0.57**	0.14	0.51	−0.18	**0.83**	0.10	0.60
20. My parents avoid looking at me when I have disappointed them	0.32	**0.56**	−0.23	0.49	0.23	**0.71**	−0.24	0.56
21. My parents act cold and unfriendly if I do something they do not like	0.24	**0.56**	−0.01	0.55	0.08	**0.63**	0.03	0.55
22. My parents think my thoughts are naive	0.00	**0.53**	0.03	0.32	−0.11	**0.58**	0.14	0.37
23. My parents never praise me	−0.12	**0.50**	0.06	0.34	−0.14	**0.67**	−0.01	0.34
24. My parents insist that I do things their way	0.28	**0.46**	0.03	0.54	0.19	**0.44**	0.13	0.54
25. My parents often compare me with others (e.g., themselves when they were young or children of my age)	−0.06	−0.04	**0.92**	0.69	0.00	−0.11	**0.92**	0.68
26. My parents like to compare me to other children that they approve of when I act against their wishes	0.05	−0.10	**0.91**	0.74	0.01	0.01	**0.86**	0.75
27. My parents compare me with children who are better than I am at certain things	0.01	0.04	**0.73**	0.59	−0.04	0.06	**0.75**	0.59
28. My parents ask me why I cannot be as good as other children (e.g., children of our relatives/their friends or my classmates)	0.12	0.03	**0.69**	0.67	0.14	0.01	**0.70**	0.68
29. My parents tell me that I am not as good as other children when I fall short of their expectations	0.13	0.14	**0.60**	0.72	0.07	0.26	**0.50**	0.64
30. When I misbehave, my parents tell me I am not as good as other children	0.17	0.14	**0.57**	0.69	0.14	0.20	**0.50**	0.67
Variance explained (%)	40.38	5.92	5.63		6.07	42.73	5.13	

RI, relational induction; HPC, harsh psychological control; SCS, social comparison shame; Com., communalities. Factor loadings greater than 0.40 are in bold.

or paternal warmth, respectively. The harsh psychological control dimension also displayed the strongest negative correlations (maternal: $r = -0.37$, $p < 0.001$; paternal: $r = -0.33$, $p < 0.001$) while the relational induction dimension showed the weakest negative correlations (maternal: $r = -0.13$, $p < 0.001$; paternal: $r = -0.12$, $p < 0.01$). In general, these findings supported the concurrent validity of the CPPCS.

Moreover, differentiated predictions on adolescents' developmental outcomes were observed for individual dimensions in the CPPCS (see Table 5). Specifically, for self-esteem and life

TABLE 2 Model comparisons in confirmatory factor analyses (subsample B; n=482).

Models	χ^2	*df*	BIC	CFI	TLI	RMSEA	RMSEA 90% CI	SRMR	ΔBIC
Maternal subscale									
A. Unidimensional structure	1619.11	403	39339.38	0.84	0.83	0.08	0.077, 0.086	0.05	
B. Three-factor structure resultant from EFA	1081.45	400	38820.08	0.91	0.91	0.06	0.057, 0.066	0.04	519.30
Paternal subscale									
A. Unidimensional structure	1704.87	403	38294.92	0.83	0.82	0.08	0.080, 0.089	0.06	
B. Three-factor structure resultant from EFA	1065.54	400	37673.94	0.91	0.91	0.06	0.056, 0.065	0.04	620.98

df, degree of freedom; BIC, Bayesian information criterion; CFI, comparative fit index; TLI, Tucker-Lewis index; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual; CI, confidence interval; ΔBIC, change in BIC.

satisfaction, the dimension of harsh psychological control and social comparison shame showed significant negative predictions while relational induction dimension demonstrated positive predictions. Furthermore, harsh psychological control was a significant positive predictor of adolescents' depression while the other two dimensions were not. The findings supported the notion that relational induction is less detrimental than the other two dimensions among Chinese adolescents.

4. Discussion

The present study reported findings of a validation study on the Chinese Parental Psychological Control Scale (CPPCS), which was developed to measure parents' psychological control from all essential dimensions. The results indicated that the CPPCS has favorable psychometric properties, including good reliability and validity. Exploratory and confirmatory factor analyses supported the three-dimension structure of the CPPCS for both paternal and maternal scales, with the factor structure invariant across adolescent gender groups and all dimensions showing adequate internal consistency. Findings also supported the convergent validity of the CPPCS. Dimensions in paternal and maternal subscales were significantly correlated with each other and with parental warmth (positively) and rejection (negatively). The psychological control dimensions also showed divergent predictions on adolescents' developmental outcomes, including well-being and ill-being measures. These findings suggested that the CPPCS is a useful tool for a differentiated approach to parental psychological control in Chinese contexts, especially for its full coverage of different controlling tactics and consideration of individual dimensions' different functions.

In the present study, EFA and CFA yielded three interrelated but psychometrically distinct dimensions in the CPPCS, including "relational induction," "harsh psychological control," and "social comparison shame." Although the three dimensions were closely correlated with each other, the unidimensional structure was not acceptable. The findings provide empirical support for the multidimensionality of parental psychological control, which is consistent with some previous conclusions (Yu et al., 2015; Sze, 2016). In addition, the "harsh psychological control" dimension seemed to have stronger positive and negative correlations with parental rejection and warmth, respectively, than the other two dimensions. This observation supports the thesis that different aspects of parents' psychological control may not necessarily have the same meaning and function in Chinese contexts. In general, the present findings reiterate the need to distinguish between dimensions of psychological control rather than treating it as a global index or a unidimensional construct.

The resultant factor structure of the CPPCS echoes Fung and Lau's (2012) proposition that relational induction behaviors are conceptually different from those more hostile ones (i.e., the "harsh psychological control" dimension). Apart from the above-mentioned different correlations between these two dimensions and the other two parental factors (rejection and warmth), "harsh psychological control" dimension also showed stronger negative predictions on adolescents' developmental outcomes, while the "relational induction" dimension did not significantly predict depression and even positively predicted self-esteem and life satisfaction among adolescents. The preliminary findings on the differentiated functions support the notion that hostile forms of psychological control are universally detrimental for child development while relational induction in terms of guilt induction and shared shame may be more benign in Chinese contexts (Chen et al., 2016). Chinese parents are likely to use relational induction to draw children's attention to parental sacrifices and the influence of their misbehavior on parental or familial reputation and honor, helping them acquire empathy for their parents and attunement to others' perceptions, feelings, and thoughts (Fung and Lau, 2012; Yu et al., 2015). In a highly collectivist social milieu, this form of parenting is a strategic way to achieve socialization goals, which are likely to be culturally acceptable and thus less intrusive (Yu et al., 2019; Fang et al., 2022).

However, the present "relational induction" included tactics of guilt induction and shared shame, but not love withdrawal, which is different from Fung and Lau's (2012) classification. Instead, love withdrawal loaded on the "harsh psychological control" dimension together with other hostile tactics. Such differences reinforce the need to explore factor structure using EFA prior to performing CFA, which

TABLE 3 Invariance tests across gender groups and grades for the three-factor structure (Whole sample, n=963).

	χ^2	*df*	CFI	TLI	SRMR	RMSEA	RMSEA 90% CI	Compare	$\Delta\chi^2$	ΔCFI	Δ*df*	ΔRMSEA
Maternal subscale												
Full sample (n = 963)	1552.58	400	0.92	0.91	0.04	0.06	0.053, 0.059					
Males (n = 460)	972.39	400	0.91	0.90	0.05	0.06	0.054, 0.064					
Females (n = 503)	1147.69	400	0.90	0.90	0.05	0.06	0.060, 0.068					
A. Configural	2137.18	800	0.90	0.90	0.05	0.06	0.059, 0.065					
B. Metric	2170.10	827	0.90	0.90	0.05	0.06	0.058, 0.064	B vs. A	32.92	0.000	27	−0.001
C. Scalar	2217.48	854	0.90	0.90	0.05	0.06	0.058, 0.064	C vs. B	47.38	−0.002	27	0.000
Grade 7 (n = 560)	1117.90	400	0.91	0.90	0.04	0.06	0.054, 0.062					
Grade 8 (n = 403)	1004.35	400	0.90	0.90	0.05	0.06	0.059, 0.069					
D. Configural	2139.74	800	0.91	0.90	0.05	0.06	0.058, 0.064					
E. Metric	2179.27	827	0.91	0.90	0.05	0.06	0.057, 0.063	E vs. D	39.53	−0.001	27	−0.001
F. Scalar	2217.74	854	0.91	0.90	0.05	0.06	0.056, 0.062	F vs. E	38.47	0.000	27	−0.001
Paternal subscale												
Full sample (n = 963)	1522.20	400	0.92	0.92	0.04	0.06	0.053, 0.059					
Males (n = 460)	1013.19	400	0.90	0.90	0.05	0.06	0.057, 0.066					
Females (n = 503)	1055.63	400	0.92	0.91	0.04	0.06	0.055, 0.064					
A. Configural	2068.83	800	0.91	0.90	0.05	0.06	0.057, 0.064					
B. Metric	2094.06	827	0.91	0.91	0.05	0.06	0.056, 0.063	B vs. A	25.23	0.001	27	−0.001
C. Scalar	2136.90	854	0.91	0.91	0.05	0.06	0.056, 0.062	C vs. B	42.84	−0.002	27	0.000
Grade 7 (n = 560)	1078.67	400	0.92	0.91	0.04	0.06	0.052, 0.060					
Grade 8 (n = 403)	1084.18	400	0.90	0.89	0.05	0.07	0.063, 0.073					
D. Configural	2162.85	800	0.91	0.90	0.05	0.06	0.058, 0.064					
E. Metric	2219.46	827	0.91	0.90	0.05	0.06	0.058, 0.064	E vs. D	56.61	−0.002	27	0.000
F. Scalar	2257.22	854	0.91	0.90	0.05	0.06	0.057, 0.063	F vs. E	37.76	0.000	27	−0.001

df, degree of freedom; CFI, comparative fit index; TLI, Tucker-Lewis index; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual; CI, confidence interval; $\Delta\chi^2$, change in χ^2; ΔCFI, change in CFI; Δdf, change in df; ΔRMSEA, change in RMSEA.

has been grossly overlooked in previous studies (e.g., Fung and Lau, 2012; Yu et al., 2015; Fang et al., 2022). Moreover, the results support our expectation that love withdrawal is theoretically more aversive than guilt induction and shared shame. Prior research has suggested that love withdrawal, in comparison to guilt induction and shaming, was less likely to be perceived by children and adolescents as well-intended (Rohner et al., 2005; Cheah et al., 2019). Thus, some inconsistent findings in previous research may be partially due to the problematic assumption of similar conceptual meanings and functions of love withdrawal and guilt induction (Wang et al., 2007; Li et al., 2016; He et al., 2019; Gao et al., 2022).

The present findings also provide empirical evidence for the notion that "social comparison shame" is a unique dimension of parental psychological control (Fang et al., 2022), despite that most previous research did not include this type of tactics (Barber et al., 2005; Shek, 2006; Yu et al., 2021) or mixed it with shared shame (Yu

TABLE 4 Reliability of the Chinese Parental Psychological Control Scale and correlations among subscales and other parental factors (Whole sample, n=963).

Subscales	No. of items	Reliability/AVE				Inter-correlations			Correlations with criteria			
		Maternal		Paternal		RI	HPC	SCS	Maternal		Paternal	
		MIC	α/CR/ω/AVE	MIC	α/CR/ ω/AVE				REJ	WAR	REJ	WAR
RI	12	0.41	0.89/0.89/0.90/0.54	0.42	0.90/0.89/0.89/0.55	1.00	0.73***	0.71***	0.69***	−0.13***	0.70***	−0.12**
HPC	12	0.43	0.90/0.90/0.91/0.57	0.45	0.91/0.91/0.90/0.60	0.73***	1.00	0.70***	0.86***	−0.37***	0.85***	−0.33***
SCS	6	0.66	0.92/0.92/0.92/0.65	0.66	0.92/0.92/0.92/0.65	0.72***	0.70***	1.00	0.68***	−0.24***	0.68***	−0.27***

RI, relational induction; HPC, harsh psychological control; SCS, social comparison shame; CR, composite reliability; AVE, average variance extracted; MIC, mean inter-item correlation; REJ, parental rejection; WAR, parental warmth. Inter-correlations of maternal and paternal subscales are shown below and above the diagonal, respectively. Maternal and paternal psychological control subscales were correlated to respective maternal and paternal rejection or warmth, respectively. $^{**}p<0.01$, $^{***}p<0.001$.

TABLE 5 Predictions of individual dimensions of psychological control on adolescents' developmental outcomes (Whole sample, n=963).

Coefficients [β (SE)]	Relational induction	Harsh psychological control	Social comparison shame
Self-esteem	0.26 (0.09)** / 0.24 (0.09)**	−0.21 (0.08)* / −0.21 (0.08)*	−0.20 (0.08)*/ −0.17 (0.07)*
Life satisfaction	0.24 (0.09)** / 0.28 (0.09)**	−0.32 (0.08)*** / −0.38 (0.08)***	−0.21 (0.07)** / −0.17 (0.07)*
Depression	−0.11 (0.09) / −0.12 (0.09)	0.43 (0.08)*** / 0.44 (0.08)***	0.04 (0.07) / 0.01 (0.07)

Maternal predictions are before the slash and paternal predictions are after the slash. $^{*}p<0.05$, $^{**}p<0.01$, $^{***}p<0.001$.

et al., 2015; Sze, 2016). Our findings imply that social comparison shame is conceptually different from shared shame. It draws children's attention to their inferiority and shortcomings compared to others, such as siblings or peers. Despite the fact that upward comparison may communicate parental expectations relative to well-mannered or high-achieving role models, negative labeling accompanied by potentially excessive demands makes children more likely to experience this type of parenting as disrespect, denigration, personal attack, or rejection (Smetana et al., 2021). This may be the reason that social comparison shame also negatively predicted adolescents' self-esteem and life satisfaction in the present study.

Overall, the validated CPPCS and related findings in the present study provide additional empirical evidence to support the multifaceted nature of parental psychological control and culture-specific conceptualizations of its subtypes. This theoretical contribution also highlights the need to differentiate unique functions of individual dimensions of parental psychological control on Chinese adolescents, which has been ignored in previous studies and may be a promising way to resolve the existing inconsistent findings. Most importantly, the validated scale serves as a useful instrument that can be adopted in future studies involving Chinese adolescents to understand Chinese parents' usage of different forms of psychological control and its correlates, impacts of individual dimensions on children's and adolescents' development, and the underlying mechanisms (e.g., moderating and mediating effects).

The present study has several limitations. First, participants were from only two grades in four secondary schools based on a convenience sampling strategy, which limits the application of the CPPCS and generalization of the findings in other Chinese samples. Future studies will benefit from using a more representative adolescent sample recruited by probability sampling methods such as stratified sampling. Second, when we formed the initial item pool, we only consulted 19 adolescents. It is also possible that the interpretation of parental psychological control varies across samples with different social background (e.g., mainland China versus Hong Kong; rural versus urban), age, and family structure (Cheah et al., 2019; Fang et al., 2022). Given adolescents' perception and interpretation are essential in constructing correct and comprehensive items on parental psychological control (Barber et al., 2012), future studies may further validate the CPPCS by interviewing more adolescents with different backgrounds. In addition, the present study only validated adolescent-reporting version of the scale, future study can further construct and validate a parent-reporting version. In this way, data can be collected through not only adolescents' self-reporting but also parental reporting.

Third, the present study only tested multi-group factorial invariance with cross-sectional data. Given the increasing emphasis on assessment tool's longitudinal invariance, which enables a given scale to assess the same construct with the same structure across time (Widaman et al., 2010; Millsap and Cham, 2012), there is a need to test the longitudinal invariance of the CPPCS in future studies. Fourth, the present study only used two additional parental factors (rejection and warmth) and three adolescents' outcome measures (self-esteem, life satisfaction, and depression) to test concurrent and predictive validities, respectively. Future studies need to adopt more criteria measures, including parental measures that are proximal to psychological control such as overparenting, harsh parenting, and autonomy support as well as adolescents' outcome indicators (e.g., anxiety and academic achievement). In particular, there is a need to create a short version of the current 60-item scale (30 for paternal and maternal subscales, respectively) to reduce participants' burden and increase the applicability of the CPPCS. Thus, in validating the abbreviated version, more criteria measures should be employed.

5. Conclusion

Despite these limitations, the validated CPPCS is a valuable addition to the existing conceptualization and assessment of parental psychological control among Chinese samples. The scale can serve as a useful tool for differentiated research on culture-specific meanings and functions of parental psychological control. Future studies will also benefit from developing a shortened form of the scale that retains the strong psychometric properties of the full-length scale but will be more concise.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by the Institutional Review Board at the Hong Kong Polytechnic University. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Author contributions

XZ designed the research and contributed to all the steps of the work. DD contributed to the data collection and editing the manuscript. YP helped revise the manuscript. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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The mediating effect of math self-efficacy on the relationship between parenting style and math anxiety

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The present study aims to investigate the associations among math self-efficacy, parenting style, and math anxiety in primary school children. The sample comprised 400 participants, aged between 10 and 11years old, from an elementary school in China. Participants completed three self-reported questionnaires on math anxiety, parenting styles and math self-efficacy. The results revealed that rejection was strongly and positively correlated with math anxiety, while emotional warmth was negatively related to math anxiety. Interestingly, math anxiety was found to be related to rejection, with math self-efficacy playing a mediating role in this relationship. Conversely, math self-efficacy played a mediating role in the relationship between parenting styles and math anxiety, while over protection exhibited no significant correlation with math anxiety. The study also showed that gender differences existed in the level of math anxiety and math self-efficacy, with boys exhibiting lower math anxiety and higher math self-efficacy than girls. These results provide important insights into the development and treatment of math anxiety in primary school children. Specifically, parents and educators should focus on enhancing children's math self-efficacy beliefs, while adopting a parenting style characterized by emotional warmth and low levels of rejection.

KEYWORDS

math anxiety, parenting style, math self-efficacy, emotional warmth, rejection (psychology)

Introduction

Mathematics is important for the development of individuals and countries. Mathematics affected individuals' decision making in daily activities (Ghazal et al., 2014), such as personal health (Huizinga et al., 2008), retirement savings (Banks and Oldfield, 2007), career choices (Levy et al., 2021). At the national level, improving science, technology, engineering, and mathematics (STEM) education is the key to economic growth and security (Xie et al., 2015; Bacovic et al., 2022). Additionally, the development of STEM fields depend on strong mathematical skills (Falloon et al., 2020; Yalçın, 2022). Hence, effectively improving mathematics performance had become an important concern for learners, educators and researchers (Ramirez et al., 2018).

Math anxiety

Anxiety is one of most common negative emotions experienced by elementary school children (Kaskens et al., 2020; Raccanello et al., 2022). As an aspect of anxiety, math anxiety is a significant problem among primary school children (Dowker et al., 2016) and has attracted researchers' attention on this topic. Researchers have observed that many people are afraid of math (Dreger and Aiken, 1957). Ashcraft (2002) defined math anxiety as the emotional responses of tension, apprehension, and fear that individuals experience when engage in math-related tasks, emphasizing the unpleasant experience of math anxiety. The prevalence of math anxiety is high across countries and age groups, and its consequences of math anxiety are far-reaching (Ma, 1999; Lee, 2009; Vukovic et al., 2013). People who suffer from higher math anxiety tend to avoid math, math-related environments and careers, particularly those involving science, technology, engineering and math throughout their lives (Meece et al., 1990; Chipman et al., 1992). Therefore, math anxiety can have a significant impact on people's future career choices (Levy et al., 2021).

Math self-efficacy

Improving children's math self-efficacy and increasing their confidence in learning mathematics are critical to their future mathematical development (Kaskens et al., 2020; Casinillo, 2023; Kyaruzi, 2023). Mathematical self-efficacy is defined as an individual's belief in their ability to perform mathematical tasks and is considered a predictor of math anxiety and performance (Hackett, 1985; Pajares and Miller, 1994; Bandura, 2012; Son et al., 2017). Gender differences have been found in mathematical self-efficacy (Kyaruzi, 2023), with men typically reporting higher levels than women (Hackett and Betz, 1981; Frenzel et al., 2010). Additionally, culture differences have been noted, with students from Asian countries such as Korea and Japan exhibiting low math self-efficacy and high levels of math anxiety despite high performance in mathematics (Lee, 2009).

Parenting styles

Parents are key socializers and role models for their children, and their beliefs and parenting styles can influence their children's learning and achievement in math (Maloney et al., 2015; Chang and Beilock, 2016). Parental academic stress and support have been found to be negatively correlated with students' math performance (Puklek Levpušček and Zupančič, 2009; Chiu, 2017). Moreover, parenting style is related to math anxiety. Parenting styles have been classified into three categories: authoritative, authoritarian, and permissive (Baumrind, 1966, 1971, 1978). Authoritarian parenting styles have been found to have a direct negative impact on math anxiety. Children with parents who used authoritarian parenting styles obtain lower math scores (Feldman and Wentzel, 1990; Chao, 1994; Weiss and Schwarz, 1996; Chiu, 2017). On the other hand, authoritative parenting styles can have a direct positive effect on math anxiety while also having an indirect negative effect through math self-efficacy (Macmull and Ashkenazi, 2019). These findings suggest that parenting styles may affect children's math performance and math anxiety. The impact of parenting style on math anxiety might be strongly influenced by math self-efficacy.

However, due to cultural differences between Eastern and Western cultures, the classification of parenting styles cannot be directly applied to Chinese parenting. Therefore, an appropriate classification of parenting styles should be selected to investigate the relationship between parenting style, math anxiety, and math self-efficacy in China. Given emotions are a crucial factor in math anxiety research (Deci et al., 1994) and that the participants in this study are Chinese elementary school students, the current study aims to explore the relationship between different expressions of emotions in parenting and math anxiety. Additionally, Chinese students grow up in an environment that places a greater emphasis on family and blood ties. Thus, a final classification of parenting styles based on emotions was utilized. The impact of Chinese parents' emotions in parenting on students' anxiety in learning mathematics is one of the main concerns of this study. The basic psychological needs of individuals, including emotions, are significant research components in the field of math anxiety (Parsons et al., 1982; Chiu, 2017). By examining the effects of parenting styles and emotions on students' math anxiety, this study can enrich the research field of math anxiety related to the basic psychological needs of individuals. Specifically, this study is the first to use the emotional dimensions of parenting styles to investigate the relationships and effects between parenting styles, math self-efficacy, and math anxiety among Chinese elementary school students.

In this study, parenting styles are divided into three emotional dimensions: rejection, emotional warmth, and over protection (Arrindell et al., 1999; Arrindell and Engebretsen, 2000; Arrindell et al., 2005). Rejection can take many different forms, such as verbal abuse, punishment, choosing other family members over the child, constant criticism and rejection (Arrindell et al., 1999), which is similar to need frustration (Moè et al., 2020) and authoritarian parenting styles (Baumrind, 2012). Emotional warmth, on the other hand, includes appropriate care, warmth, affection, inspiration, and praise for the child, which are examples of acts that foster a positive emotional climate (Arrindell et al., 1999). This is similar to need satisfaction (Moè et al., 2020) and authoritative parenting styles (Yaffe, 2020). Finally, over protection is characterized by exaggerated concern and worry, stress for the child's safety, intrusive hostility, and excessive involvement with the child (Arrindell et al., 1999). The relationships between these three dimensions of parenting style and math self-efficacy and math anxiety were examined separately to better understand the affective influence of parenting style on math anxiety and math self-efficacy.

The relationship between math self-efficacy, parenting style, and math anxiety

Parents play a crucial role in the development of their children's math anxiety (Maloney et al., 2015; Chang and Beilock, 2016). Math anxiety is influenced by social factors such as parental involvement in education and parenting styles. Different parenting styles have varying effects on math anxiety, with both direct and indirect correlations. Individuals subjected to authoritarian parenting exhibited higher levels of math anxiety (Sepehrianazar and Babaee, 2014; Macmull and Ashkenazi, 2019). Conversely, the authoritative parenting style has

significant direct positive and indirect negative effects on math anxiety. Specifically, authoritative parenting has a direct positive effect on math anxiety, but it is also positively related to math self-efficacy, which reduces math anxiety through the role of math self-efficacy (Macmull and Ashkenazi, 2019). Permissive parenting style is positively correlated with math anxiety, albeit to a lesser extent (Macmull and Ashkenazi, 2019). Based on prior research, hypothesis 1a posited that math anxiety would be significantly and positively associated with rejection and over protection, whereas it would be negatively associated with emotional warmth and math self-efficacy. Hypothesis 1b posited that emotional warmth would be positively related to math self-efficacy, while rejection and over protection would be negatively related to math self-efficacy.

Studies had shown that parents influence their children's math self-efficacy when pertains to their abilities and confidence in handling math tasks (Armstrong, 1981; Parsons et al., 1982). Moreover, parents' perceptions and expectations of their children's mathematical success also affect their children's mathematical abilities (Yee and Eccles, 1988). Students are expected to perform better academically when parents encouraged them to develop communication skills and independence while providing the necessary demands and boundaries for learning, which is a hallmark of authoritative parenting (Vansteenkiste et al., 2006). These students not only have higher grade point averages but also higher levels of academic confidence (Cetin, 2015). Clearly, parents, as primary influencers of their children's learning, play a significant role in their math self-efficacy when learning mathematics. Examining the effects of parenting styles on children's math self-efficacy would provide further insight into math self-efficacy and lay the groundwork for future improvements in children's self-efficacy. Therefore, based on the above studies and considering the role of math self-efficacy between parenting style and math anxiety as described above, this study used math self-efficacy as a mediating variable to examine the relationship between parenting style and math anxiety. Together with the above-mentioned arguments, hypothesis 1c proposed that there would be a significant mediating effect of math self-efficacy between parenting style and math anxiety.

Anxiety among students in academic settings can lead to low self-efficacy (Usher and Pajares, 2008), as students perceive their anxiety as evidence of their lack of success (Bandura, 1977, 2012). Anxiety about mathematics can manifest as early as mid-primary school (Gierl and Bisanz, 1995). Studies with French elementary school students have found no link between math anxiety and self-efficacy (Joët et al., 2011). In contrast, studies of middle and high school students in the United States have found that those with greater math anxiety believed they were less effective at solving mathematical problems (Lopez and Lent, 1992; Lent et al., 1996; Lopez et al., 1997). According to Galla and Wood (2012), math self-efficacy played a positive role in reducing the negative effects of anxiety.

Aims and hypotheses

In this study we collected data from 454 fifth and sixth-grade students to investigate the associations among math self-efficacy, parenting style, and math anxiety in primary school children in China. Drawing upon the complex relationship between parenting styles, math self-efficacy, and math anxiety described above, this study develops the following hypotheses based on prior research: (H1a) Emotional warmth and math self-efficacy are significantly negatively associated with math anxiety, whereas rejection and over protection were significantly positively associated with math anxiety; (H1b) Emotional warmth is significantly positively related to math self-efficacy, while rejection and over protection were significantly negatively related to math self-efficacy; (H1c) There would be a significant mediating effect of math self-efficacy between parenting style and math anxiety. Meanwhile, since previous research has identified gender differences in math self-efficacy (Macmull and Ashkenazi, 2019) and math anxiety (Hopko et al., 2003; Beilock et al., 2010; Bieg et al., 2015; Dowker et al., 2016) in previous studies, and this study also aims to further investigate gender differences in these constructs by proposing Hypothesis 2 that math self-efficacy and math anxiety will significantly differ by gender.

Materials and methods

Participants

A total of 454 fifth- and sixth-grade students from a public elementary school in Zhejiang Province, China, were selected to participant in this study. Participants with a significant amount of missing data were excluded from the analysis. Missing data was considered significant when there were unanswered questions in any questionnaire that accounted for more than 20% of the total number of questions. Furthermore, data points that exceeded 1.98 standard deviations from the mean were also excluded from the analysis. Ultimately, 400 valid participants' data were obtained, resulting in effective response rate of 88.11%. Of the participants, 197 were boys and 203 were girls, with 201 in the fifth grade and 199 in the sixth grade. All students participated in this study only after receiving informed consent from their legal guardians and providing their own oral consent.

Procedure

The research team first submitted the scales used in the study to the school director for review. The director evaluated whether the meaning of the question items in the scale was acceptable to students and whether the wording of the items was positive and avoided any adverse psychological effects on the students. After the director approved the scales and determined the time for distribution, the scales were administered and collected in the classroom. The three scales were answered by students. The main test was administered by experienced graduate students in psychology and education, and a guideline was read out by the main examiner during the test. The collected data was analyzed using SPSS 21.0.

Measures

Math anxiety rating scale

The mathematics anxiety scale used in this study was based on the Mathematics Anxiety Rating Scale developed by Richardson and Suinn (1972). It was developed specifically for

the mathematics discipline and elementary school students. The scale consisted of 27 self-report items, with items 24, 25, and 26 items reversed scored. The scale measured four dimensions of math anxiety: stress fear, emotional worry, test anxiety, and classroom anxiety, using a five-point Richter scale. A score of 1 represented very non-conforming, 2 represented non-conforming, 3 represented partially conforming, 4 representing conforming, and 5 represented very conforming. A higher rating on the scale corresponded to higher math anxiety. The total score for each dimension was divided by the total number of items for that dimension, and the resulting mean score was the score for that dimension. Higher scores indicated greater anxiety for each dimension and overall math anxiety. The internal consistency reliability Cronbach's α for the stress fear, emotional worry, test anxiety, and classroom anxiety dimensions were 0.85, 0.84, 0.81, and 0.78, respectively, while the internal consistency reliability Cronbach's α for the overall scale was 0.93.

The revised short-form parenting style scale

The Revised Short-Form Parenting scale was based on Arrindell's scale (Arrindell et al., 1999, 2005; Arrindell and Engebretsen, 2000), with modifications made to localize it to the Chinese context. The scale was known as the Short-Enga Minnen Barndoms Uppfostran Chinese Version (s-EMBU-C) and was a self-administered questionnaire divided into a father's version and a mother's version, each with 21 items and identical content. The 15th item was reverse scored, and the scale measured three dimensions: rejection, emotional warmth, and over protection. A four-point Richter scale was used, with a score of 1 indicating "never," 2 indicating "occasionally," 3 indicating "often," and 4 indicating "always." The total score of each dimension was divided by the total number of questions in that dimension, and the average score was the final score of that dimension. A higher score on each dimension indicated a greater likelihood that the student had experienced that specific parenting style, or that the child felt the degree of the dimension in their relationship with their parents. The internal consistency coefficient of the revised short-form parenting style warmth ranged from 0.74 to 0.84, and the retest reliability after 10 weeks ranged from 0.70 to 0.81, indicating good reliability (Jiang et al., 2010).

Math self-efficacy scale

The math self-efficacy scale used in this study was adapted from the relevant dimensions of the Teacher Efficacy Scale, originally developed by Gibson and Dembo (1984). The self-report scale consisted of 12 items, with items 5, 6, and 9 being reversed scored. The scale included two dimensions: the first six items measured Mathematical Ability Self-Efficacy, while the last 6 items were Mathematical Behavior Self-Efficacy. Participants rated their level of agreement with each item on a five-point Richter scale (1 = totally disagree; 3 = generally; 5 = totally agree). To calculate scores of each dimension, the total score for each dimension was divided by the number of items in that dimension, and the resulting average score was taken as the score for that dimension. The internal consistency coefficient of the scale was 0.85 (Chen and Wang, 2018). In this study, the internal consistency reliability Cronbach's α for the Mathematical Ability Self-efficacy dimension and the Mathematical Behavior self-efficacy dimension were 0.82 and 0.85, respectively.

Statistical analyses

To investigate the relationship between parenting style, math self-efficacy and math anxiety among fifth and sixth-grade students, descriptive statistics and Pearson correlation analysis was performed. Furthermore, in order to further examine the mediating role of math self-efficacy, this study utilized rejection and emotional warmth as predictor variables, with math anxiety as the outcome variable and math self-efficacy as the mediating variable. The SPSS PROCESS component was employed and Model 4 was selected for the analysis of mediating effects, which was a full mediation model. To examine the mediating effects, the bias-corrected nonparametric percentile Bootstrap method created by Hayes (2013) was utilized. Specifically, 95% confidence intervals were calculated for each of the 5,000 replicate samples, and statistical significance was indicated if the confidence interval did not contain a value of 0.

Results

Descriptive statistics for each variable

Table 1 showed the descriptive statistics. The results of the correlation analysis (Table 1) indicated that emotional warmth and math self-efficacy had a significant negative correlation with math anxiety, while rejection had a significant positive correlation with math anxiety. Emotional warmth also had a significant positive correlation with math self-efficacy, while rejection had a significant negative correlation with math self-efficacy. In addition, over protection had a significant negative correlation with emotional warmth, and a significant positive correlation with rejection. Finally, there was a significant negative correlation between rejection and emotional warmth.

The results suggested that there was a strong association between parenting style, math self-efficacy, and math anxiety among fifth and sixth-grade students. The findings partly supported Hypothesis 1a, which proposed a significant negative relationship between emotional warmth, math self-efficacy and math anxiety, as well as a significant positive relationship between rejection and math anxiety. However, there was no significant correlation between over protection and math anxiety. The results also partially support Hypothesis 1b, which posited a significant positive correlation between emotional warmth and math self-efficacy, a significant negative correlation between rejection and math self-efficacy, and no significant correlation between over protection and math self-efficacy.

Gender differences were considered in this study, and the correlation between parenting style, math anxiety, and math self-efficacy for male and female students were analyzed separately (Table 2). Results showed that there were significant gender differences in the correlations between rejection and math self-efficacy, as well as between over protection and math anxiety. Specifically, the correlation between rejection and math self-efficacy was insignificant for male students, whereas it was significant for female students. Similarly, the correlation between over protection and math anxiety was insignificant for male students, while it was significant for female students.

In addition, the results of the independent samples t-test showed significant gender differences in emotional warmth [$t(399) = 2.52$,

TABLE 1 Means, standard deviations, and correlations between all the variables.

	Mean	SD	Rejection	Emotional warmth	Over protection	Math self-efficacy	Math anxiety
Rejection	1.32	0.36	1				
Emotional warmth	3.15	0.58	−0.52**	1			
Over protection	1.97	0.44	0.41**	−0.22**	1		
Math self-efficacy	3.72	0.79	−0.12*	0.33**	−0.01	1	
Math Anxiety	2.17	0.79	0.19**	−0.27**	0.07	−0.75**	1

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$ for bold values.

TABLE 2 Means, SDs, and correlations between all the variables separated by gender.

	M_G (SD_G)	M_B (SD_B)	Rejection	Emotional warmth	Over protection	Math self-efficacy	Math anxiety
Rejection	1.33 (0.37)	1.32 (0.35)	1	−0.55**	0.46**	−0.15*	0.22**
Emotional warmth	3.08 (0.60)	3.22 (0.55)	−0.49**	1	−0.28**	0.32**	−0.25**
Over protection	1.88 (0.43)	2.06 (0.42)	0.38**	−0.24**	1	−0.13	0.18*
Math self-efficacy	3.55 (0.77)	3.89 (0.78)	−0.08	0.32**	−0.02	1	−0.75**
Math anxiety	2.36 (0.82)	1.97 (0.70)	0.16*	−0.25**	0.07	−0.73**	1

MG refers to the mean value of boys and MB refers to the mean value of girls, while SDG and SDB refer to the standard deviation values of girls and boys, respectively. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$ for bold values. The data for female students is above the table's diagonal line, while the data for male students is below it.

$p < 0.05$], over protection [$t(399) = 4.20$, $p < 0.01$], math self-efficacy [$t(399) = 4.48$, $p < 0.01$], and math anxiety [$t(399) = -5.08$, $p < 0.01$] among fifth and sixth-grade elementary school children. These results support Hypothesis 2. Boys showed higher emotional warmth compared to girls, while boys were higher in over protection compared to girls (Table 2). Moreover, boys reported higher math self-efficacy compared to girls, and boys exhibited lower math anxiety than girls (Table 2). No significant gender difference was found in rejection [$t(399) = -0.07$, $p > 0.05$].

An analysis of the mediating role of math self-efficacy on the relationship between parenting style and math anxiety

The results of this analysis were summarized in Table 3. The results showed that the indirect effect of rejection on math anxiety through math self-efficacy was significant, as the 95% confidence interval did not include zero. Moreover, the mediating effect was found to be 44.68% of the total effect. The indirect effect of emotional warmth on predicting math anxiety through math self-efficacy was significant, as the 95% confidence interval did not include zero, with the proportion of the mediating effect to the total effect being 91.55%. However, the indirect effect of over protection on predicting math anxiety through math self-efficacy was not significant, as the 95% confidence interval included zero. Therefore, Hypothesis 1c was partly supported. Furthermore, the results of this study indicated that there was a significant mediating effect of math self-efficacy between rejection and emotional warmth and math anxiety. However, there was no significant mediating effect of math self-efficacy on the relationship between over protection and math anxiety (Figure 1).

We further analyzed the data separately for male and female students to examine the gender differences, and found that there were gender differences in the mediating effects. The results for female students were consistent with the overall analysis (Table 4), while for male students, math self-efficacy only mediated the relationship between emotional warmth and math anxiety (Table 5; Figure 2).

Discussion

This study examined the relationship among parenting styles, math self-efficacy, and math anxiety in primary school students. The study revealed significant relationships between parenting styles, math self-efficacy, and math anxiety. Specifically, students who experienced more rejection from their parents reported higher level of math anxiety. Moreover, emotional warmth in parenting was found to be significantly negatively correlated with math anxiety, meaning that the higher level of emotional warmth perceived by children, the lower level of math anxiety they would perceive. Additionally, there was a negative correlation between math self-efficacy and math anxiety, suggesting that an increase in math self-efficacy led to a decrease in math anxiety. The study also found gender differences in math anxiety and math self-efficacy, with females displaying higher levels of math anxiety and lower levels of math self-efficacy compared to males.

Finally, the study showed that math self-efficacy had a significant mediating effect on the relationship between rejection and math anxiety, as well as on the relationship between emotional warmth and math anxiety. However, there was no significant mediating effect of math self-efficacy on the relationship between over protection and math anxiety.

TABLE 3 Analysis of the mediated effects between parenting style and math anxiety (N=400).

Parenting style	Mediating variable	Total effect value	Indirect effect value	Boot SE	Boot CI lower limits	Boot CI upper limits	Intermediation effect values (%)
Rejection	Math self-efficacy	0.94	0.42	0.19	0.05	0.79	44.68
Emotional warmth	Math self-efficacy	−0.71	−0.65	0.10	−0.85	−0.46	91.55
Over protection	Math self-efficacy	0.22	0.02	0.12	−0.20	0.26	-

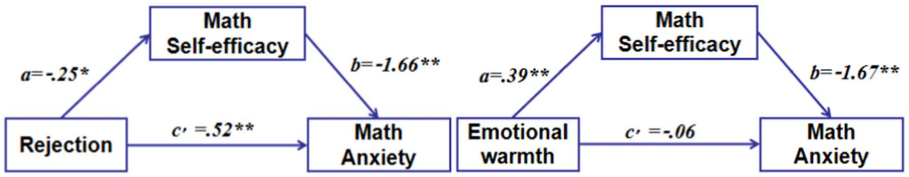

FIGURE 1
Analysis of the mediating role of math self-efficacy on the relationship between rejection and math anxiety (left) and the Relationship between emotional warmth and math anxiety (Right). *p<0.05; **p<0.01.

The relationship between math self-efficacy, parenting style, and math anxiety

Griggs et al. (2013) suggested parents played a significant role in influencing their children's self-efficacy, as parents were the primary individuals with whom children interact. When parents adopted a rejecting parenting style, children may struggle to acquire problem-solving skills, adjust to daily life, evaluate situations, and develop appropriate action plans with parental guidance and experience. Over time, this may lead to deficiency in problem-solving abilities, which could resulted in heightened anxiety and reduced self-efficacy (Rapee, 1997; Chorpita and Barlow, 1998; Wood et al., 2003).

When children experienced rejection, they may exhibit cautious behavior in school and became overly attentive to cues presented in the school environment (Sherman et al., 2013). This may be particularly pronounced in situations where there were many students, and teachers were unable to provide individualized attention, as such behavior may be perceived by the child as rejection. Future research could explore the potential relationship between parental rejection and students' perceptions of teacher rejection, as well as how both factors may influence math anxiety and math self-efficacy among students.

In order to foster the development of children's self-efficacy, emotional warmth from parents is essential (Zimet et al., 1988). Emotional warmth refers to the ability of parents to create a warm and supportive environment for their children, in which they can act autonomously, make their own choices, and express their own perspectives (Turner et al., 2009). When parents adopt this approach, it can have a positive impact on children's self-efficacy, which in turn can help them to feel more confident in using their own strategies to learn math. This may not always lead to immediate success, but over time, it can help to build children's self-efficacy and reduce their anxiety around math. By creating a nurturing environment that fosters children's self-efficacy, parents can help their children to become more engaged and effective learners in math.

In prior research, the concept of over protection was similar to the authoritarian parenting style, wherein parents exhibit excessive interference in their children's lives as per their preferences (Macmull and Ashkenazi, 2019). However, unlike earlier studies, no correlation was observed between over protection and math anxiety in this study. Earlier studies have shown that an authoritarian parenting style leads to an increase in children's anxiety, and the mediation effect of such a parenting style was significant between math self-efficacy and math anxiety (Macmull and Ashkenazi, 2019). The authoritarian parenting style is known to render children passive learners with low self-efficacy, consequently hampering their academic abilities (Diener and Dweck, 1978; Macmull and Ashkenazi, 2019). Nonetheless, the present study conducted in China did not observe a significant correlation between over protection and math anxiety. The findings could be attributed to the influence of the Chinese culture, where children are accustomed to excessive help and protection from their parents, and grow up in a structured and parent-dominated environment.

Gender differences in math anxiety and math self-efficacy

Gender differences in math anxiety and math self-efficacy have been widely reported in the literature (Else-Quest et al., 2010; Hill et al., 2016; Su et al., 2021). Prior studies have consistently found that females reported higher levels of math anxiety and lower levels of math self-efficacy compared to males. The current findings are consistent with these prior reports. These findings underscore the importance of addressing gender differences in math anxiety and self-efficacy, as well as the need to support students in managing stress and anxiety in the classroom, particularly as they progress through their academic careers.

The gender differences were found not only in the levels of math anxiety and math efficacy, but also in the significance of the correlations between rejection and self-efficacy and over protection and math anxiety. These results suggest that cultural factors may play a role in shaping these gender differences. Specifically, in the context of Chinese family education and social culture, boys may experience more rejection from parents due to the perception that they are more active

TABLE 4 Analysis of the mediated effects between parenting style and math anxiety for girls (N=203).

Parenting style	Mediating variable	Total effect value	Indirect effect value	Boot SE	Boot CI lower limits	Boot CI upper limits	Intermediation effect values (%)
Rejection	Math self-efficacy	1.09	0.54	0.26	0.01	1.05	49.54
Emotional warmth	Math self-efficacy	−0.65	−0.62	0.14	−0.90	−0.35	95.38
Over protection	Math self-efficacy	0.57	0.30	0.18	−0.02	0.66	-

TABLE 5 Analysis of the mediated effects between parenting style and math anxiety for boys (N=197).

Parenting style	Mediating variable	Total effect value	Indirect effect value	Boot SE	Boot CI lower limits	Boot CI upper limits	Intermediation effect values (%)
Rejection	Math self-efficacy	0.74	0.27	0.24	−0.19	0.78	-
Emotional warmth	Math self-efficacy	−0.62	−0.56	0.13	−0.84	−0.32	90.32
Over protection	Math self-efficacy	0.21	−0.05	0.14	−0.32	0.25	-

and trouble-prone than girls. This may explain why the correlation between rejection and math self-efficacy was not significant for boys. In contrast, girls may experience less rejection and more praise for being well-behaved, which could explain why they may be more affected by rejection behaviors that impact their math self-efficacy. Gender stereotypes related to personality and ability are not unique to China and have been studied in other cultural contexts (Tomasetto et al., 2011; Ceci, 2018; Moè et al., 2021). The relationship between rejection and math self-efficacy may not be solely tied to gender, but also to the personality traits. Therefore, exploring the connections between rejection, gender, and math self-efficacy in various cultural contexts could provide additional insights into these relationships.

Over protection was significantly and positively associated with girls' math anxiety, while it was not significantly associated with boys' math anxiety. This may due to the fact that in China, boys tend to exhibit contradictory behaviors. On one hand, they may be troublemakers and disruptive in the family, while on the other hand, they may enjoy having their parents clean up after them. As a result, boys may view over protection as normal behavior, and may not experience a significant correlation between over protection and math anxiety. On the other hand, girls are often encouraged to be well-behaved, which may lead to them relying more on their own judgment and ideas to conduct their lives. Parental over protection may then make them feel controlled and dominated, resulting in a significant positive correlation with girls' math anxiety.

The study also found gender differences in the analysis of mediating effects. Math self-efficacy was found to be significantly mediated only between emotional warmth and math anxiety in male students. The lack of significant mediation between rejection and math anxiety can be attributed to the fact that Chinese boys, as discussed earlier, experience more rejection behaviors while growing up compared to Chinese girls, which makes them more accustomed to rejection and less affected by it in terms of their math self-efficacy.

This study not only found gender differences in the perceptions of emotional warmth, over protectiveness, math self-efficacy, and math anxiety among boys and girls but also revealed differences in how boys and girls perceive the relationships among these variables. Gender differences often mask socio-cultural gender stereotypes, such as the stereotype that boys are more active and girls are more obedient. Both males and females face gender stereotypes and socio-cultural constraints that restrict them to conform to narrow socio-cultural biases. In STEM education, for instance, research has found that there exists a stereotype that females perform poorly compared to males (Moè et al., 2021). Alleviating the anxiety that exists in the area of mathematics learning is an important part of STEM education, which can help learners overcome gender stereotypes prevalent in STEM learning.

The mediating effect of mathematical self-efficacy in the relationship between parental rejection and emotional warmth and mathematical anxiety

The present study demonstrated a significant mediating effect of mathematical self-efficacy in the relationship between parental rejection and emotional warmth and mathematical anxiety. Specifically, the results suggested that the degree of perceived rejection by the child during parent–child interactions was negatively associated with mathematical self-efficacy, which in turn was positively associated with higher levels of mathematical anxiety. Conversely, higher levels of perceived emotional warmth were positively associated with mathematical self-efficacy, which in turn was negatively associated with higher levels of mathematical anxiety. These findings may be explained by the fact that children who perceive higher levels of rejection during parent–child interactions may develop lower levels of mathematical self-efficacy, which may lead to increased levels of mathematical anxiety. On the other hand, children who perceive higher levels of emotional warmth may develop higher levels of mathematical self-efficacy, which may lead to decreased levels of mathematical anxiety. Previous research has also suggested that students who perceive that their parents provide them with opportunities to develop their communication skills, autonomy, and set clear boundaries tend to perform better academically and exhibit higher levels of self-efficacy (Turner et al., 2009). These findings underscore the importance of promoting positive parent–child interactions, particularly with regard to fostering emotional warmth and reducing perceptions of rejection, as a means of enhancing mathematical self-efficacy and reducing mathematical anxiety in children. Such efforts may be particularly

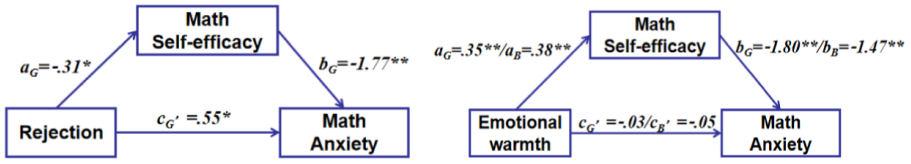

FIGURE 2
Mediating role of math self-Efficacy on relationship between rejection and math anxiety for girls only (left), and emotional warmth and math anxiety for boys and girls (right). a_G, b_G, and c'_G represent the coefficients for girls. a_B, b_B, and c'_B represent the coefficients for boys.*p<0.05; **p<0.01. In the above figure, coefficients a and b were significant while c′ was not, indicating that math self-efficacy had a fully mediating role in emotional warmth and math anxiety.

important for children who are at risk of developing low levels of mathematical self-efficacy and high levels of mathematical anxiety.

Conclusion and practical implications

The results of this study indicate that emotional warmth is positively associated with children's math self-efficacy, highlighting the importance of creating a warm and supportive family environment to reduce children's math anxiety. Parents should provide their children with encouragement, support, and assistance to help them develop their math self-efficacy and minimize rejection, which can damage their sense of self-efficacy. Teachers can also play a crucial role in creating a warm and supportive learning environment that fosters students' self-efficacy and reduces math anxiety. To alleviate math anxiety in children, it is essential to create an environment that promotes their sense of self-efficacy. Parents and teachers can create this environment by offering praise and encouragement, providing opportunities for success, and reinforcing their children's self-beliefs. Moreover, parents can help their children develop communication skills and autonomy, while setting appropriate boundaries to work within. Teachers can use instructional strategies that build students' self-efficacy, such as scaffolding, modeling, and providing opportunities for practice and feedback. Overall, the findings of this study suggest that creating a warm and supportive environment at home and school can help to alleviate math anxiety in children. By promoting children's math self-efficacy, parents and teachers can help students feel more confident and competent in math-related subjects, which may ultimately lead to improved academic performance and a greater enjoyment of mathematics.

Given the gender differences between boys and girls, it is crucial to adopt a more open and inclusive mindset that respects these differences in education and upbringing. Boys and girls should not be limited to societal and cultural constructs, but allowed to express their authentic selves. For instance, girls can be lively and boys can be well-behaved, which can help them reach their full potential.

Limitations

The study population comprised Chinese fifth and sixth graders, and future research should aim to expand upon the investigation of the mediating relationship between parenting style, math self-efficacy, and math anxiety. Additionally, as the sample size grows larger, it would be worthwhile to examine whether there are any grade-based differences in the mediating relationship as identified in the present study. This study utilized student self-reports as the sole data collection method. Future research should consider utilizing multiple data sources, such as parental reports on parenting styles. When assessing students' math self-efficacy or anxiety, feedback evaluations from peers and math teachers should also be considered. Additionally, to gain a better understanding of the relationship between parenting styles, math self-efficacy, and math anxiety, future research could employ a longitudinal design to examine how each variable changes and interacts over time.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Huzhou University. The patients/participants provided their written informed consent to participate in this study.

Author contributions

CW and XL: conceptualization. CW: methodology, supervision, and funding acquisition. H-jW, CW, and XL: validation. XL: formal analysis, writing—original draft preparation, and visualization. CW and H-jW: writing—review and editing. H-jW: project administration. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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How do parents and school staff conceptualize parental engagement? A primary school case study

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Understanding what different stakeholders mean by "parental engagement" is vital as school leaders and policy makers increasingly turn to parental engagement to improve pupils' outcomes. Yet, to-date, there has been little examination of whether parents', teachers', and school leaders' conceptions of parental engagement match those used in research and policy. This case study used online questionnaires to explore the conceptions of parental engagement held by 103 parents and 40 members of staff at one large English primary school. The results showed that only a quarter of school staff conceptualized parental engagement in relation to learning at home and that school leaders appeared to overestimate the impact of school-based activities. This is at odds with previous research suggesting that it is parental engagement with learning in the home – rather than parents' involvement with school - that is associated with pupil attainment. This suggests that there might be a striking mismatch in the way that parental engagement is conceptualized by researchers advocating for its efficacy, and by school staff devising and implementing parental engagement initiatives. It is vital to raise awareness of this possibility amongst practitioners, researchers, and policy makers because any such mismatch could result in the misdirection of time and resources and the undermining of parental engagement's potential as a powerful tool for raising attainment and closing achievement gaps.

KEYWORDS

parental engagement, parental involvement, teacher attitudes, school leaders, policy

1. Introduction

Parental engagement has been linked to improvements in attendance, behavior, and academic achievement (Gorard et al., 2012; Jeynes, 2012, 2022; Wilder, 2014; Marti et al., 2018; Sylva et al., 2018). It has even been argued that - for primary school pupils – parental engagement has a bigger impact on pupil outcomes than school quality (Desforges and Abouchaar, 2003) or socioeconomic status (Jasso, 2007). As a result, the term parental engagement has been widely used within policy documents, research papers, and schools themselves (Barr and Saltmarsh, 2014). There appears to be an underlying assumption that the various stakeholders share an understanding of – and aspirations for – parental engagement. Yet, there has been little examination of whether parents', teachers', and school leaders' conceptions of parental engagement are aligned with those of researchers and policymakers. This study aims to address this through an examination of how parental engagement is conceptualized by parents and school staff in England.

There has been no single definition of parental engagement in academic literature or educational policy. Wilder's (2014) meta-synthesis found that published studies have defined parental engagement in relation to: parent-child communication about school; assisting with homework; having high aspirations; attending school events; reading to children; supervising; communicating with schools; and parenting style. Meanwhile, the focus in policy has been on the role of parents in relation to their children's schooling (Barr and Saltmarsh, 2014) and parents' entitlement to information from schools (Harris and Goodall, 2008). In the UK context, the influential Education Endowment Foundation (2018:1) have defined parental engagement as "the involvement of parents in supporting their children's academic learning." Whilst widely cited, the emphasis on academic learning implies a "school-centric" view of education. Meanwhile, Pushor and Amendt (2018) have argued convincingly that teachers and school leaders should take a much broader, "family-centric" view of education. A broader definition is offered by Abdul-Adil and Farmer (2006: 2), who suggest that parental engagement encompasses "any parental attitudes, behaviors, style, or activities that occur within or outside the school setting to support children's academic and/or behavioral success." The key strength of this "family-centric" (Pushor, 2015) definition is that it acknowledges the role of parents in relation to schools *and* in relation to their children's learning outside of school. This paper therefore follows Goodall and Montgomery (2014) in recognizing that a whole spectrum of home- and school- based activity exists under the broad term of "parental engagement," allowing respondents to define and exemplify the concept during data collection.

Daniel (2005) noted three other terms – parent involvement, parent participation and family-school partnerships – which are often used interchangeably with parental engagement. Parental engagement was chosen as our preferred term because it is widely recognized in the UK school context. However, as with other studies in the field (e.g., Goodall, 2013), the term "parent" is used to refer inclusively to all parents, carers, and guardians throughout.

Different conceptualizations of parental engagement affect pupil outcomes in different ways. Wilder's (2014) meta-synthesis of nine meta-analyses found a positive relationship between parental engagement and academic achievement regardless of how these concepts were defined and measured. However, the relationship was strongest when defined as parental expectations for the academic achievement of their children. The same result has been reported in other meta-analyses (Jeynes, 2007; Axford et al., 2019), but controlled intervention studies targeting parental expectations are needed (Gorard, 2012). Meanwhile, Desforges and Abouchaar's (2003) large-scale review of the parental engagement literature found that "at-home good parenting" had the largest effect on children's achievement. This was true across all social classes and ethnic groups. This is consistent with evidence that effective parental engagement is usually rooted in the home (Melhuish et al., 2001; Sylva et al., 2003; Lehrl et al., 2020) whilst school-initiated, school-based parental engagement (such as attending school events or volunteering in school) does not consistently raise attainment (Okpala et al., 2001; Husain et al., 2016). Similarly, Harris and Goodall (2007) concluded that parents have the greatest impact on their children's achievement through supporting learning in the home. It is therefore vital that all stakeholders have a shared understanding of parental engagement and recognize the types of activity that are – and are not – associated with pupil attainment. This is important because any mismatch could lead to misdirected efforts and resources in the push to maximize parental engagement and improve pupil outcomes.

1.1. The national policy context

The representation of parental engagement within the educational policy landscape is key here because the aim of this study is to investigate whether the conceptualization of parental engagement in research and policy matches the conceptualizations currently being used within schools in England. Moreover, the language of policy documents and policy demands placed on school are likely to influence how parental engagement is conceptualized by school leaders. The idea that parental engagement enhances educational outcomes is not new and has received significant, long-standing political attention (e.g., Plowden, 1967). Since then, the importance of parents in relation to schooling in England has been re-emphasized in a series of policy documents including "Excellence in Schools" (Department for Education and Employment, 1997), "Higher Standards, Better Schools for All" and "Every Parent Matters" (Department for Education and Skills, 2005, 2007). Most significantly for school leaders, parental engagement has been a recurring theme in successive versions of the Ofsted Inspection Framework (OIF).

From the first OIF, published in 1992, "parental links" have been a factor contributing to the overall judgment of schools (Elliot, 2012). More recently, the OIF has included the need for schools to "engage with parents and carers in supporting pupils' achievement" (OFSTED, 2012: 16), "engage parents to the benefit of pupils" (OFSTED, 2015: 51), and "engage effectively with learners and others in their community, including – where relevant – parents" (OFSTED, 2019a: 13). It is clear from these statements that the intent is to boost pupil performance through parental engagement, but it is not clear what specific activities the statements aim to encourage. Is the policy aiming to encourage greater parental involvement in school-based activities? Is the intention to encourage schools to facilitate more learning in the home? Improve home-school communication? Or parent-voice in decision-making? This is ambiguous because of the numerous possible conceptions of parental engagement. Epstein (1987, 1995, 2001) identified the following types of parental engagement: parenting, communicating with school, volunteering in school, learning at home, decision making, and collaborating with the community. Whilst Epstein's research was mostly conducted in the U.S., similar roles were identified by a U.K.-based review of parental engagement (Goodall and Vorhaus, 2011).

Although the formal policy statements within the OIF are ambiguous, the research summary published alongside the latest OIF suggests that the intention is to encourage "the involvement of parents in their children's learning" through "providing practical advice on how parents can support learning at home" (OFSTED, 2019b: 38) and improving home-school communication. Strikingly, there is no suggestion that schools should be prioritizing parental attendance at school events. This is consistent with the evidence that it is parental engagement with learning in the home – rather than parents' involvement with school – that is associated with

increased pupil attainment (Okpala et al., 2001; Desforges and Abouchaar, 2003; Harris and Goodall, 2007).

From this, it appears that the conceptualization of parental engagement in U.K. educational policy broadly matches that of researchers. Namely, the emphasis is on facilitating parental engagement with pupils' learning beyond the school gates. Alignment around this goal could present a powerful mechanism for improving pupil outcomes. However, the integration of parental engagement into educational policy in England has been inconsistent. Partnership with parents has only recently been added to the Headteachers' Standards (Department for Education, 2020) and Core Content for Initial Teacher Training (Department for Education, 2019). As it stands, less than 10% of U.K. teachers have undertaken training related to parental engagement (Education Endowment Foundation, 2018).

1.2. Barriers to parental engagement

Many parents face material barriers to parental engagement – particularly in the form of attending school events. Working parents commonly express frustration that the timing of school events prevents them from engaging, whilst childcare and other caring responsibilities can pose similar difficulties (Harris and Goodall, 2008; UK Government, 2018). These barriers tend to be understood by school staff because many are parents whose jobs prevent them from attending their own children's school events.

However, other barriers may be less tangible and less well understood, particularly those faced by parents from minority groups (Harris and Goodall, 2008; Conus and Fahrni, 2019). Treating parents as a homogeneous group is a flaw in most schools' parental engagement policies (Crozier and Davies, 2007). This overlooks structural barriers to the parents' involvement and fuels misconceptions amongst staff. For example, parents from ethnic minority backgrounds are more likely to be labeled as "difficult" or "hard to reach" whilst non-attendance at school events may be the result of language barriers or a lack of knowledge of the local education system (Harris and Goodall, 2008; Theodorou, 2008). Over three quarters of the "hard-to-reach" parents interviewed by Campbell (2011) described negative experiences during their own time as pupils and/or previous negative interactions with school staff or other parents on the school site.

Socio-economic status (SES) is another factor that predicts level of parental engagement (Payne, 2006). However, research suggests that what you do with your children is much more important than who you are (Dearing et al., 2006; Jasso, 2007). Hence, SES does not determine the level of parental engagement but mediates it through material deprivation and parental behaviors (Sacker et al., 2002; Hayes et al., 2016). Parents without post-16 education are less confident communicating with teachers and find educational jargon more off-putting (Williams et al., 2002). Low-income parents may also struggle to attend school events as a result of lack of childcare or transport (Harris and Goodall, 2008). Finally, low-income parents often feel stigmatized by teachers (Wilson and McGuire, 2021) whilst middle-class parents are more likely to view teachers as their equals and feel confident in the school environment due to their shared social capital (Harris and Goodall, 2008).

Whilst parent-teacher relationships are often the focus of parental engagement research, Barr and Saltmarsh (2014) concluded that school leaders set the tone for building and maintaining relationships with families and communities, particularly for marginalized parent groups. Meanwhile, other studies have emphasized the importance of "a welcoming front of house" including the office area and the office staff (OFSTED, 2011: 8). The current study therefore includes all these staff groups.

These issues affect parents' engagement with schools, but they do not automatically impact engagement with their children's learning (Goodall and Montgomery, 2014). For example, language barriers and being uncomfortable engaging with school staff might impact attendance at school events, but they do not necessarily prevent parents from engaging with their children's learning in their own home and their own language. Smith and Wohlsetter (2009) suggest that school staff and policy makers generally lack awareness of the invisible strategies minority or low-income parents use to support their children's education. Goodall (2015) 2021 identifies a tendency for policy makers, educators, and researchers to adopt a deficit model when considering parents that are not visibly engaged with school. When parents do not engage in expected ways they are labeled as "hard to reach parents" (Munroe and Evangelou, 2012). This phrasing suggests that the problem lies with the parents rather than with the school. Pushor and Amendt (2018) believe that this is because staff are predisposed to look outward, toward parents, families, and the community to find explanations for perceived low levels of parent engagement (e.g., "these parents don't care"). Meanwhile parents may feel that problems lie primarily with schools being unwelcoming or difficult to access (Crozier and Davies, 2007).

Parental role construction can also affect the extent to which parents engage with their child's learning and their child's school. Parents have different beliefs about their role in the education of their child (Jasso, 2007). This is likely to be related to parents' sense of personal efficacy (Gubbins and Otero, 2020). Parents will only get involved to the extent that they feel their contributions will make a difference (Hoover-Dempsey et al., 2001). This is consistent with Desforges and Abouchaar's (2003) conclusion that parental perception of their role and their levels of confidence in fulfilling it can determine the extent of their engagement.

1.3. The theoretical framework

This study uses Goodall and Montgomery's (2014) model of parental engagement. The model presents parental engagement as a continuum, with parental involvement and parental engagement at opposite ends of a spectrum. During parental involvement, activities tend to be school-based and school-directed. Examples could include teachers providing parents with information or inviting parents into classrooms to observe or support the teacher. This type of involvement can be appealing to school leaders because it is easy to initiate and measure. However, it is likely to have minimal impact on pupils' outcomes (Harris and Goodall, 2007).

At the next point on the continuum, the focus moves from involvement with the school to involvement with the broader process of schooling. Agency is shared between parents and the school (Goodall and Montgomery, 2014). For example, a parent-teacher meeting where parents are partners in constructing a fuller

portrait of the child. It is recognized that parents' knowledge of their child is essential information that should be embraced to maximize the child's potential (Moss et al., 1999).

Parental engagement directly with children's learning is the final point on the continuum (Goodall and Montgomery, 2014). This is characterized by the attitude toward learning in the home. At this point, parents' actions may still be based on information provided by the school, but the choice of action remains with the parent. Parents choose to engage with their child's learning here because of their perceptions of their role as parents (Peters et al., 2007). At this stage parental engagement is unlikely to be located in school. Parents are engaged wherever they and their children discuss learning or engage in learning activities. This is consistent with earlier assertions that the most beneficial parental engagement is likely to be interactions between parent and child in the home (Melhuish et al., 2001; Desforges and Abouchaar, 2003; Sylva et al., 2003).

Goodall and Montgomery's (2014) framework is used in this study because it provides a broad view of the spectrum of parental engagement activities, thus enabling us to compare different conceptions. For example, parents reading at home with their child, family museum visits, parents volunteering in school, and parents' evenings can all be discussed in relation to the continuum. A purely school-centric or entirely family-centric model of parental engagement is unlikely to be able to cope with the perspectives of parents and school staff simultaneously. Furthermore, the model recognizes that parents can influence their children's learning directly through engagement at home and indirectly through involvement with school (Desforges and Abouchaar, 2003). Thus, it allows us to consider both routes without conflating them. Finally, the smooth continuum between home and school avoids conceptualizing schools as closed, self-sufficient systems, and allows us to view them as open systems that engage in learning at the boundaries between families and communities (Price-Mitchell, 2009). This allows recognition of boundary-spanning activities such as home visits.

The aim of this study was to explore whether there is a shared understanding of the term "parental engagement" among parents and school staff at one large English primary school. It provides an in-depth exploration of how parental engagement is conceptualized by parents and staff through the following research questions:

(1) Which parental engagement activities are identified by parents and school staff?
(2) What are the perceived barriers to further parental engagement according to parents and school staff?

2. Methodology

This paper presents a case study examining parental engagement in its real-life school context. This was deemed to be the most appropriate research strategy because parental engagement is context-dependent (Crozier and Davies, 2007; OFSTED, 2011) and case studies are useful when "the boundaries between phenomenon and context are not clearly evident" (Yin, 1981: 59). As a result, this case study focused on parental engagement at one school whilst utilizing multiple sources to allow for triangulation being respondents (Johnson, 1994).

2.1. The school context

The school examined in this case study is a large, state-maintained English primary school with over 600 pupils and 60 members of staff. The school has been given the pseudonym *Hollyoaks*. Hollyoaks was selected because the first author's pre-existing relationship with the school enabled direct communication with parents and staff members, and a detailed understanding of the school's context. It is also much larger than the average primary school which allowed the examination of subgroups such as comparing the views of senior leaders with those of class teachers and teaching assistants.

Hollyoaks is an inner-city school located in an area of the Midlands that has significant levels of deprivation. According to the 2021 census, 27% of working-aged residents had no qualifications and the proportion of residents experiencing long term unemployment (17%) was almost double the national average (9%; Office for National Statistics, 2021). Consequently, over 40% of pupils at Hollyoaks are eligible for free school meals. The percentage of residents from minority ethnic groups (50%) is more than double the national average (19%; Office for National Statistics, 2021). Consequently, the schools' pupils have diverse ethnic backgrounds. The largest groups within the school are Pakistani, White British and Romani. This is important because minority and low-income families may experience different barriers to parental engagement (Weiss et al., 2003; Harris and Goodall, 2008; OFSTED, 2011).

2.2. Ethics

This study received ethical approval from the Department of Education Studies ethics committee of the University of Warwick. In accordance with British Educational Research Association guidelines (British Educational Research Association [BERA], 2018), the school has been given the pseudonym Hollyoaks to protect the anonymity of pupils, parents, and staff. Voluntary informed consent was obtained from the Headteacher in writing prior to starting the study, and then from each individual staff and parent respondent at the start of the survey. Participation was optional.

2.3. Participants

A total of 103 parents from Hollyoaks completed the online parent questionnaire. The respondents had a total of 172 children attending Hollyoaks. The parental response rate was 30%. **Figure 1** shows the ethnicity breakdown of the parent respondents.

Forty members of staff from Hollyoaks completed the online staff questionnaire (5 senior leaders, 26 class teachers, 11 teaching assistants, 2 office staff, 6 other staff). This represented a response rate of 63% which compares favorably to other school staff surveys in the literature (e.g., Sturman and Taggart, 2008 [44%]; Elton-Chalcraft et al., 2017 [10–45%]; Fotheringham et al., 2022 [6%]).

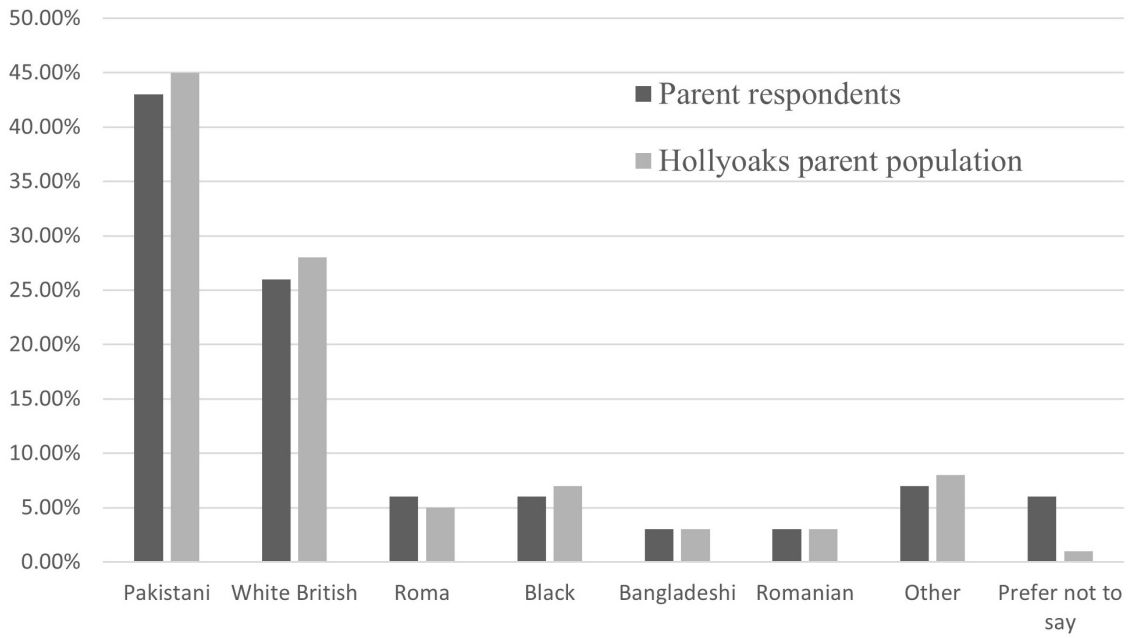

FIGURE 1
A graph showing the ethnicity breakdown of the parent respondents compared with the ethnicity breakdown of the Hollyoaks parent population.

2.4. Measures

A staff questionnaire and parent questionnaire were developed for the purpose of collecting primary data for this study. Each questionnaire consisted of eight questions. One open question was used at the start of the staff questionnaire to elicit detailed descriptions of parental engagement in the participants' own words. The rest consisted of closed questions (Likert scales and multiple choice) to facilitate comparison between the responses of different groups. An optional comment box was added to each closed question so that participants were able to expand on or clarify their responses. The content of the questionnaire was driven by the research questions and informed by the findings of the literature review. For example, a matrix was used to ask staff and parents to consider the perceived impact of different types of parental engagement. The activities for consideration in the questionnaire were taken from both ends of Goodall and Montgomery's (2014) continuum.

The draft questionnaires were piloted with eight teachers and twelve parents from other schools and several questions were re-worded as a result. For example, "in the last 12 months, have you taken your child to visit educational places" was found to be ambiguous and was therefore edited in the final version to ask about museums and libraries.

2.5. Procedures

With the permission of the Headteacher, a link to the staff questionnaire was included as a standing item on Hollyoaks' pre-existing daily briefing emails sent to all staff. Verbal reminders were also given during weekly staff meetings. Meanwhile, all parents were invited to complete the parent questionnaire via Hollyoaks' existing online parent communication system. This enabled most parents to complete the survey at home on their own devices. Parents were also given the opportunity to complete the survey on school iPads in the playground before or after school in order to provide equal opportunity to parents who could not access the internet and/or a suitable device at home. Both surveys remained open for 4 weeks.

2.6. Data analysis

The responses from the parent survey and the staff survey were first analyzed separately in order to identify which types of parental engagement were valued by each group. Views from both sets of respondents were then compared for the analysis of barriers to parental engagement. Descriptive statistics were used to summarize and compare responses to the closed questions.

Deductive thematic analysis was used to analyze the free-text descriptions of strong parental engagement. Staff were asked, "In your own words, please explain as fully as possible what you think we mean by the term "parental engagement." Include examples of what you think strong parental engagement looks like." Their free-text responses were coded using Goodall and Montgomery's (2014) continuum as either level 1, level 2, or level 3 (see **Table 1**). Using these pre-defined levels as a framework for analysis allowed a balanced approach advocated by Janesick who argues that the analysis of qualitative data requires the mind to be "open but not empty" Janesick (2000: 384). Each response was coded by the first author and then independently coded by a second person, blind to the first author's ratings. The codes assigned by the two raters were then cross-checked. The codes given were consistent for 32/40 responses (80%). For the responses where different codes were assigned, the two raters

TABLE 1 An overview of how each level was defined during the codifying process.

	Definition	Examples of staff responses assigned this code
Level 1	Activity focused on parental involvement with the school on the school's own terms.	"Inviting parents into school to join in with activities we are doing with the children" "Parental engagement to me means parents participating in their child's schooling through workshops and parents' meetings."
Level 2	Activity focused on parental engagement with the process of schooling and shared agency with parents.	"Involving parents in all aspects of school life and finding out their views on things" "Parents are involved in school life. They participate and contribute to school life and ethos."
Level 3	Activity focused on parental engagement with their child's learning. Recognizes the agency of parents and the value of activity at home.	"Empowering parents to be actively involved in their child's learning – academic, personal, emotional and creative development within school and outside of school." "Parents being actively engaged in their child's learning, either through school events or in supporting their education at home"

The definitions are adapted from Goodall and Montgomery (2014).

reached an agreement through discussion with reference to the original definitions.

3. Results

3.1. What sort of parental engagement do school staff identify?

As a result of coding process outlined above, 15% of staff conceptualizations of parental engagement were coded at level 1, 60% at level 2, and 25% at level 3. This suggests that staff currently have mixed views of parental engagement at Hollyoaks. A sizeable minority of staff appear to believe that the goal of parental engagement is to increase parent attendance at school events. Just one quarter of staff expressed aspirations for parental engagement which included empowering parents to engage with their children's learning beyond the school gates.

The frequency of each type of response was broken down according to staff group (see **Table 2**). It is encouraging to note that no level 1 responses were given by senior leaders. However, they still fall short of consensus in their conceptions of parental engagement as 2/5 made no reference to parental engagement with learning at home. The wide spread of responses in all groups suggests that there is work to be done in ensuring that all staff have shared understanding of what is meant by parental engagement and the future aspirations for Hollyoaks in this area.

Next, staff members were asked to consider the impact on learning of 15 different parental engagement activities. The purpose of this question was not to attempt to evaluate the actual impact of each activity on learning, but rather to consider whether staff perceptions are consistent with the growing evidence that level 3 activities are more impactful than level 1 or 2. Overall, parents reading with their children at home, encouraging their children to access educational resources, and taking their children to educational places were rated by staff as having the greatest impact on learning. Parents volunteering in school and attending family learning, performances and exhibitions in school were considered to have the least impact on learning. This suggests that most staff are on some level aware that what parents do with their children at home is more important than their engagement with school-based activities.

TABLE 2 An overview of the number of responses coded at each level, broken down by role within school.

Role within school	Number of level 1 responses	Number of level 2 responses	Number of level 3 responses
Senior leader	0	2	3
Class teacher	2	11	3
Teaching assistant	3	7	1
Office staff	1	0	1
Other	0	4	2
Total	6	24	10

Comparing the impact scores given by different staff groups revealed that senior leaders tended to believe that school-based activities were having a greater impact on learning than the impact perceived by class teachers or teaching assistants. For example, for parent-to-school days (where parents observe lessons) all senior leaders believed there was a strong positive impact on learning compared to one third of teachers. The literature review indicated that school-based, school-initiated activities such as parent-to-school days are likely to have little impact on learning which suggests that senior leaders are overestimating the impact of this initiative rather than teachers underestimating it. Leaders may overestimate the positive benefits of their own initiatives. Alternatively, senior leaders may be more likely to only consider the positive side of school-based initiatives whilst teachers and teaching assistants may be balancing the positives with the realities of having parents and young siblings in school. Some teachers chose to add free text comments which included references to lessons being disrupted by babies crying and parents taking phone calls in crowded classrooms.

Interestingly, the reverse pattern was found for most parent-initiated activities with teachers believing the impact was stronger than senior leaders. For example, two thirds of teachers indicated that parents taking their children to educational places (e.g., museums, libraries etc.) had a strong positive impact on learning compared to just one of the senior leaders. Again, previous research supports the views of teachers rather than those of senior leaders.

3.2. What sort of parental engagement do parents identify?

Parents were asked to consider a list of ways they might support learning and to indicate for each activity whether they had done it in the last 12 months, had not done it but would be interested in future, or were not interested doing it. The results are summarized in **Table 3**.

Table 3 shows that vast majority of parents already engage with learning through parents evening, supporting with homework,

TABLE 3 An overview of parent responses to questions about different ways that parents might engage with learning (n = 103).

		Already doing	Interested in doing in future	Not interested
School – centered	Attending parents evening	97	2	1
	Discussions with class teachers	84	13	3
	Attending school performances/exhibitions	83	16	1
	Attending workshops	80	19	1
	Attending family learning	63	29	8
	Discussions with school leaders	38	55	7
	Discussions with the parent link worker	24	60	16
	Volunteering in school	7	67	26
Family-centered	Talking to my child about their learning	96	3	1
	Supporting with homework	95	5	0
	Reading with my child	93	7	0
	Encouraging my child to access educational resources (e.g., games, documentaries etc.)	92	6	2
	Taking my child to educational places (e.g., museums, libraries etc.)	78	21	1
	Hosting staff for a home visit	13	57	30

All figures are percentages.

reading at home, encouraging access to educational resources, and talking to children about their learning. This suggests that parents value these types of engagement – most of which are family-centered. The high percentages interested in volunteering in school, having discussions with staff, and attending events (e.g., exhibitions, workshops, performances and family learning) in future suggests that parents also value school-based parental engagement opportunities. However, given that family-centered engagement is likely to have the greatest impact, the most important areas are the family-centered activities that parents are interested in engaging with. For example, 21% of parents had not taken their child to a museum or library but were interested in doing so and 57% would be interested in hosting staff for a home visit.

Parents were invited to add any ways in which they engaged with their children's learning that were not already covered by the questionnaire. Most comments repeated activities already discussed (e.g., "speaking to teachers at least once a week" and "encouraging children to read more"). However, one comment suggested that parents support learning through "discussions with other parents." Parent-to-parent engagement with pupils' learning is an interesting consideration as it appears to be largely absent from the parental engagement literature. Its strength is in it being entirely parent led but schools may be able to support or facilitate engagement of this kind through providing space and time for parent networks.

3.3. What are the perceived barriers to parental engagement?

Staff and parents were asked to indicate their perceived barriers to greater parental engagement. There were striking differences between the perceptions of the two groups (see **Figure 2**). The two most common barriers identified by parents were school-based issues around the timing of events and lack of notice. Staff underestimated both of these barriers and generally perceived the main barriers to be shortcomings of the parents. Three quarters of staff said that parents lacked the skills to support their children's education and nearly half of staff thought that parents not caring about their children's education was a significant barrier.

There were large within-group differences in staff perceptions of barriers. Encouragingly none of senior leaders said that parents do not care, however this view was held by half of teachers and teaching assistants, and all office staff. The opposite pattern was observed in group differences in response to parents not having the skills to support their children's education. All senior leaders but only half of teachers considered this to be a barrier. Interestingly, only 10% of parents thought that they might lack the skills to support their child's education. It is vital that school staff empower all parents to believe in their own ability to make a difference, but this will be difficult to do whilst none of the senior leaders believe it themselves.

Language barriers was the final area in which there was significant discrepancy between staff and parents. Only 10% of parents considered language to be a significant barrier but this is likely to be skewed by the fact that completion of the online questionnaire required competency in English. For staff, 60% indicated that language was a barrier. Most staff considered the responsibility for resolving this to be on the parents rather than on the school. Crucially, 4/5 of senior leaders said that not enough parents speak English whilst none of them thought that not enough staff spoke Urdu etc. This outlook is reflected in decisions taken at Hollyoaks. For example, the school hosts ESOL (English for Speakers of Other Languages) classes for parents but does not translate home-school communications.

Despite this, 90% of parents said they felt welcome in school. Parents were then asked to what extent they felt that parental

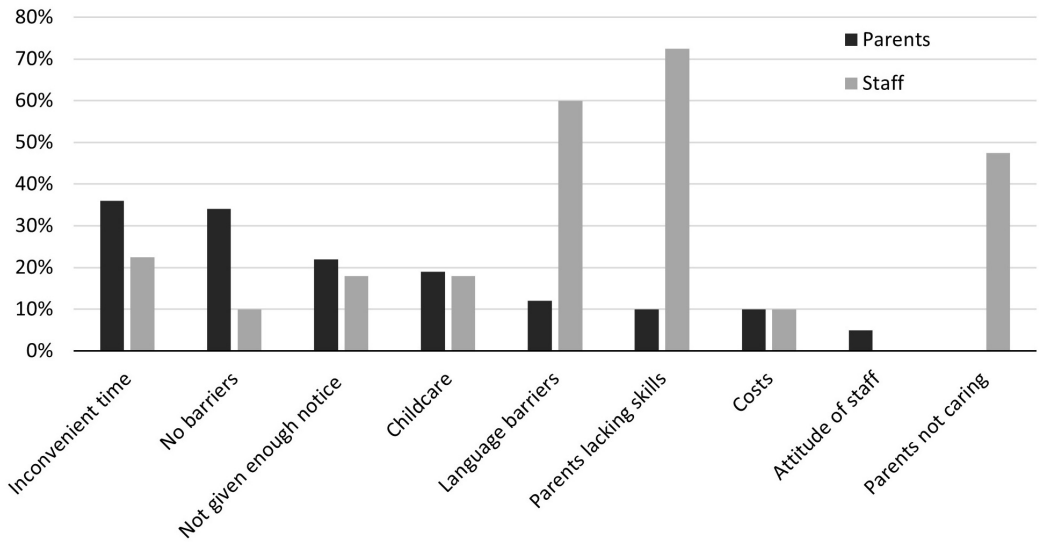

FIGURE 2
An overview of the barriers to parental engagement as perceived by staff and parents at Hollyoaks.

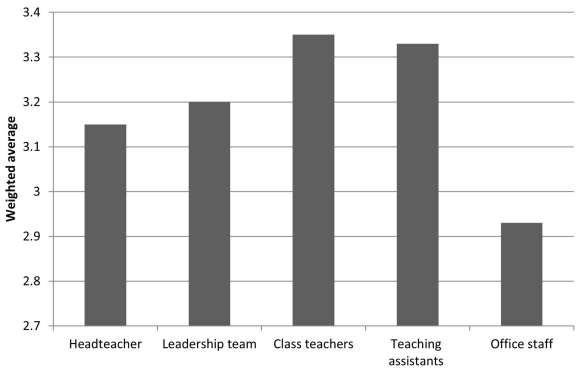

FIGURE 3
A graph showing the extent to which parents agreed that parental engagement is valued by each staff group at Hollyoaks.

engagement was valued by different staff groups at Hollyoaks. Parents responded on a 4-point Likert scale for each staff group. Weighted averages were calculated and are compared in **Figure 3**. Some researchers caution against calculating numerical averages from Likert scales because it assumes that the "distance" between each point on the scale is equal (Göb et al., 2007). However, in **Figure 3** the point of interest is not the absolute value of the weighted average, but the relative score given to each group. Parents felt that their engagement was most valued by class teachers, followed by TAs. A smaller percentage of parents agreed that the headteacher and senior leadership team valued parental engagement. Parents felt least valued by office staff.

4. Discussion

This study examined the conceptualization of parental engagement among parents and school staff. The data showed that three quarters of staff conceptualized parental engagement in relation to participation in school events and relationships with teachers. Just one quarter of school staff described parental engagement in terms of the relationship between parents and their children's learning beyond the school gates. Meanwhile, almost all parents felt that they regularly engaged through home-based activities, including reading at home, encouraging access to educational resources, and talking to children about their learning. There were also clear differences between the barriers to engagement identified by parents and those identified by school staff. This suggests that parents and school staff do not have a shared conception of – or aspirations for – parental engagement even within the same school.

The school-centered conceptions being used by school staff are concerning because there is strong, pre-existing evidence that parents contribute most to pupil outcomes through engaging with their learning outside of school (Melhuish et al., 2001; Desforges and Abouchaar, 2003; Sylva et al., 2003; Harris and Goodall, 2007). Senior leaders in this study also appeared to overestimate the impact of school-based activities despite evidence that the impact of school-based events is often minimal (Okpala et al., 2001; Desforges and Abouchaar, 2003; Harris and Goodall, 2007; Husain et al., 2016). Researchers and policy makers have suggested that schools should "shift from simply involving parents with the school to enabling parents to engage themselves more directly with their children's learning" (OFSTED, 2011: 8) but the finding here suggest that some schools may still be focused on school-centric parental involvement. This may be related to the fact that less than 10% of teachers have had any training in relation to parental engagement (Education Endowment Foundation, 2018).

All parents in this study were keen to engage directly with their children's learning. This is consistent with the findings of Harris and Goodall (2008), Theodorou (2008), and Campbell (2011) who have previously shown that parents care deeply about their children's education, including those who face barriers to engaging with schools. This study has gone further in also identifying several

areas in which greater facilitation by the school is likely to be welcomed by parents. For example, 99% of parents said they want to take their children to museums and libraries but only 78% are currently doing so. In response, the school could host parental engagement events at local libraries or museums. These could be organized in partnership with parents to ensure that the format, timing, and communication of the event allow for maximum engagement. This represents an exciting opportunity for the school to facilitate parental engagement with learning, in response to an expression of interest from parents themselves.

Similarly, 98% of parents are interested in encouraging their children to access educational resources but only 92% have done this at any point in the last 12 months. This provides an opportunity for Hollyoaks to "shift to encouraging parental engagement with learning in the home through providing levels of guidance and support which enable such engagement to take place" (Harris and Goodall, 2008: 286). In response, Hollyoaks could compile examples of free educational, age-appropriate games and apps. The school could also signpost parents to documentaries or home-learning resources that complement each in-school topic or which may just be of general interest to families. They could also host the infrastructure for parents to be able to share their own ideas with each other as the foundation for building parent-parent networks.

In addition to implementing evidence-based initiatives, school leaders must play a key role in fostering a culture that allows parental engagement to thrive (Pushor and Amendt, 2018). However, in the current study, staff perceived the biggest barriers to parental engagement to be: parents not attending school-based events (78%), parents not having the right skills to support their children's education (73%), and parents not caring about their children's education (48%). This is consistent with Goodall's (2015) conclusion that educators tend to adopt a deficit model when considering parents that are not visibly engaged with school, whilst parents may feel that problems lie primarily with the school (Crozier and Davies, 2007). Pushor and Amendt (2018) suggested that school leaders must lead a transformation whereby school staff look at their own disposition, actions, or inactions to find reasons for perceived low parental engagement and to generate solutions (e.g., "perhaps if I had made a home visit rather than expecting parents to come here").

It is vital that school staff empower all parents to believe in their own ability to make a difference (Hoover-Dempsey et al., 2001; Desforges and Abouchaar, 2003; Peters et al., 2007). However, in this study, all of the senior leaders believed that parents lacked the required skills to support learning and therefore they are unlikely to be able to empower parents in the community they serve. Significant attempts must be made to tackle misconceptions among teachers and school leaders if the full potential of parental engagement as a tool for school improvement is to be realized. This is likely to require staff training (Goodall and Vorhaus, 2011) and scaffolded opportunities for staff and parents to mix authentically within the local community (Pushor and Amendt, 2018).

Parental engagement training could be of benefit to all school staff, not just teachers. In this study, parents felt most welcome by class teachers and TAs. This appears to be in contrast with Barr and Saltmarsh's (2014) conclusion that the headteacher and leadership team set the tone for how valued parents feel within school. However, teachers and TA in primary schools may have more opportunities for regular, informal interactions with parents, whilst headteachers and senior leaders only have personal interactions with parents in response to concerns such as poor behavior or attendance. Furthermore, parents felt that their engagement was valued least by office staff. This is concerning given the recognized importance of office staff in relation to the parent-school relationship.

5. Limitations and suggestions for further research

Caution should be exercised in drawing generalizations from this data. The case study design means that the data produced is rooted in a specific context. Data from larger, representative samples is needed to determine whether school-centric definitions of parental engagement might be a national – or indeed international – problem. The findings have direct implications for school leaders at Hollyoaks. Leaders at other schools should consider the extent to which the results and recommendations might apply to their own context. School leaders may wish to use the procedures outlined here to collect similar data from their own staff and parents to facilitate evidence-based action.

Future research with larger samples should also explore the perceptions of different parent groups, including parents of children with special educational needs and disabilities (SEND). This particular group of parents may have different perspectives on parental engagement because the SEND code of practice in England places a statutory duty on schools to take a family-centric approach and to involve parents in decision making (Department for Education, 2015). Parents of children with SEND may also face unique barriers to parental engagement including the lack of "school gate culture" in special schools (Spear et al., 2022) and a lack of confidence in the education system as a result of negative experiences (Lamb, 2009).

There is also the possibility of response bias in the parent sample. Whilst the ethnicity breakdown presented in **Figure 1** does not suggest a skewed sample, it remains possible that the sample was not representative based on other, unmeasured characteristics. For example, those with a pre-existing interest in the topic, those with higher literacy levels and those with internet access may have been more likely to respond to the questionnaires. This risk was minimized by offering all parents the opportunity to complete the survey on iPads in the playground but cannot be entirely discounted. As with all self-report surveys, social desirability bias is also a possibility. The anonymous nature of the survey removes the motivation for participants to deliberately present themselves in a favorable light, but participants may still have done so subconsciously. However, if present, one would expect the direction of this bias to predispose staff and parents to report alignment with research and policy. Social desirability bias is therefore very unlikely to undermine the key findings of this study.

Finally, the COVID-19 pandemic resulted in significant changes to the way in which parents engaged with schools and with learning. Future research should examine whether this has had any lasting impact of the ways in which parental engagement is conceptualized by parents and school staff. This may require increased scrutiny of the role played by technology, along with

the opportunities and barriers this creates (e.g., See et al., 2021; Baxter and Toe, 2023).

6. Implications

This study has challenged the assumption that stakeholders in education possess a shared understanding of what effective parental engagement is and what the barriers are to achieving this. The findings suggest that there may currently be a worrying mismatch in the way that parental engagement is conceptualized by researchers and policy makers advocating for its efficacy, and the conceptions of school staff devising and implementing parental engagement initiatives. If school leaders continue to confuse parental involvement with school and parental engagement with learning, then resources are likely to continue to be disproportionately allocated toward school-based events aimed at parents' relationships with schools, rather than supporting family-centered engagement with learning. If this happens, efforts will not lead to the progress expected and parental engagement as a strategy for school improvement will be de-valued (Cowley and Cowley, 2013).

To rectify this, school leaders, teachers, teacher educators, parents, researchers, and policy makers need a shared conceptualization of parental engagement, centered on the relationship between parents and their children's learning. Inclusion in initial teacher training and the Headteachers' standards could be a starting point for disseminating this widely. For policy makers, this presents an opportunity to unite thousands of professionals behind a family-centric conceptualization of parental engagement and equip teachers with the knowledge, skills and attitudes needed to promote parental engagement as a mechanism for improving pupil outcomes.

The findings here suggest that some staff may need to re-examine their beliefs about parents and address misconceptions so that mutually respectful partnerships can be built. For teachers, the findings of this study may serve as a starting point in examining their own conceptualization of parental engagement and considering whether deficit views of parents could be preventing them from building effective partnerships (Goodall, 2021). Meanwhile, school leaders may wish to reflect on the conceptions and possible misconceptions that may be present in their setting. For example, on whether policies and practices reflect a family-centric or school-centric conceptualization of parental engagement, and whether parental engagement training for staff could be beneficial.

This study has also provided detailed information about the views of parents and school staff in relation to specific parental engagement activities. Responses from parents indicate that there may be opportunities to refocus parental engagement efforts on learning in the home and community, rather than on surface-level engagement with the school itself. For example, schools could; provide educational resources to support the home learning environment, facilitate interaction between families and educational places such as museums and libraries, and support parent-to-parent networks.

7. Conclusion

Our study examined whether there was a shared understanding of parental engagement among parents and school staff in the context of one UK-based primary school. Our findings pointed toward a striking mismatch concerning how parental engagement is currently being conceptualized in related research and school staff perceptions who are at the forefront of developing and implementing parental engagement activities.

In highlighting disparities in how parental engagement is currently conceptualized by different groups, namely teachers and parents, and providing recommendations aimed at reaching a shared understanding, it is hoped that this study can contribute to the potential of parental engagement being harnessed more effectively.

Data availability statement

The datasets presented in this article are not readily available because participant consent was only sought for specific named researchers to access the data. Requests to access the datasets should be directed to CJ, c.jones.27@warwick.ac.uk.

Ethics statement

The studies involving human participants were reviewed and approved by the Education Studies Ethics Committee, University of Warwick. The patients/participants provided their written informed consent to participate in this study.

Author contributions

CJ contributed to the conception and design of the study, collected and analyzed the data, and wrote the first draft of the manuscript. OP contributed to the substantial redrafting of the manuscript and revisiting of the intellectual content. Both authors contributed to the manuscript revision, read, and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Can work-to-family conflict lead to preschool children's social behavior problems?—The chain mediating roles of guilt about parenting and parent-child relationships

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Parents' work-to-family conflict has been reported to be associated with preschool children's social behavior problems, but the underlying mechanisms of this association in the Chinese cultural context remain unclear. Based on ecosystem theory and the spillover-crossover model theory of emotion, this study aimed to examine the correlation between parents' work-to-family conflict and preschool children's social behavior problems in China, as well as the mediating role of guilt about parenting and parent–child relationships. Structural equation modeling was used to check the research hypotheses with a sample of 3,038 parents of Chinese preschool children. The main findings of this study are as follows: (1) Work-to-family conflict faced by parents was positively associated with guilt about parenting and preschool children's social behavior problems; (2) The effect of guilt about parenting on preschool children's social behavior problems was bidirectional; guilt about parenting was positively related to preschool children's social behavior problems, but when guilt about parenting prompted parents to adjust their parent–child relationships, it was negatively related to preschool children's social behavior problems. Taken together, these results further explain the interaction between parents' work-to-family conflict and preschool children's social behavior problems and discuss the influence of multiple factors on preschool children's social behavior problems. Theoretically, this study enriches the theoretical basis of the interaction with resources from the external environment of home education and family education. Practically, it implies that multiple levels, such as the government, early childhood education institutions, and work units, should give more support to preschool children's family education and thus work together to promote the healthy development of preschool children.

KEYWORDS

preschool children, work-to-family conflict, social behavior problems, guilt about parenting, parent-child relationships

Introduction

Behavior problems are a manifestation of children's social maladjustment, mainly referring to immature behaviors in children's emotional and social adjustment (Achenbach et al., 1987), including both explicit behavior problems (e.g., aggression and defiant behavior) and implicit behavior problems (e.g., depression/anxiety and social withdrawal; Achenbach, 1991). There are growing prospective evidence that behavior problems identified in the preschool stage [1] often persist and bring negative effect on the future development of the individual (Campbell, 1995; Liang et al., 2022). To illustrate, children who manifest markedly disruptive behavior problems during early adolescence typically have a preceding history of problems that originated during their preschool stage (e.g., Loeber and Dishion, 1983; Moffitt, 1990; Campbell, 1995). Furthermore, social adjustment problems in early childhood can also predict, to some extent, future problems such as lower learning ability and lower academic achievement (Bulotsky-Shearer and Fantuzzo, 2011). It is evident that early childhood behavior problems significantly impact individuals' future development (Egeland et al., 1990; Campbell, 1994; Campbell, 1997; Winsler et al., 2000). As such, researchers need to focus on examining risk and protective factors associated with young children's behavior problems. This study takes a multi-perspective approach, exploring the influences of various factors on preschool children's behavior problems, including educational background and parenting behaviors. This current study aims to identify effective strategies for reducing children's behavior problems, enhancing their social adjustment abilities, and promoting their healthy physical and mental development.

"Social skills are defined as abilities needed to perform competently in a social situation, including encoding skills (e.g., perception and interpretation of a situation), decision skills (e.g., social self-efficacy), and enactment skills (e.g., asking a friend to get together, planning activities with friends; Cavell, 1990; Devine et al., 2012)." Social skills are the basis for children's social adjustment since they are likely to help improve the quality and effectiveness of children's social interactions and social adjustment, which in turn, lead to less behavior problems (Winsler and Wallace, 2002). A variety of factors have been proposed to influence the course of early social skill acquisition; however, for young children who just started their learning in kindergarten, such skills are likely dependent on the family context (Anthony et al., 2005).

According to the ecosystem theory (Bronfenbrenner, 1993), family is the innermost system that influences individuals' development, called micro-system. Children first acquire social skills through direct contact with family members. Therefore, the family environment exerts strong influence on children's early development that is based on social skills. Specifically, some factors (e.g., family social status, family member relationships, marital status and quality) may influence preschool children's acquisition of social skills and affect their likelihood of social behavior problems. That has been confirmed by numerous studies (e.g., Campbell and Cluss, 1982; McGee et al., 1984; Dadds and Powell, 1991; Koot, 1993). Family is a basic unit that constitutes the ecosystem for children's development, the development of children is influenced not only by multiple factors within the family, but also by related factors outside the family. In modern, a prominent example of the ecosystem is the parents' workplace. The spillover-crossover model suggests that individuals' emotions, attitudes, and behaviors in the work domain can spill over into the family domain and influence the emotions, attitudes, and behaviors of their family members through social interaction (Bakker and Xanthopoulou, 2009; Ilies et al., 2017). The characteristics of the workplace, such as the working hours, intensity, and input-reward ratio, are likely to influence children's development, mainly through its impact on family processes and family functioning (Bronfenbrenner, 1986; Hess and Pollmann-Schult, 2019). Therefore, research on the family education of preschool children should not be limited to the family; rather, it should be extended to include external factors such as sociocultural and work characteristics, and how they are correlated to the development of children's social skills.

With the ongoing economic transformation and urbanization in China, significant changes in the public's lifestyle have emerged, leading to a direct impact on family education of preschool children. Notably, the increasing number of dual-income families in urban areas has placed a significant burden on parents, especially mothers, who must balance work responsibilities with household and family education duties to ensure adequate income for their families (Tong and Liu, 2010). Additionally, changes in urban living patterns have resulted in more nuclear families with children, making it crucial for parents to assume more responsibility for family education, rather than relying on the children's grandparents (Ma, 2023). However, traditional gender concepts continue to influence preschool children's home education. Although dual-income families require a cooperative model in which both partners share the responsibilities of family education, traditional ideas surrounding gender roles still motivate mothers to take on the primary responsibility for family education. This poses challenges for young Chinese mothers, including maintaining a work-family balance, fostering positive emotions in family education, and achieving happiness in life (Tong and Liu, 2010).

Given the challenges faced by working parents in balancing family and work, this study aims to explore the factors that mediate the relationship between work-family factors and children's social adjustment problems. Notably, there is a scarcity of empirical research on the association between parents' workplace and children's development (Vieira et al., 2016), including the internal mechanism of this relationship, particularly within the Chinese cultural context. Therefore, this study focuses on examining the variable of Chinese parents' experiences in managing their work and family roles and explores the mechanism of action in relation to preschool children's social behavior problems.

Work-to-family conflict (WFC) and preschool children's social behavior problems

Many parents of preschool children are experiencing some degree of stress or anxiety related to the attempt to balance the conflicting demands of work and family (Duxbury and Higgins, 1994). Work–family conflict (WFC) is "a form of inter-role conflict in which the role pressures from the work and family domains are mutually incompatible

1 "Preschool stage" include ages from 3 to 6 years in China, it's a time range of children's kindergarten life from the beginning to the end.

in some respect. That is, participation in the work (family) role is made more difficult by virtue of participation in the family (work) role" (Greenhaus and Beutell, 1985). Work–family conflict (WFC) manifests in two distinct ways. The first is through the interference of work responsibilities with family life, referred to as work-to-family conflict (WFC). The second involves family responsibilities diminishing the efficacy of work, known as family-to-work conflict (FWC). Drawing on Pearlin et al.'s (1990) stress process model and Bronfenbrenner (1986) ecological model of human development, research suggests that work-to-family conflict is primarily associated with adverse outcomes for children. This is due to the demands of the workplace, which limit the time and energy parents have available for their families, impede the flexibility and autonomy of family life, and negatively impact family education practices. Facing with fierce job competition, pressure of career development, and financial pressure due to the high cost of childcare, work-to-family conflict are common among Chinese young parents, which is very likely to have an impact on family life, especially on childcare. Zhang and Lin (2020) have conducted empirical studies in the Chinese context, showing that the extended time of both family and work and the double demands of emotional investment lead to the "time shortage" of urban young parents, which further increases the rearing anxiety of the family emotional atmosphere. Lau (2009) examined the impact of work-to-family conflict on the quality of parent–child interactions in Hong Kong, indicated that parents' work-to-family conflict negatively affected the quality of parent–child interactions, which in turn caused harm to children's self-esteem. Song et al. (2023) also found that Parents' work–family conflict not only directly predicts children's social behavior problems, but also indirectly increases it through the stress about parenting. Specifically, studies have indicated that children whose parents experience higher levels of work-to-family conflict tend to exhibit higher levels of emotional symptoms, conduct problems, hyperactivity/inattention, and peer relationship problems (Dinh et al., 2017; Chai and Schieman, 2021; Song et al., 2023). Based on the above research findings, the research hypothesis 1 of this study is proposed, which is that there is a positive correlation between the level of work-to-family conflict experienced by parents and preschool children's social behavior problems.

Work-to-family conflict, guilt about parenting and preschool children's social behavior problems

Guilt about parenting has been suggested as a potential mediating variable between work-to-family conflict and social behavior problems among preschool-aged children (Slobodin et al., 2020). This cognitive-emotional response occurs when parents believe that their thoughts, feelings, or behaviors as parents have caused harm to their children, leading to negative self-evaluations (Haslam et al., 2019). Guilt about parenting often arises from the competing demands of work and family responsibilities. Work-to-family conflict not only increases parents' daily stress and anxiety, but also creates a perception that their careers impede their caregiving role, potentially causing harm to their children (Dinh et al., 2017). Many studies have shown that work-to-family conflict may trigger guilt about parenting (e.g., Livingston and Judge, 2008; Bosman, 2021). Zhang (2002) suggests that traditional Chinese family values and patterns increase the likelihood that work-to-family conflict lead to guilt about parenting. For example, if the mother is on a business trip and the father has to take the children to eat fast food, the traditional concept of family will think that this family lacks rules and is irresponsible to the children. Zhang (2002) further believes that modern professional families need to have new standards of home-work relationships, thereby reducing guilt about parenting. Parents of preschool children tend to experience guilt more frequently than non-parents or parents of older children (Borelli et al., 2016; Korabik, 2017), with guilt about parenting being a significant component of work-family guilt for this group.

There could exist an association between guilt about parenting and social behavior problems in preschool children. As noted earlier, guilt about parenting is a negative emotional response associated with work-to-family conflict, which may pose a risk to the children's physical and mental well-being (Jocson and McLoyd, 2015). At the same time, as a typical moral emotion, guilt is a negative affective experience that individuals feel after violating moral standards, desirable norms, or moral rules. It motivates individuals to make up for the harm they have caused to others. Parents may engage in more compensatory behaviors driven by guilt, such as adopting overly permissive parenting styles, increasing parent–child interaction, or overindulging children, in an effort to alleviate their guilt and make up for perceived harm done to their children (Nomaguchi and Milkie, 2003; Martínez et al., 2011; Cho and Allen, 2012). These compensatory behaviors may have new effects on children's social behaviors. In summary, it is reasonable to propose that work-to-family conflict leads to guilt about parenting, which in turn influences the development of social behavior problems in preschool children. Based on the above analysis, this study proposes the hypothesis 2: which is that guilt about parenting mediates the relationship between work-to-family conflict and preschool children's social behavior problems.

Work-to-family conflict, parent–child relationships and preschool children's social behavior problems

Many studies have demonstrated the existence of an indirect or mediated relationship between work-to-family conflict experiences and children's well-being (Galambos et al., 1995; Crouter et al., 1999). According to mother-infant attachment theory (Bowlby, 1979), the parent–child relationships may be a significant mediating variable between work-to-family conflict and preschool children's social behavior problems. Parent–child relationships is the earliest form of interpersonal relationships for children, which is formed in the process of interaction between parents and children (Driscoll and Pianta, 1992; Liang et al., 2022). Previous studies found that negative parent–child relationships in early childhood are an important risk factor for anxiety problems and play an important mediating role between the parents' own characteristics, parenting behaviors, and early childhood development (Bradford et al., 2016). First，how parents balance their work and family roles is related to the quality of their parent–child relationships (Vieira et al., 2016). Second, a good nurturing relationship between parent and children shapes social, cognitive, and emotional development of children (Antonucci et al., 2004; Popov and Ilesanmi, 2015). Conversely, negative parent–child relationships are likely to increase preschool children's social behavior problems. Negative parent–child relationships lead to less child supervision, more punitive discipline, and less child involvement; these can further lead to children's

antisocial behaviors (Johnston et al., 1998; Aucoin et al., 2006). Many studies have explored the influence of parent–child relationships on children's social development in the Chinese cultural context. An example of relevant research is provided by Zhang et al. (2008), who found that early exposure to high-quality parent–child relationships can help reduce adjustment problems in children. In contrast, children who experience negative and conflicting relationships with their parents tend to exhibit more disruptive and aggressive behaviors (Lyons-Ruth, 1996). Generally, it can be reasonably postulated that work-to-family conflict may serve as a negative predictor of parent–child relationships, which, in turn, have an impact on the social behaviors of preschool children. Therefore, parent–child relationships act as a mediating variable between work-to-family conflict and the social behaviors of preschool children. This constitutes the research hypothesis 3 of the present study.

Guilt about parenting and parent–child relationships

Researches have shown that guilt about parenting can predict the parent–child relationships from two distinct perspectives. On the one hand, some scholars posit that guilt about parenting increases parental anxiety and stress, thereby hindering the development of a positive parent–child relationships (Livingston and Judge, 2008; Zeng et al., 2021). On the other hand, other scholars view guilt as a positive emotion, suggesting that guilt about parenting can motivate working parents to engage in more interactive behaviors with their children in the face of work-to-family conflict (Cho and Allen, 2012). This study lends more support to the latter perspective, proposing that guilt can have constructive properties for the parent–child relationships, and that it may weaken the negative relationship between work-to-family conflict and parent–child relationships.

Collectively, work-to-family conflict triggers feelings of guilt among parents about their family life, especially in regard to child-rearing, and this guilt may drive parents to reflect on and commit to strengthening the parent–child relationships, which in turn influences the behavioral performance of preschool children. Therefore, it can be predicted that the negative impact of work-to-family conflict on the social behavior of preschool children in China may be mediated through guilt about parenting and the parent–child relationships. This constitutes the research hypothesis 4 of this study.

The present study

Building upon prior research investigating the association between parents' work-to-family conflict and preschool children's social behavior problems, this study aims to investigate the mediating role of guilt about parenting and parent–child relationships in this association within the unique Chinese economic and cultural context. Guided by the ecosystem of child development theory, spillover-crossover model of emotion, and attachment theory, we proposed a serial mediation model that elucidates the intricate connections between these four variables and formulated four research hypotheses (see Figure 1).

The context of child development, according to Bronfenbrenner's ecosystem theory, consists of four distinct concentric systems: micro, meso, exo, and macro. Although the child does not directly encounter the exosystem, it impacts his development. For example, parents' work schedules are a part of the exosystem, which may affect the amount of time parents spend with their children and influence the opportunities for parents to communicate and collaborate with schools, consequently affect the children's development (Krishnan, 2010). Therefore, this study proposed the hypothesis that:

> *Hypothesis 1*: Parents' work-to-family conflict positively and significantly predicts preschool children's social behavior problems.

The spillover-crossover model brings together employees' main life domains: work and family. This theory suggests that employees' work experiences impact behaviors, thoughts and feelings in the home domain (Rodríguez-Muñoz et al., 2013). Many scholars have been guided by this theory to study individuals' work–family conflicts, and they have found that guilt is a common emotion experienced by individuals in work–family conflicts (e.g., Gilbert et al., 1981; Shimazu et al., 2009). For parents of preschool children, the pressure for mothers to have large quantities of face time with their children is at its apex (Milkie et al., 2015), consequently work-to-family conflict often leads to parents' guilt about parenting. Guilt about parenting may have important intra- and inter-personal consequences (Borelli et al., 2016). For instance, parents riddled with guilt about parenting may engage in more repair behaviors, such as permissive parenting, which can have a impact on children's social development (Nomaguchi and Milkie, 2003; Martínez et al., 2011). It can therefore be hypothesized that:

> *Hypothesis 2*: Guilt about parenting mediates the association between Chinese parents' work-to-family conflict and their preschool children's social behavior problems. That is, work-to-family conflict may be a positive predictor of guilt about parenting, which in turn may influence the development of preschool children's social behavior problems.

Bowlby claimed that the only initial means of communication between infant and mother is through emotional expression and its accompanying behaviors (Bowlby, 2008). It has been found that mindful parents are more involved in their children's lives and more inclined to be aware of their children's needs, which helps form better parent–child relationships and build secure mother-infant attachments (Siu et al., 2016). However, work-to-family conflict prevents the parent from fulfilling the demands of his/her family role. Work-to-family conflict leads to parents' inability to give more attention and sensitivity to children, which negatively affects the parent–child relationships. Based on the parent–child relationships, the children develop an "internal working model" of social interaction (Bowlby, 1982; Ainsworth, 1989). This internal working model directly influences the style of children's interactions with others and the development of their social competence. On the basis of the reasoning and findings, we predict that:

> *Hypothesis 3*: The parent-child relationships mediate the association between Chinese parents' work-to-family conflict and their children's performance of social behavior problems. That is, parents' work-to-family conflict may be a negative predictor of the parent–child relationships, carrying on to lead to preschool children's social behavior problems.

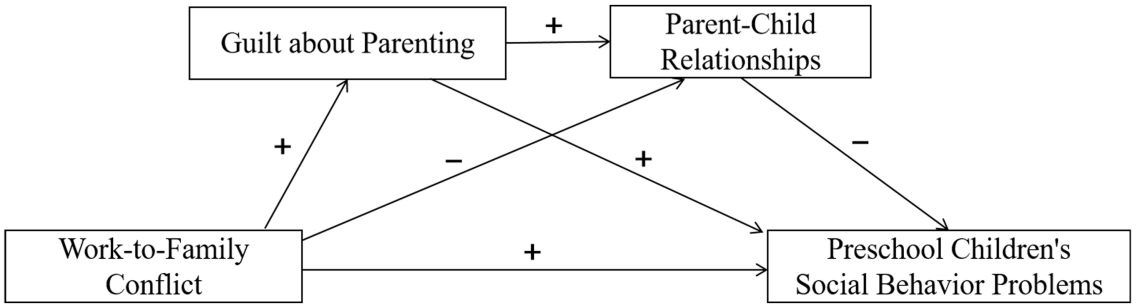

FIGURE 1
Hypothesized model of serial-multiple mediation of guilt about parenting and parent-child relationships in the relationship between work-to-family conflict and preschool children's social behavior problems.

Taken together, Hypothesis 2 and 3 suggest that:

> *Hypothesis 4*: Parents' work-to-family conflict will influence the development of preschool children's social behavior problems through the serial mediators of guilt about parenting and parent–child relationships. That is, work-to-family conflict may be a predictor of parents' guilt about parenting, thus significantly affects parent–child relationships, which in turn predict more preschool children's social behavior problems.

Methods

Participants

The study aims to examine the association between parents' work-to-family conflict and preschool children's social behavior problems in economically developed coastal areas in China. A combination of purposive and convenience sampling methods was used to collect data from parents of children aged 3–6 years old between September 1 and 25, 2022. Participants were recruited from nine cities in Guangdong Province, including Zhuhai, Guangzhou, Zhanjiang, Shenzhen, Zhongshan, Foshan, Dongguan, Jieyang, and Shantou. In order to improve the efficiency of data collection and to ensure the quality of the questionnaire, we invited the directors of kindergartens in each of the above cities to participate in this study. The questionnaires were disseminated to parents of preschool children by the directors through an online platform. In order to minimize the impact of external pressure on participants' responses, the questionnaires were designed to be anonymous. Furthermore, prior to collecting the questionnaires, informed consent was obtained from all participants. This study retained 3,197 parent questionnaires, of which, 3,038 were valid (Table 1). Samples exhibiting consistent response tendencies or response times of less than 5 minutes were considered invalid samples. Among the valid participants, 2,448 were female respondents (mothers,80.6%) and 590 were male respondents (fathers,19.4%); 816 respondents (26.9%) had the only child and 2,222 respondents (73.1%) had more than one child; 576 respondents (19.0%) had a high school education; 828 respondents (27.3%) had a junior college education; and 1,391 respondents (45.8%) had a bachelor's degree, 243 respondents (8.0%) had a master's degree or higher; Nearly 63.4% of parents (1,925) take care of children with the help of grandparents, 36.6% of parents (1,113) raise children completely independently without the help of grandparents. All measurements and procedures were permitted by the Institutional Review Board (IRB) of the first author's institution.

Measures

The research instrument consisted of four components: the Work–Family Conflict Scale, the Social Competence and Behavior Evaluation Scale, the Guilt about Parenting Scale, and the Child Adjustment and Parent Efficacy Scale. The reliability and validity of the respective scales in their Chinese versions have been verified.

Work–family conflict scale

There are many scales to measure work–family conflict. The scale selected in this part is a work–family conflict measurement tool specially developed by Haslam et al. (2014) for children's parents. The Work–Family Conflict Scale (WFCS) consists of 10 items and assesses two forms of work–family conflict, the work-to-family conflict (WFC; 5 items) and the family-to-work conflict (FWC; 5 items). Work-to-family conflict inquired how work demands interfere with family responsibilities (e.g., "To what extent do you think 'My work prevents me spending sufficient quality time with my family'? "). Family-to-work conflict asked whether family engagement interferes with work performance (e.g., "To what extent do you think 'My work performance suffers because of my personal and family commitments'? "). This study focused on examining the impact of work-to-family conflict on family relationships and child development, so only the dimension of work-to-family conflict was measured. Items are assessed on a 7-point Likert scale ranging from one (completely disagree) to seven (completely agree). There was no reverse scoring item in the scale, and the higher the score, the more serious the work-to-family conflict parents face. Jung and Kim (2021) have examined the psychometric properties of the Chinese version of the WFCS, results showed that the scale had concurrent and discriminant validity. At the same time, the internal consistency reliability for the work-to-family conflict subscale was examined in Jung and Kim' research, the Cronbach's α coefficient of the WFC subscale was 0.87.

Social competence and behavior evaluation scale

This study chose the Social Competence and Behavior Evaluation Scale (SCBE-30) compiled by LaFreniere and Dumas (1996) to measure the preschool children's social behavior problems. This scale contains a total of 30 items, using a 6-point Likert scale ranging from one (never) to seven (always), reported by the preschool children's parents. There are three dimensions of social competence (SC), anger-aggression (AA), and anxiety-withdrawal (AW) in the scale. This study intends to only measure preschool children's social behavior problems, therefore, two dimensions AA and AW are selected, and the higher the score on each dimension, the more common the preschool children's social behavior problems. Liu et al. (2011) conducted an internal consistency reliability analysis on the above two factors, and the Cronbach's α coefficients of AA and AW were 0.66 and 0.81 respectively, which met the requirements of psychometrics. The results of confirmatory factor analysis showed that SCBE-30 has a good structure and construct validity ($\chi^2/df = 2.48$, GFI = 0.880, NFI = 0.870, NNFI = 0.910, CFI = 0.920, RMSEA = 0.060; Liu et al., 2011). It proves that the SCBE-30 can be used as an effective tool to measure the social behavior problems of Chinese children.

Guilt about parenting scale

This study used the Guilt about Parenting Scale (GAPS), a unidimensional structured scale consisting of 10 items developed by Haslam and Finch (2016). The scale is scored on a 7-point Likert scale from one (very strongly disagree) to seven (very strongly agree), with higher scores indicating higher levels of guilt about parenting experienced by parents. Examples of typical items in this scale include statements such as "I often worry I am not as good a parent as I should be," "I often feel it is my fault if my child gets upset," and similar phrases. The Cronbach's α of GAPS in Chinese was 0.89, the internal consistency reliability and retest reliability of the scale met the measurement requirements, indicating that the scale has high reliability and stability across time. Zeng et al. (2021) confirmed that the one-way model fits well ($\chi^2/df = 3.\ 17$, CFI = 0. 95, TLI = 0. 93, RMSEA = 0. 07, SRMR = 0. 04).

Parenting and family adjustment scale

The parent–child relationships was a factor in the Parenting and Family Adjustment Scale (PAFAS; Sanders et al., 2014). The whole scale is a 30-item measure for parents of children aged 2 to 12 years. The parent–child relationships part of the PAFAS consists of 5 items, items are rated on a 4-point Likert scale ranging from one (not true of me at all) to four (true of me very much), they are summed to provide overall scores, with higher scores indicating higher levels of parent–child relationships. Sanders et al. (2014) have demonstrated good psychometric properties of PAFAS in an Australian sample, the construct and concurrent validity as well as internal consistency of this measure are satisfactory (coefficients ranged from 0.70 to 0.87). Guo et al. (2017) validated the PAFAS in a Chinese cultural context, the results of their study "demonstrated that PAFAS had satisfactory construct validity, acceptable internal reliability, and excellent

TABLE 1 Demographic characteristics of the sample.

	Fothers (*N* =590; 19.4%)	Mothers (*N* =2,448; 80.6%)	Totle (*N* =3,038; 100%)
Level of education			
High school or lower	93 (15.8%)	483 (19.7%)	576 (19.0%)
Junior college education	129 (21.9%)	699 (28.6%)	828 (27.3%)
Bachelor's degree	305 (51.7%)	1,086 (44.4%)	1,391 (45.8%)
Master's degree or higher	63 (10.7%)	180 (7.4%)	243 (8.0%)
Have the only child or not			
Yes	157 (26.6%)	659 (26.9%)	816 (26.9%)
No	433 (73.4%)	1,789 (73.1%)	2,222 (73.1%)
Child gender			
Boy	304 (51.5%)	1,243 (50.8%)	1,547 (50.9%)
Girl	286 (48.5%)	1,205 (49.2%)	1,491 (49.1%)
Child age			
3 years old	156 (26.4%)	608 (24.8%)	764 (25.1%)
4 years old	166 (28.1%)	756 (30.9%)	922 (30.3%)
5 years old	205 (34.7%)	844 (34.5%)	1,049 (34.5%)
6 years old	63 (10.7%)	240 (9.8%)	303 (10.0%)
Single-parent family or not			
Yes	19 (3.2%)	60 (2.5%)	79 (2.6%)
No	571 (96.8%)	2,388 (97.5%)	2,959 (97.4%)

Percentages may not add up to 100 due to missing data.

convergent and concurrent validities in a Chinese sample." Therefore, PAFAS can be an effective and satisfactory tool in the present study. Only parent–child relationships part was used in this study, its *H* coefficient was 0.82 (Guo et al., 2017).

Validity and reliability test

The present study employed SMART-PLS software to evaluate and examine the data of the measurement model and structural equation model. Specifically, this included evaluating the reliability of consistency, composite reliability, convergent validity, and discriminant validity. Cronbach's alpha coefficient and composite reliability (CR) were selected to analyze the reliability of the questionnaire in this study. As shown in Table 2, the Cronbach's α value for each variable ranged from 0.852 to 0.931, while the CR values ranged from 0.864 to 0.948. All the values exceeded 0.8, indicating a high level of reliability for the scales.

Validity test is the process of confirming whether a measurement tool accurately measures the intended construct. Validity analysis of the model typically examines both content validity and structural validity. In terms of content validity, the variable items designed in this study were derived from relevant literature and underwent multiple reviews by domain experts. Additionally, a pilot study was conducted, and the scales were subsequently revised based on the findings. Thus, it can be concluded that the scales possess high level of content validity. Regarding structural validity, convergent validity is commonly assessed using the Average Variance Extracted (AVE) criterion. In this study, the AVE values of three variables exceeded 0.5, and the AVE value of only one variable was lower than 0.5 but close to 0.5, indicating good convergent validity for the scales.

This study assessed discriminant validity using the Fornell-Larcker criterion. When AVE value of each variable is greater than its squared correlation with other variables, it indicates good discriminant validity in the latent variable model. As depicted in Table 3, the square root of AVE for each latent variable ranged from 0.553 to 0.886, all exceeding the correlations with other latent variables. This indicates that the model possesses good discriminant validity.

Furthermore, this study employed the Variance Inflation Factor (VIF) method to examine the presence of multicollinearity in the sample data. The VIF test results indicated a maximum value of 4.707, a minimum value of 1.228, and a mean value of 1.955, all of which were below the threshold of 10 for multicollinearity. Therefore, there is no issue of multicollinearity among the variables in this study.

Research results

This study first calculated descriptive statistics for all variables using SPSS version 23.0 to estimate the mean, standardized deviation between the main variables, and tested the two-way correlations between work-to-family conflict, preschool children's social behavior problems, guilt about parenting and parent–child relationships by calculating Pearson's coefficient. And then, controlling for demographic variables such as "female or male" "Only child or not" and "whether grandparents are involved in parenting" the mediating effects of guilt about parenting and parent–child relationships on work-to-family conflict and preschool children's social behavior problems were analyzed using SPSS PROCESS Model 6. PROCESS is a plugin specifically designed for analyzing mediation and moderation effects. It can be used with traditional data analysis software such as SPSS and SAS. PROCESS simplifies the multiple steps required for traditional mediation analysis into a single step, automatically conducting Bootstrap tests for mediation effects. It is scientifically robust, efficient, and user-friendly. Therefore, this study employed SPSS PROCESS Model 6 for model construction and path analysis. The statistical results, including path coefficients, confidence intervals, significance etc., were used to explain the direction and significance of the mediating effects. Besides, this study used Full Information Maximizing-Likelihood (FIML) to process the missing data in the statistical analyzes.

Common method variance analysis

Given that the data was obtained through subjective self-reports from the parents of the children, there is a possibility of common method bias. Based on the suggestions of Zhou and Long (2004), the data collection process of this study was controlled in terms of measurement procedures, such as the use of anonymous forms for the

TABLE 2 Validity and reliability test.

	Cronbach's Alpha	rho_A	Composite reliability	Average variance extracted
GP_	0.852	0.833	0.864	0.423
PCR_	0.873	0.878	0.908	0.663
PSBP_	0.865	0.868	0.887	0.506
WFC	0.931	0.937	0.948	0.785

TABLE 3 Discriminant validity test.

	GP_	PCR_	PSBP_	WFC
GP_	0.651			
PCR_	−0.071	0.814		
PSBP_	0.236	−0.345	0.553	
WFC	0.382	−0.143	0.246	0.886

measurement and the use of some reverse questions. After completing the data collection, Harman's single factor test was conducted on the study variables (Harman, 1976). Three factors had eigenvalues greater than one, as shown by the findings. The first factor explained 35.7% of total variation, less than the 40% threshold criterion (Podsakoff et al., 2003), indicating that no significant common method bias existed.

Descriptive and correlation analyzes

Table 4 provides descriptive and correlation analyzes of the four variables: work-to-family conflict, guilt about parenting, parent–child relationships, and preschool children's social behavior problems. Pearson's product–moment correlation coefficient was employed in this study to investigate the associations between the primary variables of interest. The results indicated significant correlations between work-to-family conflict, guilt about parenting, and social behavior problems in preschool children. Additionally, there was a significant correlation among work-to-family conflict, guilt about parenting, parent–child relationships, and social behavior problems in preschool children, with correlation coefficients ranging from −0.298 to 0.332. There was a statistically significant correlation between the variables.

Chain mediation model analysis

This study used a mediation model to explore the effects of work-to-family conflict and preschool children's social behavior problems. To examine the mediating impact, the non-parametric percentile bootstrapping method with bias correction was utilized. For the analysis, the bootstrapping method with 5,000 subsamples was adopted. Table 5 revealed the SEM path coefficients. The R^2 coefficient is a measure of the goodness-of-fit of the structural model and indicates the explanatory power of the endogenous latent variables. It ranges from 0 to 1, with higher values indicating better predictive capabilities. As demonstrated in Table 5, the explanatory power of the structural model in this study was found to be 11, 2.8, 13.2, and 5.3% for the respective variables. These values achieved statistical significance, indicating a meaningful level of explanatory power.

The results showed that work-to-family conflict had a significant predictive effect on guilt about parenting ($\beta = 0.473$, $p < 0.001$), parent–child relationships ($\beta = -0.065$, $p < 0.001$) and preschool children's social behavior problems ($\beta = 0.173$, $p < 0.001$). Guilt about parenting significantly predicted parent–child relationships ($\beta = 0.026$, $p < 0.001$) and preschool children's social behavior problems ($\beta = 0.061$, $p < 0.001$). Parent–child relationships significantly predicted preschool children's social behavior problems ($\beta = -0.775$, $p < 0.001$). In addition, the complete path from "work-to-family conflict" to "guilt about parenting" to "parent–child relationship" to "preschoolers' social behavior problems" also has a significant predictive effect ($\beta = 0.242$, $p < 0.001$).

Table 6 showed the mediating effects of guilt about parenting and parent–child relationships between parents' work-to-family conflict and preschool children's social behavior problems. Figure 2 was a chain mediating model. The direct effect of parents' experienced work-to-family conflict on preschool children's social behavior problems was 0.136 [95% *CI:* (0.114, 0.155)]. To further verify the mediating effect of guilt about parenting and parent–child relationships on work-to-family conflict and preschool children's social behavior problems, the results ranged from 0.026 to 0.775 (95% *CI*, not including zero), demonstrating that guilt about parenting and parent–child relationships mediated the relation between parents' work-to-family conflict and preschool children's social behavior problems, and the total standardized mediating effect value was 0.242

TABLE 4 Means standard deviations and correlations of variable (n=3,808).

Variables	M	SD	1	2	3	4
1. Work-to-family conflict	17.51	7.10	1			
2. Guilt about Parenting (GP)	45.54	10.09	0.332***	1		
3. Parent–child Relationships (PCR)	17.55	2.68	−0.140***	0.041**	1	
4. Preschoolers' Social Behavior problems (PSBP)	38.57	7.45	0.231***	0.126***	−0.298***	1

***$p < 0.001$, **$p < 0.01$. All tests were two-tailed.

TABLE 5 SEM path coefficients.

	Standardized			R^2	F
	β	SE	t		
Work-to-family conflict to guilt about parenting	0.473***	0.024	19.406	0.110***	376.587
Work-to-family conflict to parent–child relationships	−0.065***	−0.007	−9.071	0.028***	43.740
Guilt about parenting to parent–child relationships	0.026***	0.005	5.161		
Work-to-family conflict to preschoolers' social behavior problems	0.173***	0.019	45.194	0.132***	153.176
Guilt about parenting to preschoolers' social behavior problems	0.061***	0.013	4.569		
Parent–child relationships to preschoolers' social behavior problems	−0.775***	0.048	−16.244		
Work-to-family conflict to guilt about parenting to parent–child relationships to preschoolers' social behavior problems	0.242***	0.019	13.076	0.053***	170.968

***$p < 0.001$, **$p < 0.01$.

TABLE 6 Guilt about parenting and parent–child relationships in the mediating effect analysis.

Effect	Path relationship	Effect size	Bootstrap 95% CI	Relative mediation effect
Direct effect	Work-to-family conflict - > Preschoolers' social behavior problems	0.173	[0.135, 0.210]	0.710
Path1	Work-to-family conflict - > Guilt about parenting - > Preschoolers' social behavior problems	0.029	[0.015, 0.042]	0.120
Path2	Work-to-family conflict - > Parent–child relationships - > preschoolers' social behavior problems	0.050	[0.038, 0.063]	0.207
Path3	Work-to-family conflict - > Guilt about parenting - > Parent–child relationships - > Preschoolers' social behavior problems	−0.009	[−0.013, −0.006]	−0.037
Total effect		0.242	[0.206, 0.279]	1

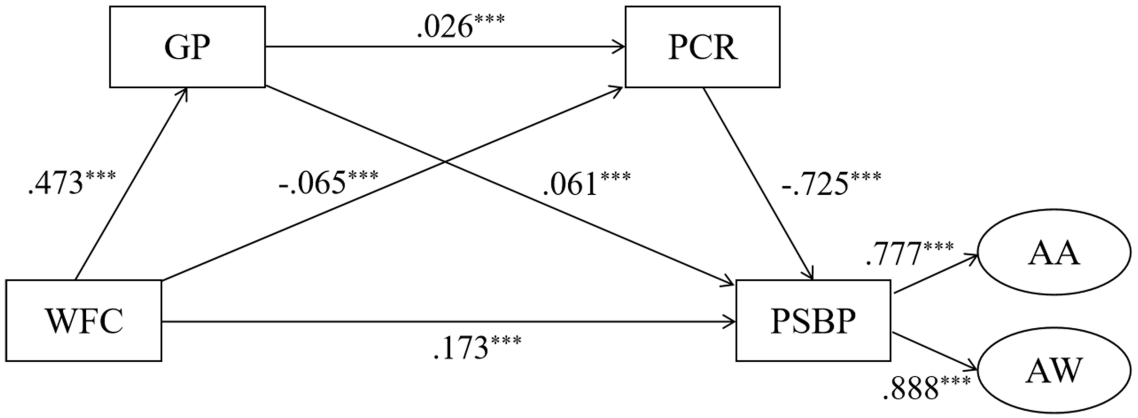

FIGURE 2
The chain mediation model, ***p<0.001, **p<0.01. WFC, Work-to-Family Conflict; PSBP, Preschoolers' Social Behavior Problems; AA, Anger-aggression; AW, Anxiety-withdrawal; GP, Guilt about Parenting; PCR, Parent–child Relationships.

[95% *CI:* (0.206, 0.279)]. Particularly, the mediating effect comprised three indirect effects, namely, path 1: work-to-family conflict → guilt about parenting → preschool children's social behavior problems (0.029); path 2: work-to-family conflict → parent–child relationships → preschool children's social behavior problems (0.050); and path 3: work-to-family conflict → guilt about parenting → parent–child relationships → preschool children's social behavior problems (−0.009). The ratios of the three indirect effects to the total effect were 12.0, 20.7, and 3.7 for path 1, 2, and 3, respectively. Hypotheses 2, 3, and 4 could be confirmed. Furthermore, we compared the indirect effects of different paths in pairs to examine if there were significant path differences. In comparison 1, the bootstrap 95% confidence interval for the difference between indirect effects 1 and 2 did not include 0 [95% *CI:* (−0.040, −0.003)], representing a statistically significant difference between the two. By the same method of comparison, there were significant difference between indirect effects 1 and 3 [comparison 2, 95% *CI:* (0.024, 0.053)] or between indirect effects 2 and 3 [comparison 3, 95% *CI:* (0.046, 0.074)].

In order to validate the effectiveness of the model and mitigate endogeneity issues, this study employed the method of variable substitution to examine the robustness of the model. Measures of parent–child relationships were used to assess the interactive characteristics between parents and preschool children. Given the close association between parenting styles and parent–child relationships (e.g., Duncan et al., 2009; Siu et al., 2016), parenting styles serve as a direct reflection of the interactive dynamics between parents and children. Hence, we substituted the mediating variable "parent–child relationships" with "parenting styles" and employed the same modeling approach for measurement. The findings revealed a favorable model fit ($R^2 = 0.053$, $F = 170.969$, $\beta = 0.243$, $t = 13.076$, $p < 0.001$) with statistical significance, indicating a high level of model robustness and replicability.

Discussion

This study contributes to the existing literature by investigating the underlying mechanisms linking work-to-family conflict and social behavior problems in preschool-aged children. The study was conducted with a sample of parents of preschool children residing in several developed coastal cities in Guangdong Province, China. We utilized a chain mediation model to test the hypotheses, whereby guilt about parenting mediated the association between work-to-family conflict and preschool children's social behavior problems, and parent–child relationships mediated the same association. Furthermore, we observed that work-to-family conflict might

indirectly influence preschool children's social behavior problems through the chain mediating effect of guilt about parenting and parent–child relationships. Collectively, these findings provide a comprehensive and constructive perspective on the relationship between work-to-family conflict and social behavior problems in preschool-aged children.

Association between work-to-family conflict and preschool children's social behavior problems

This study found that work-to-family conflict of parents was positively associated with preschool children's social behavior problems. Work-to-family conflict can positively predict children's anger-aggression and anxiety-withdrawal. This result validated the hypothesis 1 of this study, indicating that work-to-family conflict of parents is strongly associated with different aspects of preschool children's social behavior problems, and is generally consistent with the results of previous studies (Matias et al., 2017; Yucel and Latshaw, 2018; Chai and Schieman, 2021). The ecological theory of child development suggests that work-family relationship is an important part of the child development system. In the Chinese cultural context, the ages from 31 to 40 is the rising period of career development for most employees (Li et al., 2012). On the one hand, they tend to put in more experience and effort to pursue rapid career growth. On the other hand, in the eyes of work leaders, this age group is seen as "young and strong" and has some work experience (capable of doing their current job), so leaders tend to give them more work assignments. For parents of preschool children, they expect or are asked to put in a lot of work effort, while at the same time, young children aged 3–6 years old need a lot of parenting and support. Parents often play different roles and shift roles in work and family spaces, and when the roles in a given domain are required to expand, the boundaries between the two are displaced and inter-role conflicts arise (Clark, 2000). When work interferes with family, it is an important source of stress for parents that can influence an individuals' well-being (Frone et al., 1994). For both male and female, high level of work-to-family conflict reduces parents' life satisfaction, triggers more psychological stress, higher risk of burnout and higher depression (Kossek and Ozeki, 1998; McNall et al., 2010; Aarntzen, 2020). Parents' high level of pressure will be transferred to parenting behavior and emotional expression, which will virtually create a high-stress family atmosphere for young children. In this atmosphere, young children will internalize the pressure they perceive, which will lead to social problems such as anxiety and withdrawal. In conclusion, the daily stressful state of parents, as one of the important psychological micro-environments for young children, may directly cause anger-aggression, anxiety-withdrawal, and other undesirable tendencies in preschool children's social interactions.

Finally, it is important to note that some studies have found that the more time employees spend on themselves, the less conflict they experience between work and family (Spell et al., 2009). A few findings have been consistent in suggesting that hyperactive, aggressive, or noncompliant children require more parents' attention, and parents have to devote more time to the family and less time to themselves, which in turn reinforces work-to-family conflict. It is clear that difficult children often elicit more inconsistent and aggravated behaviors from mothers (Bates and Bayles, 1988; Campbell et al., 1991; Shaw et al., 1994), preschool children's social behavior problems play a reaction role to work-to-family conflict.

Mediating role of guilt about parenting

This study found that work-to-family conflict of male and female can affect preschool children's social behavior problems through guilt about parenting, which is basically consistent with our hypothesis 2. That is guilt about parenting mediated the association between work-to-family conflict and preschool children's social behavior problems. In terms of the first stage of the mediation link from work-to-family conflict to guilt about parenting, work-to-family conflict is positively associated with guilt about parenting, which supports the findings of previous studies. Balancing different life roles can be even more difficult for parents of preschool children, who are prone to feelings of guilt about parenting (Martínez et al., 2011; Borelli et al., 2016; Korabik, 2017). Work demands and characteristics have direct impacts on employees' family lives, and guilt about parenting arise when parents feel they have violated the standards of family education (Klass, 1987; Jones and Kugler, 1993).

The second stage of the mediation link is the predictive effect of guilt about parenting on preschool children's social behavior problems. From the point of view of the direct connection from guilt about parenting to preschool children's social behavior problems, this study found guilt about parenting is detrimental, hindering the healthy development of children's social adjustment. For example, the guilt from work-to-family conflict may be detected by children, inadvertently conveying negative information about the meaning of parental employment, thereby influencing children's behavior and triggering their social behavior problems. Therefore, parents with higher work-to-family conflict tend to have higher guilt about parenting, and then their children's social adjustment can be disturbed, behavior problems will increase.

Mediating role of parent–child relationships

The results of this study also showed that parent–child relationships played a mediating role between work-to-family conflict and preschool children's social behavior problems. The work-to-family conflict could do harm to preschool children's social behavior by breaching parent–child relationships, which was consistent with our hypothesis 3 and supported ecological systems theory and attachment theory (Bowlby, 1979). "When parents experience difficulties with excessive work demands—a characteristic in children's exosystem—they might not be able to fully monitor and fulfill the needs of children, which can negatively affect parental role functioning" (Chai and Schieman, 2021). It is not difficult to deduce that when work interferes with the time, emotions and energy parents devote to family education, it directly affects parents' attitudes toward their preschool children, social behavior parenting and guidance, and parent–child relationships, leading to more social behavior problems (Cho and Allen, 2012; Jung and Kim, 2021). Early childhood is a sensitive period for interpersonal relationships. Popov and Ilesanmi (2015) emphasized that only the children that manage to have a good relationship with their parents will extend social and emotional relationships normally with their

peers. Many studies in developmental psychopathology have shown that parent–child relationships in early childhood are an important factor affecting the development of behavior problems in children (Masten and Garmezy, 1985; Galen and Underwood, 1997; Schmeck and Poustka, 2001). This study reconfirmed the conclusions of most previous studies in this field, that is, work-to-family conflict will affect the harmony and intimacy of parent–child relationships, and interfere with the creation of a good parent–child relationships and family atmosphere, thereby affecting the psychological development of children and leading to social behavior problems.

Chain mediating role of guilt about parenting and parent-child relationships

This study showed that work-to-family conflict act on the preschool children's social behavior problems through the chain mediation effect of guilt about parenting and parent–child relationships, and guilt about parenting significantly positively predicts parent–child relationships, which is similar to the conclusions of previous studies (Tangney, 1990; Leith and Baumeister, 1998). This result also proved the related viewpoints of the three theories: the ecosystem of child development theory, spillover-crossover model of emotion, and attachment theory. Guilt about parenting is the emotional set of parents based on the evaluation of parenting behavior and results, and it is an important individual factor of parents in the theoretical hypothesis of this study. Specifically, when parents experience work-to-family conflict, they are more likely to feel guilty about their children and to adjust their time and energy so as to ensure better parent–child relationships. Past studies have shown that guilt tendencies can promote individuals to think about their roles, evaluate the responsibilities of different social roles, and gain motivation to take corrective measures when faced with role conflicts (Tangney, 1990; Leith and Baumeister, 1998). The constructive nature of guilt suggests that guilt may alleviate the negative relationship between work-to-family conflict and parent–child interactive behaviors. In other words, guilt about parenting promotes parents to reflect and adjust the parenting time, investment and specific practices, and then reduces the possibility of work-to-family conflict causing children's social adjustment problems by improving the parent–child relationships.

It can be seen that the influence of guilt about parenting on children's psychological growth has two sides. First, guilt about parenting is a negative emotion that may be detected by children, inadvertently conveying negative messages about the meaning of parents' employment, which could influence children's behavior (Borelli et al., 2016). However, some studies have also found that guilt about parenting might have not decreased the level of parent–child relationships, as the parents assumed responsibilities for work-to-family conflict and had higher motivation to take corrective actions. Parents' self-evaluation and guilt based on correct parenting concepts, as well as the resulting adjustment of parenting behaviors, may reduce the negative impact of external adverse objective environments on children's growth, (e.g., insufficient economic income, parents' low educational level, work-to-family conflicts, etc). This is a typical manifestation of parents' emotions and behaviors mitigating the negative impact of the external adverse environment on children's growth.

In summary, the emotional experience of guilt about parenting, when not accompanied by corresponding behavioral changes, can exacerbate parental stress and anxiety, leading to problem behaviors in children. On the other hand, when parents actively adjust their parenting behaviors in response to feelings of guilt (such as adopting permissive parenting styles or increasing parental involvement), it may lead to an improvement in the parent–child relationships. The current study proposes a chain mediation model wherein guilt about parenting plays a corrective role by reducing the impact of work-to-family conflict on active parent–child activities.

Conclusion

Social skill development is critical to children's psychological and physical development. This study investigated the underlying mechanisms accounting for the associations between work-to-family conflict and preschool children's social behavior problems. Work-to-family conflict is a form of inter-role conflict that occurs due to a shortage of resources (e.g., time, energy, or emotion) that makes it difficult to successfully perform in the family domain. This study suggested that work-to-family conflict could make a difference to preschool children's social behavior problems through a separate indirect path via guilt about parenting or parent–child relationships. Meanwhile, work-to-family conflict may also be associated with preschool children's social behavior problems through the chain mediating effect of guilt about parenting and parent–child relationships. These findings provide a theoretical foundation for reducing the negative impact of parents' work-to-family dilemmas on children's healthy growth, as well as some practical guidance for social security and kindergarten education in promoting the healthy growth of children under the tripartite cooperation between family, kindergarten and society.

Limitations and implications

This study has several limitations that need to be addressed. Firstly, the research design is cross-sectional design, which precludes any causal inferences regarding the relationship between different variables. To overcome this limitation, future studies could employ a longitudinal design to track the developmental trajectory of children's adaptability and behavior problems and verify the long-term impact of parents' work-to-family conflict, guilt about parenting, and parent–child relationships on children's development. Secondly, the data in this study were solely based on self-reports from parents of preschool children. To mitigate measurement bias, future studies could employ multi-subject reports, such as evaluations of parenting processes and preschool children's social characteristics from kindergarten teachers. Moreover, intervention studies on parents' work-to-family conflict could be conducted to verify whether such conflict is conducive to the development of children's social adaptation behavior.

Although there are some limitations, this study still holds both theoretical and practical contribution. While previous studies have mainly focused on the impact of work-to-family conflict on parents' personal health and their children's well-being, few studies have specifically investigated the relationship between work-to-family conflict and children's social behavior problems, particularly within

the context of Chinese economic and cultural factors that shape parents' work demands and parenting philosophies. By exploring the emotions that Chinese parents experience when faced with work-to-family conflict and how they mitigate its effects on their children, this study fills this gap in the literature. These findings in this study highlight the important role of work-to-family conflict, parenting guilt, and parent–child relationships on preschool children's social behavior problems, and further illuminate the chain mediating role of guilt about parenting and parent–child relationships. These results are consistent with the ecological system theory and attachment theory and have practical implications for enhancing parents' educational engagement and promoting children's growth.

Based on the findings, this study concluded that family education for preschool children is not solely the responsibility of parents, but rather requires coordination among all social actors to balance work and family demands. To this end, support and protection of children's family education at the social level should be strengthened, efforts should be made to ensure adequate childcare resources, active guidance in childcare concepts and methods, and stage-by-stage follow-up assessments of children's social development should be conducted.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding authors.

Ethics statement

The studies involving human participants were reviewed and approved by Minzu university of China. The patients/participants provided their written informed consent to participate in this study.

Author contributions

YW conceptualized the study, supervised the data collection and processing, and provided critical feedback on all versions of the manuscript. DS was responsible for securing research funding and provided input in all stages of the research process. YW, GL, and XZ worked together to draft the introduction, results, and discussion sections, and provided extensive data to support the presented ideas. MZ reviewed the data analysis, composed the data analysis section, and thoroughly revised the entire manuscript. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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The effect of parenting styles on Chinese undergraduate nursing students' academic procrastination: the mediating role of causal attribution and self-efficacy

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Background: Academic procrastination is common among college students, but there is a lack of research on the influencing mechanism of academic procrastination among nursing students. The purpose of this study was to explore the influence of parental rearing patterns on academic procrastination of nursing students, and the mediating role of causal attribution and self-efficacy.

Methods: Using Parental Bonding Instrument, Aitken Procrastination Inventory, Multidimensional Multi-Attribution Causality Scale and General Self-Efficiency Scale, the data of 683 nursing undergraduates from two universities in China were collected. Moreover, path analysis for structural equation modeling via AMOS 26.0 to evaluate mediation path model.

Results: Positive parenting style was negatively associated with academic procrastination ($r = -0.350$) and negative parenting style was positively associated with academic procrastination ($r = 0.402$). Positive parenting style directly or indirectly predicted academic procrastination through the mediating effect of internal attributional style (β = −0.10, 95% CI: −0.18 to −0.04) and self-efficacy (β = −0.07, 95% CI: −0.11 to −0.03), and this mediating effect accounted for 41.46% of the total effect. Positive parenting style directly or indirectly predicted academic delay through the mediating effect of external attributional style (β = 0.12, 95% CI: 0.07 to 0.17) and self-efficacy (β = 0.05, 95% CI: 0.03 to 0.08), and this mediating effect accounted for 42.5% of the total effect. In addition, causal attribution and self-efficacy of nursing students play a chain intermediary role between parenting style and academic procrastination.

Conclusion: Parents should give students more care and autonomy and reduce control. In addition, educators should give students attribution training, which is helpful to improve students' self-efficacy and reduce academic procrastination.

KEYWORDS

parenting style, academic procrastination, attribution style, self-efficacy, nursing students

1. Introduction

Procrastination refers to unnecessary and harmful delays, meaning "leaving things for tomorrow". Procrastination is always manifested in various small things, but accumulated over time can not only lead to poor academic performance but also lead to negative emotions that can affect personal development. Among college students, procrastination in academics is a common problem. For example, the academic procrastination rate of medical undergraduates on various academic tasks is between 13.8 and 49.9% (Madhan et al., 2012; Mortazavi et al., 2015). Nursing students are faced with heavy academic tasks, standardized examinations, clinical practice and complicated interpersonal relationships (Boardman, 2016; Wang et al., 2019; Melo et al., 2020), so nursing students are prone to academic procrastination. Continuous academic procrastination will not only affects the academic performance of nursing students, but also prevent them from obtaining the knowledge and skills to provide quality care for patients (Guo et al., 2019). Moreover, with a global shortage of nursing staff and the growing need for healthcare, it is urgent to foster more and higher-quality nursing students. Therefore, educators should make clear the causes of academic procrastination and formulate effective intervention measures to reduce academic procrastination, which will be conducive to cultivating more high-quality nursing talents.

1.1. Parenting styles, academic procrastination, and causal attribution

Parenting style is defined as a constellation of parents' attitudes and behaviors toward children and an emotional climate in which the parents' behaviors are expressed (Darling and Steinberg, 1993). Baumrind identified three styles of parental authority, including permissive, authoritarian, and authoritative, and classified them into positive and negative parenting styles with reference to the dimensions of parental responses and demands (Soysa and Weiss, 2014). In short, parenting styles typically fall somewhere between lax and overly punishing, with extremes in either direction defined as negative (Xu et al., 2017). Positive parenting styles are characterized by high levels of parental care (e.g., supportive and encouraging autonomy). In contrast, negative parenting styles are characterized by parental rejection and overprotection (e.g., heavy supervision and monitoring, coercion, and authoritarianism) (Lian et al., 2016; Chen et al., 2022). In recent years, empirical evidence consistently shows the importance of parents' socialization to children's adaptation, pointing out the influence of parents' socialization on children's psychosocial adaptation and academic achievement (Pinquart, 2016; Waterman and Lefkowitz, 2017), with this influence continuing until adulthood (Garcia et al., 2018). For example, in young adult children, differences in their adjustment and competence seem to be related to parenting during socialization years (Palacios et al., 2022). Positive parenting styles provide a safer and more stable atmosphere, which is conducive to the development of children's healthy personality and the promotion of children's education and social and economic progress. On the contrary, negative parenting can weaken a child's personality, self-confidence and character, hinder personality development, foster maladaptive behaviors and possibly lead to academic procrastination (Tang et al., 2014; Khalid et al., 2019). Hence, students' academic procrastination may be related to parenting style. Specifically, Ferrari and Olivette found a positive relationship between fathers who used an authoritarian parenting style and daughters who showed general procrastination, whereas daughters of fathers with authoritative parenting styles did not report this general procrastination tendency (Ferrari and Olivette, 1994). Previous studies have also found that high levels of procrastination are related to high levels of parental monitoring behavior (Hong et al., 2015) and punishment (Ma et al., 2011). Additionally, academic procrastination was often associated with parents employing harsh discipline and strict supervision as well as low levels of emotional support and verbal communication (Zakeri et al., 2013). Conversely, positive parenting styles, such as parents' moderate concern and understanding for their children emotionally and establishing a democratic family environment, are helpful for individuals to form reasonable time management disposition, and may reduce the degree of academic procrastination of individuals to a certain extent, thus reducing procrastination behavior (Zhiguo et al., 2018). These results emphasize that students' academic procrastination is closely related to the parenting styles they have experienced. Recently, research has begun to explore the mechanisms underlying these relationships. For example, a recent study found that positive parenting styles (such as compassionate and supportive parenting) not only directly affect the academic performance of college students but also indirectly reduce their procrastination behavior by improving their self-esteem (Batool, 2020). However, such research efforts are still scarce. Little is known about other underlying mechanisms. Especially in China culture, the relationship between academic procrastination and parenting style has not been fully clarified.

> H1: We hypothesize that parenting style will directly predict the academic procrastination of nursing students.

1.2. Potential mediation of causal attribution

The concept of "attribution" originated from Haider, aiming at understanding the cause of events or explaining the causal relationship of other people's behaviors (Weiner, 1995). After drawing lessons from Rotter's theory of location of control, Weiner's attribution theory proposed four possible behavioral attributions namely: ability attribution, effort attribution, luck attribution and context attribution (Weiner, 1994). Furthermore, Weiner emphasizes the three potential dimensions of locus of causation, stability, and controllability that can be used to categorize any causal attribution (Lee and Hall, 2020). For example, Weiner viewed ability to be internal (locus), stable, and uncontrollable; effort to be internal (locus), unstable, and controllable; luck to be external (locus), unstable, and uncontrollable; and context to be external (locus), unstable, and controllable (Weiner, 2010). Among these three dimensions, the locus of causality has the greatest impact on the student's academic achievement, with internal locus control related to successful academic achievement, while external locus control is more correlated to failed academic achievement

(Lebedina-Manzoni, 2004; Badri Gargari et al., 2011). Individuals' affective reactions to the causal attribution of academic success or failure can affect their expectations for the future, and thus affect their subsequent behavior (e.g., academic commitment) (Kong et al., 2016), so nursing students' causal attribution is the key to understanding their academic procrastination. It has been reported that internal attribution was negatively related to academic procrastination, while external attribution was positively related to academic procrastination (Rakes et al., 2013). For example, students with internal attribution style complete learning tasks earlier and have better academic performance (Carden et al., 2004; Houston, 2016). Conversely, students with procrastination have more obvious external attribution style than normal students (Janssen and Carton, 1999). This may be related to the fact that students with internal attribution style believe that academic success comes from their own working ability and effort, and thus they may have better learning input than their peers with external attribution style.

On the other hand, parenting style is an important influencing factor of children's causal attribution. For example, the study (Georgiou et al., 2016) found that students who often experience rough parental discipline or have a history of foster care had high scores on external attribution, and had problems such as being too sensitive or even aggressive in sexual behavior. However, students who often received parental care and understanding scored higher on internal attribution (Wischerth et al., 2016), which is more conducive to their psychology and health (Li et al., 2022). Besides, parents of children with higher internal attribution were more willing to promote their children's independence (Carton and Nowicki, 1994). Furthermore, a recent study (Li et al., 2022) found that good parent-child communication not only helps to bring encouragement, confidence and warmth to teenagers, but also helps them to form a positive attribution model to some extent, such as attributing their achievements to their internal factors-hard work. Conversely, overprotective, controlled and rejected parenting styles were significantly associated with the high external attribution (Cohen et al., 2008; Spokas and Heimberg, 2009).

> H2: Therefore, this study hypothesizes that causal attribution can be used as a mediating variable between parenting style and academic procrastination of nursing students.

1.3. Potential mediation of self-efficacy

Self-efficacy is defined as a belief in a person's ability to learn or perform behavior at a specific level. Bandura believes that self-efficacy can affect behavior through cognition, motivation, emotion and selectivity (Bandura, 1993). Specifically, high self-efficacy is conducive to promoting individuals' positive expectations for behavior results. In addition, it can inhibit procrastination by reducing the negative experience of individuals in the process of action. Likewise, self-efficacy also affects the level and persistence of personal efforts to tasks (Bandura, 1977, 1993). People with high self-efficacy are good at actively adapting or changing the environment, striving to overcome difficulties and persisting in tasks for a long time. Therefore, the tendency of academic procrastination is related to the perception of self-efficacy. Previous studies have found that self-efficacy can negatively predict academic procrastination (Klassen et al., 2008; Bakar and Khan, 2016). Furthermore, the results of meta-analysis show that self-efficacy was an important and stable predictor of academic procrastination.

According to social cognitive theory, the formation of self-efficacy is influenced by the expectation, guidance and social support of important people in life (Bandura, 1986), and positive parenting style is helpful to promote the development of individual self-efficacy. Compared with adolescents from autocratic or indulgent parenting styles, children from authoritative parenting styles have higher self-efficacy beliefs (Turner et al., 2009; Tam et al., 2012). Previous studies have found that negative parenting styles (such as autocracy, connivance or non-participation) are not conducive to the formation of children's self-guidance or self-regulation ability, but these abilities are the basis for the formation of children's strong self-efficacy and academic success (Diaz, 2005). On the contrary, teenagers who think their parents are warm, democratic and supportive tend to develop positive attitudes and beliefs, so they perform better academically (Hayek et al., 2022). In addition, Masud et al. (2016) found that self-efficacy mediated the relationship between authoritative parenting style and academic achievement.

> H3: Therefore, this study hypothesizes that self-efficacy may be the mediating variable between parenting style and academic procrastination.

1.4. Relationship between causal attribution and self-efficacy

Individual self-efficacy is also closely related to causal attribution. In attribution theory, the Weiner (1992) emphasizes that the attribution of behavioral success or failure affects its subsequent actions or expectations (such as self-efficacy). Self-efficacy enhanced if success was attributed to internal factors (i.e., effort or ability), but not if success was attributed to external factors (i.e., luck or opportunity) (Bandura, 1993). Bandura emphasized that the evaluation of past success or failure experience will affect self-efficacy, and then affect future performance, which depends on whether the evaluation of past success or failure experience is attributed to internal factors or external factors (Salanova et al., 2012). Previous studies have found that when positive attribution feedback is given, children's attribution to their own efforts and abilities will increase correspondingly, and their self-efficacy will enlarge correspondingly, while attributing failure to lack of ability will lead to a decline in self-efficacy. Therefore, an individual's perceived self-efficacy is influenced by his/her evaluation of the past (causal attribution) (Schunk, 1982). Further research shows that causal attribution can also influence motivation and performance through the mediating role of self-efficacy (Cheng and Chiou, 2010).

> H4: Therefore, this study hypothesizes that parenting patterns affect academic procrastination through the chain intermediary of causal attribution and self-efficacy.

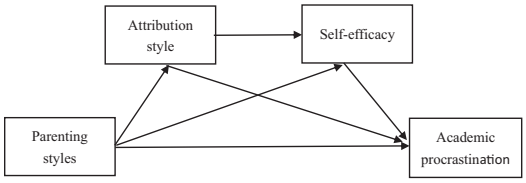

FIGURE 1
Hypothetical model.

Based on the above findings, we believe that causal attribution style and self-efficacy play a chain intermediary effect between parenting style and academic procrastination. Therefore, we put forward the hypothetical model of this study (**Figure 1**), so as to explore the influence of parenting style on academic procrastination, and investigate the role of causal attribution style and self-efficacy.

2. Materials and methods

2.1. Design and participants

A cross-sectional survey was conducted from March to May 2022. The sample of this study comes from nursing undergraduates aged 18–23 years in two four-year undergraduate colleges in Henan Province, China. Participants met the following inclusion criteria: (1) full-time undergraduate nursing students; (2) understand the purpose of the research and volunteer to participate in this study. Exclusion criteria: students who have not completed the questionnaire for various reasons. The final analytic sample included 719 participants, including 152 males (22.3%) and 531 females (77.7%), with an average age of (19.85 ± 1.15) years. Among all participants, more than half were from village and the only-child families accounted for 14.1%. In addition, nearly 90% of nursing students reported that their parents had a harmonious marital relationship in their families.

2.2. Procedure

This study was conducted in two undergraduate colleges from March to May 2022. The whole investigation process is organized orderly: first, communicate well with the school in advance; then, after thoroughly explaining the goal and significance of this study to nursing students, questionnaires were delivered to students who volunteered to participate in this study; Third, the questionnaire is short and easy to understand, and students are required to complete it within 15 min. Finally, after eliminating unqualified questionnaires, 683 valid questionnaires were obtained.

2.3. Measurements

2.3.1. General demographic data questionnaire

The general demographic information questionnaire assessed the characteristics of the participants, such as age, gender (male, female), residence (town, village), are you an only child? (Yes, no), parent's marital relations (harmonious, non-harmonious).

2.3.2. Parental bonding instrument (PBI)

We used PBI developed by Parker et al. (2011) to measure the parenting style of parents. PBI is a self-rating scale to evaluate the parents' attitudes and behaviors of participants in childhood. This study used the Chinese version of the PBI scale revised by Hong-jun et al. (2009), with a total of 46 items and 3 factors: care, encourage independence and control. A 4-point Likert scale was used to score each item. Furthermore, in this study, the dimensions of care and encouraging independence were classified as positive parenting style, while the dimension of control was classified as negative parenting style. In previous studies, the Cronbach's α of the three dimensions of the Chinese version of PBI scale was 0.736–0.848 (Gao and Zhou, 2011), and it also had good validity (Jiang et al., 2009). In the present study, the Cronbach's α for the positive and negative parenting dimensions were 0.904 and 0.748, respectively.

2.3.3. The multidimensional-multiattributional causality scale (MMCS)

The MMCS, compiled by Lefcourt et al. (1979) and widely utilized in the research of motivation cognition theory, was used to assess the attribution style of nursing undergraduates. Studies have shown that MMCS scale is suitable for college students (Li et al., 2015; Kong et al., 2016), and it evaluates students' attribution style from two aspects: academic achievement (24 items) and interpersonal relationship (24 items). In addition, the scale proposed four possible attributions: ability, effort, context, and luck attribution, in which ability and effort belong to internal-controlled attribution, and luck and context belong to external-controlled attribution. Since academic procrastination is mainly related to academic achievement, this study only focuses on the academic achievement part (24 items). Each item was scored with Likert scale of 5 (0 = disagree, 4 = agree). Cronbach's α of this scale is 0.815. Additionally, it also has good structural validity (Powers and Rossman, 1983) and convergent validity (Powers et al., 1985). In this study, the Cronbach's α of the scale is 0.750.

2.3.4. General self-efficacy scale (GSEC)

GSEC is used to measure a person's sense of efficacy in coping with everyday situations and adapting to stressful life events (Schwarzer and Jerusalem, 1995). A total of 10 entries were each scored using 4-point Likert, and higher scores indicating higher self-efficacy. The Cronbach's α was 0.871 in this study.

2.3.5. Aitken procrastination inventory (API)

The API is a self-rating scale designed by Aitken (1982) in 1982, which is used to evaluate long-term persistent procrastination among college students. It consists of 19 items, of which 9 topics are scored backwards. The scale adopts five-point scoring method, and the higher the score, the more serious the students' procrastination behavior. The reliability and validity of the Chinese version of the scale in Chinese college students are in line with psychometric criteria (Xiaoli et al., 2008). In this sample, the Cronbach's α of the scale is 0.852.

2.4. Statistical analysis

Statistical analysis was performed using IBM SPSS statistics 25.0 and Amos26.0. First, the mean and standard deviation were used to describe participants' scores of Parenting styles, causal attribution, self-efficacy and academic procrastination. Second, we used Harman's single factor test to test the common method bias from self-reported data. Thirdly, all continuous variables are tested for normality. If the data was normally distributed, we used Pearson correlation analysis to test the correlation between variables. Otherwise, Spearman correlation analysis was used. Finally, AMOS26.0 was used to construct structural equation model for mediating effect test. The threshold for all variables' significance was set at $\alpha = 0.05$. In accordance with the mediation effect test procedure (Wen and Ye, 2014), we estimated structural model with maximum likelihood method and used χ^2/df comparative fitting index (CFI), goodness of fit index (GFI), Tucker-Lewis index (TLI), increasing fitting index (IFI), approximated root mean square error (RMSEA) to estimate the fitting degree of the model. For large sample sizes, the threshold value of χ^2/df is between 3 and 5 were acceptable (Lefcheck, 2016). Furthermore, we used CFI > 0.90, GFI > 0.9, TLI > 0.9, IFI > 0.9, and RMSEA < 0.08 as an indicator for acceptable fit between models (Hu and Bentler, 1999; Byrne, 2016). Then, we used the bootstrapping method to test for indirect effects. This method has the advantage that it can still be used when the data does not obey the normal distribution (Hayes and Preacher, 2010). In bootstrapping, if the 95% confidence interval of the standardized path coefficient does not contain 0, the mediation effect is significant.

2.5. Ethics statement

This research has been approved by XXX (ID number: 20220107001). Before starting this investigation, the participants signed the informed consent form, and were told that they could choose not to participate. In order to ensure anonymity, we did not collect student names or other identifiers.

3. Results

3.1. Common method bias test

With data collected through self-report, common methodological bias problems may arise in this study (Podsakoff et al., 2003). Even if necessary control is carried out in the measurement process, for example, participants fill in the report anonymously and some questions are expressed in reverse (Hao, 2004). To ensure the rigor of this study, Harman's single factor test was used to test for common method bias. Results showed a total of 25 factors with eigenvalues greater than 1, explaining 60.7% of the variance, with the first factor explaining a variance of 15.3%, much less than the threshold value of 40% (Podsakoff et al., 2003). Thus, there is no serious common method bias in this study.

3.2. Correlation analysis of parenting style, causal attribution, self-efficacy, and academic procrastination

Table 1 shows the average and standard deviation of parenting style, causal attribution, self-efficacy and academic procrastination scores, and correlation coefficient between among the variables. Pearson correlation analysis showed that SE was positively associated with IA ($r = 0.381$, $p < 0.01$) and negatively associated with EA ($r = -0.377$, $p < 0.01$). Furthermore, we also found a significant negative relationship between AP and PPS, IA, and SE ($r = -0.350$, $p < 0.01$; $r = -0.349$, $p < 0.01$; $r = -0.454$, $p < 0.01$), and a significant positive relationship with NPS and EA ($r = 0.402$, $p < 0.01$; $r = 0.447$, $p < 0.01$).

3.3. Measuring model

Validating factor analyses were needed to test the measurement model prior to testing for mediating effects. We developed a measurement model with 4 latent variables (parenting style, attributional style, self-efficacy, and academic procrastination) and 24 observed variables. We determined that the measurement model developed was a good fit [χ^2 (161) = 577.931; GFI = 0.925, CFI = 0.915; NFI = 0.886; SRMR = 0.044; RMSEA = 0.062]. In addition, we found that all observed standardized loadings of each indicator on the corresponding factors were significant ($p < 0.05$ between 0.310 and 0.618).

According to the previous theoretical basis and the results of the correlation matrix, the parenting style is used as the independent variable of this study, the academic procrastination style is used as the dependent variable, and the causal attribution and self-efficacy are used as the mediating variables to construct the model. According to two paths: positive parenting style → internal attribution → self-efficacy → academic procrastination and negative parenting style → external attribution → self-efficacy → academic procrastination, we constructed 2 latent variable mediation models.

3.4. The mediating effect of causal attribution and self-efficacy

3.4.1. Mediating analysis of internal attribution and self-efficacy between positive parenting styles and academic procrastination

The model (standardized path coefficient) mediated by internal attribution and self-efficacy is shown in Figure 2. The model 1 fits well: χ^2/df = 4.910 < 5, CFI = 0.980, GFI = 0.988, AGFI = 0.950, TLI = 0.939, IFI = 0.980, and RMSEA = 0.08. Positive parenting styles positively predicted internal attribution and self-efficacy, and negatively predicted academic procrastination ($\beta = 0.56$, $P < 0.001$; $\beta = 0.24$, $P < 0.01$; $\beta = -0.19$, $P < 0.05$); Internal attribution positively predicted self-efficacy ($\beta = 0.32$, $P < 0.001$); Internal attribution and self-efficacy both negatively predicted academic procrastination ($\beta = -0.18$, $P < 0.01$; $\beta = -0.23$, $P < 0.01$). Using ML

TABLE 1 Descriptive statistics and correlations between study variables (N = 683).

Variable	Mean ± SD	1	2	3	4	5	6
PPS	1.97 ± 0.42	1					
NPS	1.42 ± 0.46	−0.550**	1				
IA	3.36 ± 0.49	0.383**	−0.319**	1			
EA	2.94 ± 0.58	−0.300**	0.319**	0.040	1		
SE	2.72 ± 0.61	0.342**	−0.323**	0.381**	−0.377**	1	
AP	2.81 ± 0.60	−0.350**	0.402**	−0.349**	0.447**	−0.454	1

M, mean; SD, standard deviation; PPS, positive parenting style; NPS, negative parenting style; IA, internal attribution; EA, external attribution; SE, self-efficacy; AP, academic procrastination. **$P < 0.01$.

method to test the mediating effect, the 95% CI of each mediating path does not contain 0, and the mediating effect is significant (Table 2). Internal attribution and self-efficacy accounted for 45.34% of the total effect, and played a partial mediating role.

3.4.2. Mediating analysis of external attribution and self-efficacy between negative parenting styles and academic procrastination

The model (standardized path coefficient) mediated by external attribution and self-efficacy is shown in Figure 3. Model 2 fits well: $\chi^2/df = 4.261 < 5$, CFI = 0.992, GFI = 0.995, AGFI = 0.963, TLI = 0.962, IFI = 0.992, and RMSEA = 0.069. Negative parenting styles positively predicted external attribution and academic procrastination; and negatively predicted self-efficacy ($\beta = 0.36$, $P < 0.001$; $\beta = 0.20$, $P < 0.001$; $\beta = -0.19$, $P < 0.001$); External attribution negatively predicted self-efficacy ($\beta = -0.36$, $P < 0.001$); External attribution positively predicted academic procrastination ($\beta = 0.32$, $P < 0.001$) and self-efficacy negatively predicted academic procrastination ($\beta = -0.25$, $P < 0.001$). Using ML method to test the mediating effect, the 95% CI of each mediating path does not contain 0, and the mediating effect is significant (Table 2). External attribution and self-efficacy accounted for 50.00% of the total effect, and played a partial mediating role.

4. Discussion

4.1. Influence of parenting styles on academic procrastination

This study showed that positive and negative parenting styles can negatively and positively predict academic procrastination of nursing undergraduates respectively **(Hypothesis 1)**. This suggests that the more parents care and encourage nursing students, the more likely they are to actively participate in learning and have less academic procrastination, while nursing students who experience negative parenting style are opposite. This is consistent with existing research (Chen et al., 2015; Won and Yu, 2018). Parenting style, as an integral part of the family micro-system, has a significant impact on teens' personality, behavior, attitude, and many other aspects (Thimm, 2010; Jones et al., 2012), while academic procrastination, as a behavior attitude, is also affected by the family environment, especially parenting style (Luo Yun and Zhenhong, 2016). Authoritarian parenting style, such as strict control and supervision, neglecting children's attitudes, is not conducive to the formation of individual healthy psychology, hinders individual personality development, and easily lead to academic procrastination (Zakeri et al., 2013). Especially in East Asia, parents are strict with their children's academic performance and control their children seriously (Pomerantz and Wang, 2009). Students who are excessively interfered and controlled by their parents have low adaptability and are more likely to feel frustrated and helpless (Won and Yu, 2018). In addition, it is easy to have a negative attitude toward study, and even a rebellious attitude, which is manifested as academic procrastination. In contrast, students living in a warm and constructive family atmosphere tend to gain understanding and support and face difficulties and setbacks in learning with a positive attitude, resulting in less academic procrastination (Vahedi et al., 2009).

4.2. Mediating effect of causal attribution

This study found that positive parenting style not only negatively affects learning procrastination directly, but also indirectly negatively affects academic procrastination through the mediating effect of internal attribution. To the contrary, negative parenting style not only directly and positively affects academic procrastination, but also indirectly positively affects academic procrastination through the mediating effect of external attribution (**Hypothesis 2**). This indicates that positive parenting style is beneficial to develop students' internal attribution style, making them believe that personal efforts and abilities are related to learning success or failure, so as to actively engage in learning and reduce academic procrastination. However, negative parenting style easily led to the formation of students' external attribution, which makes them think that academic success or failure depends on external factors (e.g., luck, opportunity), and lacks learning motivation, resulting in academic procrastination. Causal attribution is mainly restricted by external environmental factors, of which the family environment is especially important for individual cognitive development (Li and Qian, 2002). For example, Chinese adolescents with less parental attention and more rejection and punishment by their parents reported more negative attribution styles (Xu, 2000). Besides, encouraging independent parenting will promote children's independent development and form a high internal attribution. However, negative parenting

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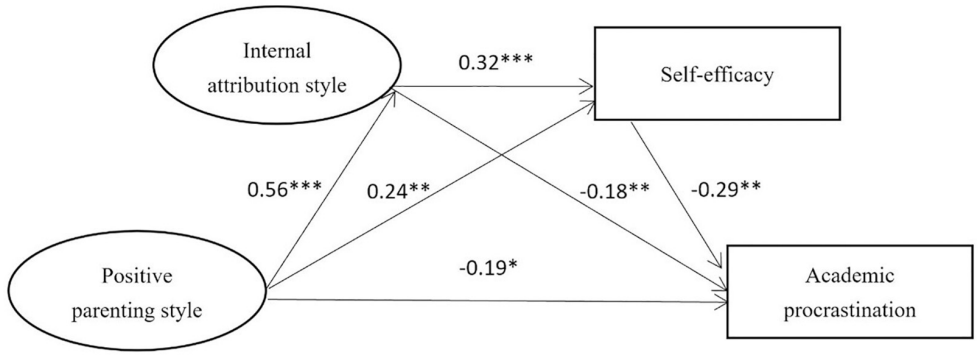

FIGURE 2
The model of internal attribution style and self-efficacy as mediators between positive parenting style and academic procrastination. *, **, *** denotes $p < 0.05$, $p < 0.01$, $p < 0.001$, respectively.

TABLE 2 Bootstrap analysis of the mediating model.

	Effect	Path	Effect	Bootstrap SE	95% CI	Relative mediating effect (%)
Model 1	Total	PPS → AP	−0.41			
	Direct	PPS → AP	−0.19	0.06	−0.30, −0.08	46.34
	Indirect	PPS → IA → AP	−0.10	0.03	−0.18, −0.04	24.39
		PPS → SE → AP	−0.07	0.02	−0.11, −0.03	17.07
		PPS → IA → SE → AP	−0.05	0.01	−0.09, −0.03	12.20
Model 2	Total	NPS → AP	0.40			
	Direct	NPS → AP	0.20	0.04	0.12, 0.28	50.00
	Indirect	NPS → EA → AP	0.12	0.02	0.07, 0.17	30.00
		NPS → SE → AP	0.05	0.01	0.03, 0.08	12.50
		NPS → EA → SE → AP	0.03	0.01	0.02, 0.05	7.50

PPS, positive parenting style; IA, internal attribution; SE, self-efficacy; AP, academic procrastination; PPS, positive parenting style; EA, external attribution.

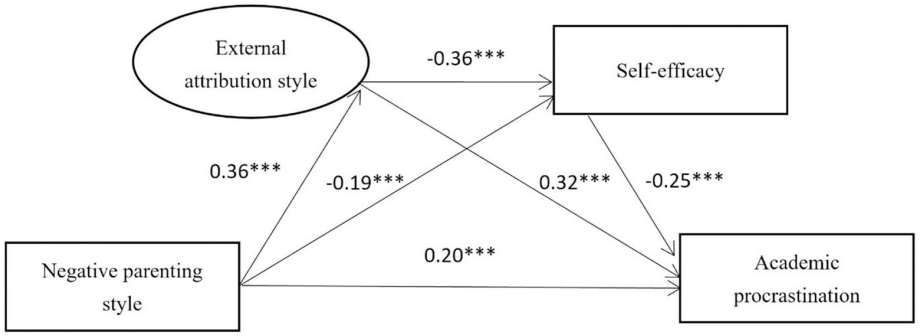

FIGURE 3
The model of external attribution style and self-efficacy as mediators between negative parenting style and academic procrastination. *** indicates $p < 0.001$.

styles, such as doting and controlling, will keep children in a restricted state for a long time, like to be controlled by others and easily form external attribution style (Keshavarz et al., 2014). Additionally, the attribution style reflects the students' self-perception and can influence their expectations and beliefs about their abilities, and subsequently manipulate their behavioral motivation (Badri Gargari et al., 2011). For instance, Brownlow et al. (Brownlow and Reasinger, 2012) found that highly procrastinating undergraduates attribute test-taking success to external, erratic factors and see themselves as contributing little to academic achievement. However, low-procrastinators are prone to attribute their academic success to effort. In this study, attribution style, as a cognitive style, mediated the relationship between parenting style and nursing undergraduates' academic procrastination: it was not only affected by parenting style, but also significantly predicted students' academic procrastination level.

4.3. Mediating effect of self-efficacy

Further research in this study found that, besides causal attribution, self-efficacy also partially mediated the impact of parenting style on academic procrastination **(Hypothesis 3)**. Specifically, higher self-efficacy was related to lower academic procrastination, which was consistent with earlier findings (Klassen et al., 2008). Self-efficacy plays a significant role in individual psychology, which will have a huge impact on individual behavior, beliefs, and achievements, and can promote individual mental health (Abdel-Khalek and Lester, 2017). It is difficult to avoid setbacks and pressures in the process of completing their studies. High self-efficacy students have stronger anti-interference ability and are less negatively affected when faced with high pressure and anxiety. Therefore, students with high self-efficacy have good faith in completing academic tasks (Chow, 2011), thus reducing the tendency to procrastinate. However, students with low self-efficacy will fall into a vicious cycle of procrastination in their study (Waschle et al., 2014). Therefore, cultivating students' self-efficacy is an important way to improve their learning input and reduce academic procrastination.

4.4. Chain mediation effect between causal attribution and self-efficacy

Some researchers have suggested that causal attribution can indirectly influence learning attitudes and behaviors by affecting self-efficacy. Feedback that attributes success or failure to internal factors (e.g., effort) can increase students' self-efficacy, while conversely attributing failure to external factors (e.g., task difficulty) results in lower expectations for the future (Schunk, 1982; Su et al., 2021). This statement is supported by this study. This study found that causal attribution was strongly correlated with self-efficacy, which constitute the intermediate link of positive(negative) parenting style → internal attribution (external attribution) → self-efficacy → academic procrastination **(Hypothesis 4)**. Self-efficacy and attribution theorists believe that learners' self-efficacy level and their attribution style of success and failure will affect their efforts and persistence, and ultimately motivation and achievement (Bandura, 1986; Weiner, 2000), so some types of attribution may be better. A previous study found that nursing students who are accustomed to more ability attribution and effort attribution have a positive attitude toward their careers, and think they have the ability to change the unfavorable career environment (Kong et al., 2016). Thus, the best attribution for causing adaptive behavior is to attribute academic procrastination to self-internal factors. In this way, nursing students usually think that they should be held accountable for event outcomes, thus actively increasing their investment in learning and helping to improve their professional confidence. Therefore, it is necessary for nursing educators to conduct attribution training (Hall et al., 2007) for nursing students with academic procrastination, and should focus on cultivating their ability attribution and effort attribution.

4.5. Limitations and future directions

This study has some limitations. First, this study was only conducted among undergraduate nursing students in 2 universities in Henan Province, China, which may limit the generalizability of the results. Secondly, this study is a cross-sectional study, which only examines the relationship between variables at a certain time point, and cannot infer a clear causal relationship. Third, the data collection adopts the way of self-reporting, and the results may have subjective deviation. It is suggested that a multi-center longitudinal study can be carried out in future research, and a variety of evaluation methods can be combined, such as combining self-evaluation with peer evaluation, teacher or parent evaluation, to further explore the mechanism of action among variables, so as to clarify the reasons for academic procrastination of nursing undergraduates.

5. Conclusion

This study investigated the parenting styles, attribution style, self-efficacy, and academic procrastination of undergraduate nursing students. In this study, a chain mediation model was constructed from the perspective of individual psychological quality to explore the process and mechanism of parenting style affecting the academic procrastination of nursing undergraduates. This study found that parenting styles can directly predict the academic procrastination of undergraduate nursing students, with a significant negative relationship between positive parenting style and academic procrastination, and that between negative parenting style and academic procrastination. Furthermore, parenting styles can also indirectly predict undergraduate nursing students' academic procrastination through mediation of attribution style and self-efficacy. Attribution style and self-efficacy can influence the relationship separately, and they can also act as chain intermediaries. This result not only enriches the theoretical explanation and empirical evidence of the procrastination mechanism, but also provides more options for substantive intervention in undergraduate nursing students' academic procrastination.

6. Implications

The results of this study have some implications for nursing student education. First of all, the effect of positive parenting on academic procrastination of nursing undergraduates suggests that parents should pay attention to parenting methods, avoid using negative methods (such as control, rejection and negation), and adopt more positive parenting methods (such as caring, understanding and encouragement) to interact with students, so as to promote their learning input and reduce academic procrastination. Secondly, attribution style and self-efficacy of nursing students play a chain intermediary role between parenting styles and academic procrastination. It is suggested that educators should change students' attribution style in the teaching process, cultivate students' belief in self-control of

academic procrastination, and enhance students' self-confidence in solving learning difficulties, thus effectively reducing academic procrastination. Although attribution styles are relatively stable, it still has a certain plasticity. Nursing teachers can guide students to form adaptive attribution styles through attribution training, deepen their awareness and beliefs about academic failure and success, and help to reduce students' stigma and negative emotions about academic procrastination to improve their motivation for future achievement.

Data availability statement

The original contributions presented in this study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by the Review Committee of Psychological Research Ethics Review Organization of Henan Key Laboratory of Psychology and Behavior (ID number: 20220107001). The patients/participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

YL and WD were responsible for the study design and critical revision of the manuscript. YL wrote the first draft of the manuscript. WD, HT, XG, SW, and CC were responsible for analysis and interpretation of data. GL provided the statistical expertise. CC directed all the work. All authors have read and agreed to the published version of the manuscript.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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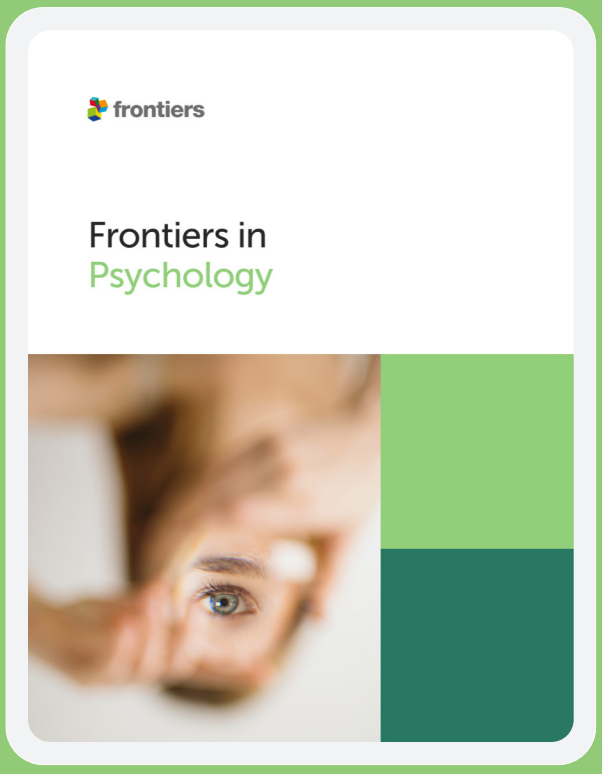

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